TEACHERS SERVICE COMMISSION

OPEN NATIONAL TENDERING

THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTITIONING WORKS ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI

TSC/T/021/2019-2020

Teachers Service Commission

Upper Hill, Kilimanjaro Road,

Private Bag, 00100

Nairobi

Email: info@tsc.co.ke

Website: http//www.tsc.go.ke
ddprocurement@tsc.go.ke

CLOSING DATE: WEDNESDAY 5TH SEPTEMBER, 2019 AT 9.00 AM

INVITATION TO TENDER:

TENDER REF No: TSC/T/021/2019-2020

TENDER NAME: THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTITIONING WORKS ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI

The Teachers Service Commission invites sealed bids from eligible candidates, **THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTITIONING WORKS ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI**

Invited candidates ONLY may obtain further information from and inspect the tender documents at TSC House, Kilimanjaro Road, Upper Hill, Private Bag, Nairobi, Supply Chain Management Services, 2nd floor Podium Wing during normal working hours.

Interested eligible candidates may obtain further information and inspect the tender documents from Supply Chain Management Section, 2nd Floor Podium Wing, Teachers Service Commission House, Kilimanjaro Road Upper Hill during normal office working hours.

A complete set of tender documents may be obtained by interested candidates upon payment of a nonrefundable fee of **Kshs.1, 000.00** payable to **The Secretary, Teachers Service Commission at National Bank Account No. 01001000905000, Harambee Avenue Branch or Bankers Cheque and present the bank slip to TSC cash office for an official receipt**. The Tender documents may also be downloaded from TSC website (www.tsc.go.ke) or www.tenders.go.ke Tender documents downloaded from the website free of charge.

Prices quoted should be net inclusive of all taxes, and delivery costs, must be in Kenya Shillings and shall remain valid for 120 days from the closing date of the tender.
Completed tender documents are to be enclosed in plain sealed envelopes, marked with the tender number and name and be deposited in the Tender Box at TSC House Podium Wing, Main Reception Ground Floor or be addressed to The Secretary, Teachers Service Commission, P.O Box -00100, Nairobi so as to be received on or before **Thursday 5TH SEPTEMBER, 2019 at 9.00am.**

Tenders must be accompanied by a Tender Security of 2% of the tender value in form of a guarantee from a reputable bank or from an insurance company approved by PPRA (formerly TSC), payable to the Commission Secretary Teachers Service Commission. The tender security should remain valid for 150 days after the date of tender opening.

Tenders will be opened immediately thereafter in the presence of the candidate's representatives who choose to attend at Teachers Service Commission House, 3rd Floor Podium Wing. 1.7 Interested bidders are requested to attend a site meeting on 22nd July, 2019 at 9.00 am at TSC office. Interested bidders are requested to attend a **Pre-Bid Conference meeting on Wednesday 28 AUGUST 2019 AT 9.00 am** at TSC Headquarter.

Architectural drawings and design will be provided during the site visit meeting.

SECRETARY/ CHIEF EXECUTIVE

INSTRUCTIONS TO TENDERERS

TABLE OF CONTENTS

INSTRUCTIONS TO TENDERERS.

1. General/Eligibility/Qualifications/Joint venture/Cost of tendering

1.1 The Employer as defined in the Appendix to Conditions of Contract invites tenders for Works Contract as described in the tender documents. The successful tenderer will be expected to complete the Works by the Intended Completion Date specified in the tender documents.

1.2 All tenderers shall provide the Qualification Information, a statement that the tenderer (including all members of a joint venture and subcontractors) is not associated, or has not been associated in the past, directly or indirectly, with the Consultant or any other entity that has prepared the design, specifications, and other documents for the project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the Works, and any of its affiliates, shall not be eligible to tender.

1.3 All tenderers shall provide in the Form of Tender and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary.

1.4 In the event that pre-qualification of potential tenderers has been undertaken, only tenders from pre-qualified tenderers will be considered for award of Contract. These qualified tenderers should submit with their tenders any information updating their original pre-qualification applications or, alternatively, confirm in their tenders that the originally submitted pre-qualification information remains essentially correct as of the date of tender submission.

1.5 Where no pre-qualification of potential tenderers has been done, all tenderers shall include the following information and documents with their tenders, unless otherwise stated:

(a) copies of original documents defining the constitution or legal status, place of registration, and principal place of business; written power of attorney of the signatory of the tender to commit the tenderer:

(b) total monetary value of construction work performed for each of the last five years:

(c) experience in works of a similar nature and size for each of the last five years, and details of work under way or contractually committed; and names and addresses of clients who may be contacted for further information on these contracts;

(d) major items of construction equipment proposed to carry out the Contract and an undertaking that they will be available for the Contract.

(e) qualifications and experience of key site management and technical personnel proposed for the Contract and an undertaking that they shall be available for the Contract.

(f) reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the past five years;

(g) evidence of adequacy of working capital for this Contract (access to line(s) of credit and availability of other financial resources);

(h) authority to seek references from the tenderer's bankers;

(i) information regarding any litigation, current or during the last five years, in which the tenderer is involved, the parties concerned and disputed amount; and

(j) proposals for subcontracting components of the Works amounting to more than 10 percent of the Contract Price.

1.6 Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements, unless otherwise stated:

(a) the tender shall include all the information listed in clause 1.5 above for each joint venture partner;

(b) the tender shall be signed so as to be legally binding on all partners;

(c) all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;

(d) one of the partners will be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of all partners of the joint venture; and

(e) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

1.7 To qualify for award of the Contract, tenderers shall meet the following minimum qualifying criteria;

(a) annual volume of construction work of at least 2.5 times the estimated annual cash flow for the Contract;

(b) experience as main contractor in the construction of at least

(c) two works of a similar nature and complexity equivalent to the Works over the last 10 years (to comply with this requirement, works cited should be at least 70 percent complete);

(d) proposals for the timely acquisition (own, lease, hire, etc.) of the essential equipment listed as required for the Works;

(e) a Contract manager with at least five years' experience in works of an equivalent nature and volume, including no less than three years as Manager; and

(f) liquid assets and/or credit facilities, net of other contractual commitments and exclusive of any advance payments which may be made under the Contract, of no less than 4 months of the estimated payment flow under this Contract.

1.8 The figures for each of the partners of a joint venture shall be added together to determine the tenderer's compliance with the minimum qualifying criteria of clause 1.7 (a) and (e); however, for a joint venture to qualify, each of its partners must meet at least 25 percent of minimum criteria 1.7 (a), (b) and (e) for an individual tenderer, and the partner in charge at least 40 percent of those minimum criteria. Failure to comply with this requirement will result in rejection of the joint venture's tender. Subcontractors' experience and resources will not be taken into account in determining the tenderer's compliance with the qualifying criteria, unless otherwise stated.

1.9 Each tenderer shall submit only one tender, either individually or as a partner in a joint venture. A tenderer who submits or participates in more than one tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the tenderer's participation to be disqualified.

1.10 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.

1.11 The tenderer, at the tenderer's own responsibility and risk, is encouraged to visit and examine the Site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the tenderer's own expense.

1.12 The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender.

1.13 The price to be changed for the tender document shall not exceed Kshs. 1,000/=

1.14 The procuring entity shall allow the tenderer to review the tender document free of charge before purchase.

2. Tender Documents

2.1 The complete set of tender documents comprises the documents listed below and any addenda issued in accordance with Clause 2.4.

(a) These Instructions to Tenderers
(b) Form of Tender and Qualification Information
(c) Conditions of Contract
(d) Appendix to Conditions of Contract
(e) Specifications
(f) Drawings
(g) Bills of Quantities
(h) Forms of Securities

2.2 The tenderer shall examine all Instructions, Forms to be filled and Specifications in the tender documents. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the tendering documents in every respect will be at the tenderer's risk and may result in rejection of his tender.

2.3 A prospective tenderer making an inquiry relating to the tender documents may notify the Employer in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. The Employer will only respond to requests for clarification received earlier than seven days prior to the deadline for submission of tenders. Copies of the Employer's response will be forwarded to all persons issued with tendering documents, including a description of the inquiry, but without identifying its source.

2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents by issuing addenda. Any addendum thus issued shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all tenderers. Prospective tenderers shall acknowledge receipt of each addendum in writing to the Employer.

2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders, in accordance with Clause 4.2 here below.

3. Preparation of Tenders

3.1 All documents relating to the tender and any correspondence shall be in English language.

3.2 The tender submitted by the tenderer shall comprise the following:

(a) These Instructions to Tenderers, Form of Tender, Conditions of Contract, Appendix to Conditions of Contract and Specifications;
(b) Tender Security;
(c) Priced Bill of Quantities;
(d) Qualification Information Form and Documents;
(e) Alternative offers where invited; and
(f) Any other materials required to be completed and submitted by the tenderers.

3.3 The tenderer shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause relevant to the Contract, as of 30 days prior to the deadline for submission of tenders, shall be included in the tender price submitted by the tenderer.

3.4 The rates and prices quoted by the tenderer shall only be subject to adjustment during the performance of the Contract if provided for in the Appendix to Conditions of Contract and provisions made in the Conditions of Contract.

3.5 The unit rates and prices shall be in Kenya Shillings.

3.6 Tenders shall remain valid for a period of sixty (60) days from the date of submission. However, in exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting the Tender Security. A tenderer agreeing to the request will not be required or permitted to otherwise modify the tender, but will be required to extend the validity of Tender Security for the period of the extension, and in compliance with Clause 3.7 - 3.11 in all respects.

3.7 The tenderer shall furnish, as part of the tender, a Tender Security in the amount and form specified in the appendix to invitation to tenderers. This shall be in the amount not exceeding 2 percent of the tender price

3.8 The format of the Tender Security should be in accordance with the form of Tender Security included in Section G - Standard forms or any other form acceptable to the Employer. Tender Security shall be valid for 30 days beyond the validity of the tender.

3.9 Any tender not accompanied by an acceptable Tender Security shall be rejected. The Tender Security of a joint venture must define as "Tenderer" all joint venture partners and list them in the following manner: a joint venture consisting of" ……"," ……", and "……".

3.10 The Tender Securities of unsuccessful tenderers will be returned within 28 days of the end of the tender validity period specified in Clause 3.6.

3.11 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Contract Agreement and furnished the required Performance Security.

3.12 The Tender Security may be forfeited

(a) if the tenderer withdraws the tender after tender opening during the period of tender validity;

(b) if the tenderer does not accept the correction of the tender price, pursuant to Clause 5.7;

(c) in the case of a successful tenderer, if the tenderer fails within the specified time limit to

(i) sign the Agreement, or

(ii) furnish the required Performance Security.

3.13 Tenderers shall submit offers that comply with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. Alternatives will not be considered, unless specifically allowed in the invitation to tender. If so allowed, tenderers wishing to offer technical alternatives to the requirements of the tendering documents must also submit a tender that complies with the requirements of the tendering documents, including the basic technical design as indicated in the Drawings and Specifications. In addition to submitting the basic tender, the tenderer shall provide all information necessary for a complete evaluation of the alternative, including design calculations, technical specifications, breakdown of prices, proposed construction methods and other relevant details. Only the technical alternatives, if any, of the lowest evaluated tender conforming to the basic technical requirements shall be considered.

3.14 The tenderer shall prepare one original of the documents comprising the tender documents as described in Clause 3.2 of these Instructions to Tenderers, bound with the volume containing the Form of Tender, and clearly marked "ORIGINAL". In addition, the tenderer shall submit copies of the tender, in the number specified in the invitation to tender, and clearly marked as "COPIES". In the event of discrepancy between them, the original shall prevail.

3.15 The original and all copies of the tender 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, pursuant to Clause 1.5 (a) or 1.6 (b), as the case may be. All pages of the tender where alterations or additions have been made shall be initialed by the person or persons signing the tender.

3.16 Clarification of tenders shall be requested by the tenderer to be received by the procuring entity not later than 7 days prior to the deadline for submission of tenders.

3.17 The procuring entity shall reply to any clarifications sought by the tenderer within 3 days of receiving the request to enable the tenderer to make timely submission of its tender.

3.18 The tender security shall be in the amount of 0.5 – 2 per cent of the tender price.

4. Submission of Tenders

4.1 The tenderer shall seal the original and all copies of the tender in two inner envelopes and one outer envelope, duly marking the inner envelopes as "**ORIGINAL**" and "**COPIES**" as appropriate. The inner and outer envelopes shall:

(a) be addressed to the Employer at the address provided in the invitation to tender;

(b) bear the name and identification number of the Contract as defined in the invitation to tender; and

(c) provide a warning not to open before the specified time and date for tender opening.

4.2 Tenders shall be delivered to the Employer at the address specified above not later than the time and date specified in the invitation to tender. However, the Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Sub-Clause 2.5 in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.

4.3 Any tender received after the deadline prescribed in clause 4.2 will be returned to the tenderer un-opened.

4.4 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in clause 4.2. Each tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with clause 3.13 and 4.1, with the outer and inner envelopes additionally marked "**MODIFICATION** "and "**WITHDRAWAL**", as appropriate. No tender may be modified after the deadline for submission of tenders.

4.5 Withdrawal of a tender between the deadline for submission of tenders and the expiration of the period of tender validity specified in the invitation to tender or as extended pursuant to Clause 3.6 may result in the forfeiture of the Tender Security pursuant to Clause 3.11.

4.6 Tenderers may only offer discounts to, or otherwise modify the prices of their tenders by submitting tender modifications in accordance with Clause 4.4 or be included in the original tender submission.

5. Tender Opening and Evaluation

5.1 The tenders will be opened by the Employer, including modifications made pursuant to Clause 4.4, in the presence of the tenderers' representatives who choose to attend at the time and in the place specified in the invitation to tender. Envelopes marked "**WITHDRAWAL**" shall be opened and read out first. Tenderers' and Employer's representatives who are present during the opening shall sign a register evidencing their attendance.

5.2 The tenderers' names, the tender prices, the total amount of each tender and of any alternative tender (if alternatives have been requested or permitted), any discounts, tender modifications and withdrawals, the presence or absence of Tender Security, and such other details as may be considered appropriate, will be announced by the Employer at the opening. Minutes of the tender opening, including the information disclosed to those present will be prepared by the Employer.

5.3 Information relating to the examination, clarification, evaluation, and comparison of tenders and recommendations for the award of Contract shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced. Any effort by a tenderer to influence the Employer's officials, processing of tenders or award decisions may result in the rejection of his tender.

5.4 To assist in the examination, evaluation, and comparison of tenders, the Employer at his discretion, may ask any tenderer for clarification of the tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, telex or facsimile 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 arithmetic errors discovered in the evaluation of the tenders in accordance with Clause 5.7.

5.5 Prior to the detailed evaluation of tenders, the Employer will determine whether each tender (a) meets the eligibility criteria defined in Clause 1.7;(b) has been properly signed; (c) is accompanied by the required securities; and (d) is substantially responsive to the requirements of the tendering documents. A substantially responsive tender is one which conforms to all the terms, conditions and specifications of the tendering documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the works; (b) which limits in any substantial way, inconsistent with the tendering documents, the Employer's rights or the tenderer's

obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.

5.6 If a tender is not substantially responsive, it will be rejected, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

5.7 Tenders determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:

(a) where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and

(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 the adjustment will be made to the entry containing that error.

(c) 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 Bill of Quantities, the amount as stated in the Form of Tender shall prevail.

(d) The Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Work (i.e. Corrected tender sum less P.C. and Provisional Sums)

(e) The Error Correction Factor shall be applied to all Builder's Work (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

(f) 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 3.11.

5.8 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with Clause 5.5.

5.9 In evaluating the 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 5.7;

(b) excluding provisional sums and the provision, if any, for contingencies in the Bill of Quantities, but including Day works where priced competitively.

(c) making an appropriate adjustment for any other acceptable variations, deviations, or alternative offers submitted in accordance with clause 3.12; and

(d) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with clause 4.6

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

5.11 The tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.

5.12 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 an non-indigenous sub-contractor.

6. Award of Contract

6.1 Subject to Clause 6.2, the award of the Contract will be made to the tenderer whose tender has been determined to be substantially responsive to the tendering documents and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be (a) eligible in accordance with the provision of Clauses 1.2, and (b) qualified in accordance with the provisions of clause 1.7 and 1.8.

6.2 Notwithstanding clause 6.1 above, the Employer reserves the right to accept or reject any tender, and to cancel the tendering process and reject all tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the action.

6.3 The tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by cable, telex or facsimile. This notification (hereinafter and in all Contract documents called the “Letter of Acceptance”) will state the sum (hereinafter and in all Contract documents called the “Contract Price”) that the Employer will pay the Contractor in consideration of

the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract. At the same time the other tenderers shall be informed that their tenders have not been successful.

The contract shall be formed on the parties signing the contract.

6.4 The Agreement will incorporate all agreements between the Employer and the successful tenderer. Within 14 days of receipt the successful tenderer will sign the Agreement and return it to the Employer.

6.5 Within 21 days after receipt of the Letter of Acceptance, the successful tenderer shall deliver to the Employer a Performance Security in the amount stipulated in the Appendix to Conditions of Contract and in the form stipulated in the Tender documents. The Performance Security shall be in the amount and specified form

6.6 Failure of the successful tenderer to comply with the requirements of clause 6.5 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.

6.7 Upon the furnishing by the successful tenderer of the Performance Security, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful.

6.8 Preference where allowed in the evaluation of tenders shall not be allowed for contracts not exceeding one year (12 months)

6.9 The tender evaluation committee shall evaluate the tender within 30 days of the validity period from the date of opening the tender.

6.10 The parties to the contract shall have it signed within 30 days from the date of notification of contract award unless there is an administrative review request.

6.11 Contract price variations shall not be allowed for contracts not exceeding one year (12 months)

6.12 Where contract price variation is allowed, the valuation shall not exceed 15% of the original contract price.

6.13 Price variation request shall be processed by the procuring entity within 30 days of receiving the request.

6.14 The procuring entity may at any time terminate procurement proceedings before contract award and shall not be liable to any person for the termination.

6.15 The procuring entity shall give prompt notice of the termination to the tenderers and on request give its reasons for termination within 14 days of receiving the request from any tenderer.

6.16 A tenderer who gives false information in the tender document about its qualification or who refuses to enter into a contract after notification of contract award shall be considered for debarment from participating in future public procurement.

7. Corrupt and Fraudulent practices

7.1 The procuring entity requires that tenderers observe the highest standards of ethics during procurement process and execution of contracts. A tenderer shall sign a declaration that he has not and will not be involved in corrupt and fraudulent practices.

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 1 – CONDITIONS OF CONTRACT.

SECTION 01 - CONDITIONS OF CONTRACT

CONDITIONS OF CONTRACT

1. Definitions

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

"Bill of Quantities" means the priced and completed Bill of Quantities forming part of the tender.

"Compensation Events" are those defined in Clause 24 hereunder.

"The 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 Contractor 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 Contractor 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.

"A Defect" is any part of the Works 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.

1.3

"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 an acceleration order.

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

"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" is the area defined as such in the Appendix to Condition of Contract.

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

"Start Date" is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with the Site possession date(s).

"A Subcontractor" 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.

1.4

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 the Contract and the law governing the Contract shall be English language and the Laws of Kenya respectively 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 Contractor 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 These being RENOVATION WORKS, the Employer shall give possession of NOT all parts of the Site to the Contractor. COMPLETION OF WORKS may be phased. This shall not be a basis for any extension of the Contract period or any monetary claim and compensation.

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 or 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 Contract 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 Manager 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 require 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 instructions 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 a defect. 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 Defects 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 Contract 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 does 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 costs.

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 Work, 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 costs 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 30 days of the date of issue of each certificate. If the Employer makes a late payment, the Contractor shall be paid simple interest on the late payment in the next payment. Interest shall be calculated on the basis of number of days delayed at a rate **three percentage** points above the Central Bank of **Kenya's average rate** for base lending prevailing as of the first day the payment becomes overdue.

23.4 If an amount certified is increased in a later certificate or 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.

1.12

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

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

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

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

24. Compensation Events

24.1 The following issues shall constitute Compensation Events:

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

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

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

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

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

(f) Ground conditions are substantially more 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 work 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 Contractor, 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.

1.14

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 – (SHALL NOT APPLY)

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 provisions in the Contract Bills of Quantities or Specifications) for permanent incorporation in the Works. Unless otherwise stated in the Contract, if at 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 prices 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 prices contained in the Contract Bills of Quantities shall be deemed to be based upon the basic prices of materials to be permanently incorporated in the Works as determined by the J.B.C. and set out in the schedule of basic rates issued 30 days before the date for submission of tenders. A copy of the schedule used by the Contractor in his pricing shall be attached in the Appendix to Conditions of Contract.

25.5 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 rates.

26. Retention

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

27. Liquidated Damages

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

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

28. Securities

28.1 The Performance Security shall be provided to the Employer no 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 theWorks within seven [7] days of the Project Manager issuing a Certificate of Completion.

32. Final Account

32.1 The Contractor shall issue the Project Manager with a detailed account of the total amount that the Contractor considers payable to him by the Employer under the 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 authorised 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 a breach of Contract to the Project Manager for a cause other than those listed under 3.19 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 Contract 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 date of 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.

1.20

34.3 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any 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 buildings, 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, holding 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 payments 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) Institution 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 thereunder 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 party:

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 matters 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 desirable in order to determine the rights of the parties and assess and award any sums which ought to have been the subject of or included in any certificate.

37.8 The Arbitrator shall, without prejudice to the generality of his powers, have powers 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.

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

APPENDIX TO CONDITIONS OF CONTRACT

THE EMPLOYER IS

Name: _____

Address: _____

Name of Authorized Representative: _____

Telephone: _____

Facsimile: _____

The Project Manager is _____

Name: _____

Address: _____

Telephone: _____

Facsimile: _____

The name (and identification number) of the Contract is _____

_____

The Works consist of _____

_____

The Start Date shall be _____

The Intended Completion Date for the whole of the Works shall be

_____

The following documents also form part of the Contract:

_____

_____

The Contractor shall submit a revised program for the Works within _____ days of delivery of the Letter of Acceptance.

The Site Possession Date shall be _____

1.24

The Site is located at _____ and is defined in drawings nos. _____

The Defects Liability period is _____days

Other Contractors, utilities etc., to be engaged by the Employer on the Site

Include those for the execution of;

1. _____

2. _____

3._____

4._____

The minimum insurance covers shall be;

1. The minimum cover for insurance of the Works and of Plant and Materials in respect of the Contractor's faulty design is _____

2. The minimum cover for loss or damage to Equipment is _____

3. The minimum for insurance of other property _____

4. The minimum cover for personal injury or death insurance

- For the Contractor's employees is _____
- And for other people is _____

The following events shall also be Compensation Events:

1. _____

2. _____

3. _____

4. _____

The period between Program updates is _____ days.

The amount to be withheld for late submission of an updated Program is _____

The proportion of payments retained is _____ percent.

The Price Adjustment Clause _____ (shall/shall not) apply

The liquidated damages for the whole of the Works is _____ (per day)

The Performance Security shall be for the following minimum amounts equivalent as a percentage of the Contract Price _____ percent (%)

The Completion Period for the Works is _____ [Weeks].

The rate of exchange for calculation of foreign currency payments is

_____

The schedule of basic rates used in pricing by the Contractor is as attached *[Contractor to attach].*

Advance Payment _____ _____ shall/shall not be granted.

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 2

ARCHITECTURAL SPECIFICATIONS.

Except where the area of grubbing is to be excavated, all resulting holes shall be filled up solid with approved material compacted to the same relative density as the surrounding material.

EXCAVATION

The Contractor is advised to visit the site and ascertain the nature of the ground to be excavated and he shall price accordingly and no claim will be allowed for want of knowledge in this respect.
Rates for excavation shall include for excavation in soil, earth, black cotton, sandy soil, murram, tuff, soft rock, boulders or whatever other subsoil is encounterd, except hard rock as defined below.

WATER IN EXCAVATIONS

The Contractor shall excavate sumps, cut drains, provide and place all necessary materials and provide and work pumps, plant and apparatus for dealing with any water which may find its way into the excavation from any source whatsoever.
The responsibility for draining away, pumping, or otherwise removing water from the excavations shall rest with the Contractor throughout the duration of the contract but methods employed shall be subject to the agreement of the Architect.
Provision has been made in the Preliminaries and General Conditions of these Bills of Quantities for the Contractor to insert a price against this item.

HARD ROCK

Any rock or other hard materials encountered in excavating to the required depths which in the opinion of the Architect or Engineer can only be removed by wedges, compressed by air or other special plant, or explosives shall be paid for as an extra and the price shall include for trimming and leveling. No blasting will be allowed without prior permission. Material which can be removed by pick or trax cavator, ripper or similar mechanical plant will not be classified as rock.

FOUNDATION EXCAVATIONS

a) The foundation trenches and column bases shall be excavated to the widths and depths of the concrete foundations shown on the drawings or to such widths and depths as the Engineer may instruct after examination of the excavations. Quantities of all excavations shall be measured and valued by the Quantity Surveyor and any difference between such measurements and the measurements herein given shall be dealt with as a variation of contract. If however, the Contractor excavates to any greater depths than shown in the drawings or as instructed by the Engineer, then he shall at his own expense fill in such extra depth of excavations with concrete as specified for the foundations to the satisfaction of the Engineer. The Contractor shall not be paid for the cost of any excavation executed deeper or wider than shown on the drawings or instructed by the Engineer nor for the cost of back filling such excavation or disposing of surplus.

b) The Contractor shall report to the Engineer when secure bottoms have been obtained to the excavations and are ready to receive the foundation concrete. Any concrete or other work put in before the excavations have been inspected and approved by the Engineer shall, if so directed, be removed and new work substituted in accordance with the specification after excavations have been approved, all at the Contractor's expense.
c) The bottoms of all foundation trenches and column bases shall be trimmed square and level. The Contractor shall form such steps on bottoms of foundation, trenches as the Engineer may consider necessary in such positions and to such depths as he may direct.

SURPLUS SOIL DISPOSAL

Excavated material not required for subsequent refilling shall be removed to areas off site which will be approved by the Architect.

TOP SOUIL FOR SPREADING

Where required in the Bills of Quantities, top soil required for subsequent spreading over finished work shall be especially selected and shall be dumped in special heaps as indicated by the Architect.Such top soil shall be reasonably free from vegetation to the satisfaction of the Architect, and shall be compacted as little as possible in the heaps.

FILLING UNDER SURFACE BEDS IN BUILDINGS
Murram Filling

Murram for filling as base course shall be from an approved source and of the highest quality. It shall be laid in layers not less than 150mm thick and not greater than 230mm thick prior to compaction. Water will be applied to O.M.C and each layer will be thoroughly compacted by at least 8 passes of a 10 tone smooth wheeled roller or a 2 tone vibrating roller until all movement ceases and 100% C.B.R. is obtained.

Hardcore Filling

Hardcore filling shall be crushed rock, broken brick, broken concrete or other approved hard granular materials broken to pass not greater than a 150mm ring or to be 75% of the finished thickness of the layers being compacted whichever is the less and graded so that it can be easily and thoroughly compacted by rolling. The filling is to be laid in layers each of a consolidated thickness not exceeding 230mm.Where rolling by 10 tonne smoothed wheeled roller or 2 tonne vibrating roller is impossible, compaction shall be by hand or mechanical tampers. Each layer shall be compacted by at least 8 passes of the roller.
The top surface of hard core shall be leveled or graded to falls as required and blinded with similar material broken to 25mm gauge and surfaced with stone dust and well wetted before consolidation by the roller. The surface so obtained shall be to the Engineer's approval.

MATERIALS FOUND IN EXCAVATIONS

All materials classified as rock may, if approved by the Architect or Engineer be used as hardcore filling and the measured quantities of imported filling will be adjusted accordingly; all rock so used must be broken to the required size as before described before being used.

No sand, aggregate, murram or other material found in the excavations is to be used in the works without the written permission of the Engineer.

FILLING OBTAINED FROM THE EXCAVATIONS

Filling obtained from surplus excavated materials is to be free from all weeds, roots, vegetable soil or other instable materials and is to be filled in layers each of not more than 230mm finished thickness. Each layer to be well wetted and consolidated as described herein.

INSECTICIDE TREATMENT

Where described, the top surface of filling shall be treated with Gladiator pesticide (manufactured by Dow Agrosciences Ltd.) to be applied by Rentokil Ltd.P.O BOX 44360,Nairobi, or other equal approved firm, in accordance with the manufacturers instruction and subject to a twenty year guarantee to the satisfaction of the Architect.

DIOTHENE SHEETING

Diothene sheeting shall be produced by an approved manufacturer. Joints in sheeting shall be treble folded with a 150mm fold and taped at 300mm intervals with 50mm wide black plastic adhesive tapes. The sheeting shall not be stretched but shall be laid with sufficient wrinkles to permit shrinkage up to 15%

CONCRETE WORK

CEMENT

Cement for use in the works is to be Portland Cement to BS 12 and shall be fresh and free from any lumps or set or partly set particles. It shall be stored on the site as to be carefully protected from the weather and rising damp.

SAND OR FINE AGGREGATE

Fine aggregate shall be clean, siliceous sand complying in all respects with BS 882. Sand shall be washed and screened before use and shall be rewashed and /or rescreened free of charge if so directed by the Architect or Engineer.

COARSE AGGREGATE

Coarse aggregate shall be clean, hard, broken stone complying in all respects with BS 882.It shall be graded within the limits specified for coarse aggregate in accordance with the relevant table in BSS 882.

WATER

Water used for mixing concrete shall be clean and pure and obtained from an approved source.

BRITISH STANDARD CODE OF PRACTISE

All workmanship,materials,tests and performances shall be strictly in accordance with the British Standard Code of Practice (CP. 114:1965) for "The Structural Use of Reinforced Concrete in Buildings".

CONCRETE PROPORTIONS AND MIXING

(a) Unless otherwise described, concrete aggregate shall be proportioned by volume in accurately made and approved gauge boxes to the proportions specified and /or shown on the drawings. Gauge boxes shall be of such a size as to allow the use of one whole bag of cement per batch.

(b) Concrete shall be mixed in a mechanical batch mixer. The cement and aggregate shall be thoroughly mixed dry and then mixed for at least two minutes after the water has been added. Only sufficient water to produce a dense concrete of adequate workability should be added. For 1:2:4 mix the water content should not exceed 29.5 litres per 50kg bag of cement.

(c) Concrete shall be poured to grades as follows: -

The mixes given below e.g 1:3:5 shall mean concrete composed by volume of one part Portland cement, three parts sand or fine aggregate and five parts of coarse aggregate. All other compositions shall be interpreted in a alike manner.

Grade	A	Concrete	1: 11/2:21/2	using	5 mm to 20 mm	coarse	aggregate
Grade	B	Concrete	1: 2: 4	using	5 mm to 20 mm	coarse	aggregate
Grade	C	Concrete	1: 3: 6	using	6 mm to 25 mm	coarse	aggregate
Grade	D	Concrete	1: 4 : 8	using	10 mm to 35 mm	coarse	aggregate
Grade	E	Concrete	1: 4: 8	using	_____	graded	pumice

(d) Unless otherwise specified concrete shall be used as follows:-

High Stress reinforced concrete	GRADE A
Normal reinforced concrete	GRADE B
Surfaces beds, threshold, concrete surface channels and footings	GRADE C
Concrete benching to cupboards and fittings and filling where Described.	GRADE D
Concrete cover to steel reinforced left projecting for future Extensions.	GRADE E

CONCRETE TESTS AND STRENGTHS

Concrete test cubes shall be made and the contractor shall allow for the cost of hiring steel cube boxes from the materials Branch of the ministry of works, taking samples, having them tested by the Materials Branch of the Ministry of Works. Copies of the results are to be forwarded to the Architect and Engineer. The following minimum crushing strengths are required: -

GRADE	NOMINAL MIX	LBS/SQ. IN- 7 DAY STRENGTH	LBS/SQ. IN- 28 DAY STRENGTH
A	1:11/2:21/2	2,500(17.5N/mm2)	3,750 (26.25N/mm2)
B	1:2:4	2,000 (14.0N/mm2)	3,000 (21.00N/mm2)
C	1:3:6	1,500 (10.5N/mm2)	2,200 (15.40N/mm2)
D	1:4:8	NO TESTS REQUIRED	
E	1:4:8	NO TEST REQUIRED	

READAY MIX CONCRETE

(a) Ready mix concrete as supplied by Greenham Ready Mixed Concrete (Kenya) Ltd.P.O BOX 18472,Nairobi, may be used.
(b) The contractor shall indicate the design strength required by the Engineer when placing an order for ready mixed concrete. The strengths are indicated above.
(c) Ready mix concrete is available in 2.0 and 4.0 cubic meter deliveries and it is the Contractor's responsibility to ensure that deliveries of concrete are placed in position within $1_{1/2}$ hours from time of arrival of the tankers arriving at the site. NO WATER MAY BE ADDED AT ANY TIME.

CONCRETE PLACING AND CURING

(a) Concrete shall be placed in its final position in the moulds or forms within 20 minutes of mixing and shall not subsequently be disturbed. Concrete shall be carried on continuously up to predetermined construction joints where directed by the Architect or Engineer. It shall be placed in layers and worked and vibrated around rod reinforcement to fill all corners of the formwork.
(b) All reinforced concrete shall be vibrated using an approved type of vibrator but shall NOT be over-vibrated to bring cement and fine aggregate to the surface. Where fairfaced or board marked concrete is required, the shutters themselves are to be vibrated on the outside.
(c) As soon as possible after the initial set has taken place all exposed concrete shall be covered with a layer of Hessian, sand or other approved material and kept constantly wet for at least seven days.
(d) Construction joints shall be finished vertically (fish tailing is not accepted). A 1:1 sand/cement motor is to be applied to completed work to a thickness of not less than 25mm before new work is done.
(e) The Architect or the Engineer reserves the right to reject any concrete, whether READY MIX OR MIXED ON SITE, which in their opinion has initially set prior to placement.

DEFECTS IN CONCRETE

Any honeycombing, cavities or other defects in concrete shall on no account be patched or repaired but shall be brought to the attention of the Architect or Engineer who will give instructions for the action to be taken. Such remedial works shall be to the account of the General Contractor.

REINFORCEMENT

(a) Reinforcement shall conform with the British Standard as indicated on the drawings or specified hereinafter:-

B.S.S 4449	for Round mild, medium tensile and high steel bars.
B.S.S 4461	For cold Twisted Steel bars.
B.S.S 4483	For Hard drawn steel wire fabric mesh.

(b) The following is the schedule of steel to be fixed in lintels unless otherwise specified:-

Clear span up to 1.0m	1 No 10mm straight bottom bar for each 100mm of Wall thickness.
Clear span 1.0m to 1.8m	1 No. 12mm straight bottom bar for each 100mm of Wall thickness.
Over 1:8m	To Engineer's detail.

FABRIC MESH REINFORCEMENT

(a) Where shown on the drawings, fabric mesh reinforcement shall be laid with end and side laps of minimum one full mesh bound together with binding wire as hereinafter specified and in accordance with the manufacturer's instructions. The fabric shall be free from scale, rust, grease or other substance likely to reduce the bond between the steel and the concrete.

(b) The contractor shall include for all cutting and waste, providing the necessary binding wire and temporarily supports and all extra, material in laps. Turn up ends of mesh to prevent the points of steel puncturing the polythene underlay.

CONCRETE COVER TO REINFORCEMENT

(a) Unless otherwise directed, the concrete cover to rod reinforcement over main bars in any face shall be: -

Foundations against earth face	75mm
Foundations against blinding	50 mm
Columns	35mm
Beams	25mm
Slabs	12mm

(b) Provide and fix 75 x 75mm spacer blocks formed with 1:3 sand cement into which are cast lengths of annealed wire for tying to rods to give the cover as schedule above. Spacer blocks shall be so spaced to ensure a constant cover with maximum spacing 900mm.

FIXING ROD ENFORCEMENT

(a) All reinforcement shall be free from oil, dirt, paint and loose rust scales, e.t.c. and the contractor must allow for cleaning wire brushing, et.c as necessary to achieve this. All steel rods must be cut and bent cold in accordance with BSS 4466 to the dimension shown on schedules to be provided.

(b) The reinforcement shall be accurately placed in position as shown on the drawings and, before and during concreting, shall be secured against displacement by using No. 18 SWG annealed binding wire or suitable clips supplied by the General Contractor at all intersections and shall be supported by concrete or metal supports, spacers or metal supports, spacers or metal hangers to ensure the correct position and cover of concrete.

(c) The Contractor shall give a minimum of three days notice to the Architect and /or Engineer of his intention to concrete any portion of the works to enable an inspection of the reinforcement and shuttering. The carrying out of such an inspection will in no way relieve the Contractor of his responsibility of fixing the reinforcement in accordance with the drawing or the provisions indicated herein and to ensure the specified cover. Any failure in the concrete work where the reinforcement is found not in accordance with the drawings or not in correct position will be the sole responsibility of the Contractor. Such liability will include for any delays in completion or any claims arising from Third party Insurance and/or other sources afterwards for the repair of such failure as so directed by the Architect or Engineer.

FORMWORK

(a) All formwork and shuttering shall be of sound timber or other approved material and of adequate sizes, strength and construction to withstand the loading from the placing and consolidation of the concrete without distortion, springing or other movement. All joints shall be sufficiently tight to prevent leakage of grout during vibration.

(b) Unless otherwise instructed by the Architect or Engineer the following minimum periods shall elapse after pouring the concrete before the formwork is struck: -

Beam sides,walls and columns	2 days
Slabs (props left under)	7 days
Beam soffits (props left under)	10 days
Removal of props to slabs	14 days
Removal of props to beams	21 days

(c) No shuttering shall be removed before the concrete has cured sufficiently to withstand safely any stresses to which the structure may then be subjected

(d) The Contractor is to allow for use and waste, fixing at the various levels, straight cuttings, splayed edges, notching, fillets to form small chamfered arises, extra materials at joints, overlaps and angles, extra labour for narrow widths or small quantities, struts, hangers, brackets, wedges, wiring and supporting as necessary and any other labour and material necessary to fix, ease, adjust and remove the formwork as described.

FAIR FACE

Where so described faces of concrete shall be finished fair by means of wrot timber, hardboard or plywood lined or similar formwork, with all imperfections cut out, make good in cement mortar to match texture and colour of concrete and rubbed down with carborundum to finish clean and smooth without traces of shuttering marks, joints or other disfigurements.

CHASES AND HOLES

Form all chases, holes, e.t.c. in concrete work as required by other trades and make good thereafter.

CONCRETE FILLER BLOCKS (For hollow pot slabs)

Where indicated on the concrete layouts, provide and fix hollow precast concrete filler blocks to the various sizes shown on the concrete details. The hollow filler Blocks shall comply with BS 2028.

CONCRETE BLINDING.

Under all reinforcement concrete bases provide and lay 50mm thick concrete blinding in grade D Concrete for the full area of the base concerned.

CONCRETE IN FOUNDATIONS

Cast foundation concrete centrally under wall to the sizes indicated on the drawings. No walling is to be built on foundation concrete for at least four days or as otherwise directed.

SURFACE BED

(a) On the treated blinding provide and lay polythene sheeting as described in "Excavation" and " Earthworks".
(b) Care must be exercised to cast concrete to the requisite falls as indicated on plans and /or details.
(c) (i) Where the surface bed is specified to be cast in panels, these shall in NO circumstances exceed 35 sq.m in area and no dimension shall exceed 6m.The slabs shall be cast checker board fashion.

(ii) In the first set of panels to be poured provide and fix 600mm lengths of 12mm bar at 600mm centers and left projecting 300mm.When pouring the second set of panels provide and fix internally greased sleeves12mm I.D. slipped over the projecting rods. Between the slabs provide and fix 12mm soft board sheets, slotted to fit over sleeves to connecting rods.

(iii) In such construction provide and fix reinforcing mesh as shown on the drawings.

(iv) The top 25mm (below finished floor) or for full depth of the floor finish where in excess of 25mm provide and fill with flintcote sand/cement pointing by thoroughly mixing together 12 parts sand to 1 part flintcote before adding 1 part cement (all measured by volume) and then solidly trowelling into the joint.

(v) Slabs for vehicular traffic finished "off of beam' shall be solidly laid and tamped with a beam 50mm wide with the lines of the beam to the top surface of slab diagonal to any fall.

STEPS IN CONCRETE

Where shown on the drawings, form steps which are to be cast in with the surface bed as the work proceeds. Provide laps in reinforcement determined by the depth of the steps in footings.

PRECAST CONCRETE

(a) Precast concrete shall be cast in strong and properly made moulds true to the shapes required. For work described as "finished Fair" the3 moulds shall be lined with hardboard marine plywood or other approved material or fabricated with wrot timber as directed by the Architect on site.
(b) The concrete shall be thoroughly vibrated into the moulds and shall not be removed from them until 7 days after placing the concrete, but the sides may be removed after 3 days provided the moulds are such that the sides may be removed easily without damaging the concrete.
(c) The precast work shall be cast under sheds and shall remain under the same 7 days after pouring and a further 7 days after removal from the moulds,(14 days in all). During the whole of this period the concrete shall be shielded by sacking or other approved material and kept wet. It shall then be removed from the sheds and stacked in the open for at least 7 days to season.
(d) All precast work shall be cast in lengths convenient for handling unless otherwise described.
(e) Precast concrete copings are to be finished as precast concrete cills and shall be twice weathered for walls and once weathered to boundary walls.

FACING TO CONCRETE

Where facings are indicated on the drawings, allowance is to be made for the thickness of the material specified plus a mortar joint.

KEY FOR PLASTER

Where concrete is to be plastered, the concrete shall be left rough to form a key for plaster and, if so directed, shall be scraped or bush hammered.

CONCRETE BENCHING (Grade D Concrete)
Under wardrobe, cupboard and kitchen fittings, form 100mm high benching prepared to receive a finish to match that of the floor of the room concerned.

STRUCTURAL STEEL WORK

SPECIAL NOTES

To avoid tensional stresses in the main trusses, unsymmetrical loading during erection from the roof girders will not be permitted unless the main trusses have been adequately propped and supported to the Architects satisfaction.
The girders and trusses are to be adequately propped and supported during erection until the bracing and purlins in the adjoining bays on each side have been connected and bolts tightened.
An upward camber is to be provided where stated on the drawings.
The Contractor will be required to place an order immediately after being awarded the contract for all structural steel, bolts, and any other items not available for reservation ex stock in Kenya and which have to be imported from overseas. This order to be submitted to the Architect for his prior approval. Such approval will in no way relieve the Contractor from his responsibility for ordering the correct materials and Quantities required to complete the contract in the time limit specified.

QUALITY OF MATERIALS AND WORKMANSHIP

The Quality of all materials and workmanship used in the execution of this Contract shall comply with the requirements of most recent issues of the following British Standard and code of practice including all amendments to date of calling for tenders.

B.S 15	Mild steel for General Structural Purposes.
B.S 449	The use of structural Steel in Building (Incorporating B.S Code of Practice C.P. 113).

WALLING

CEMENT

All cement used for making mortar shall be Portland Cement Complying with B.S. 12.

SAND

All sand used for making mortar shall be clean well graded silicone sand of good sharp quality equal to samples which shall be approved by the Architect. It shall be free from lumps of stone, earth, loam, dust, salt, organic matter and any other deleterious substance, sieved through a fine sieve and washed if so directed by the Architect.

LIME

Lime for mortar shall be non-hydraulic or semi - hydraulic quick lime or hydrated lime in accordance with B.S 890,Class B.

Quick lime shall be run to putty immediately after delivery to site in a pit dug on the site or in approved containers. The water to be first run into the pit or container and the lime to be added until it is completely submerged and stirred until all lumps are disintegrated and the resulting mild-lime shall then be run through a 3mm square mesh sieve and run into a pit or other container and kept clean and moist for not less than 16 hours before use. Hydrated lime shall be added to water in a clean receptacle thoroughly mixed to the consistency of thick cream and allowed to stand and be kept clean and moist for not less than 16 hours before use.

CEMENT MORTAR

The cement mortar (1:3) shall be composed of 42.5kgs. of Portland Cement to 0.085 cubic metres of sand. The cement mortar (1:6) shall be composed of 42.5kgs of Portland Cement to 0.17 cubic metres of sand measured in specially prepared gauge boxes and thoroughly mixed in an approved mechanical mixer or mixed dry on clean approved mixing platforms with water added afterwards until all parts retempering of wholly or partly set mortar will not be allowed.
Foundation walling up to ground floor slab 1 part cement to 6 parts sand.

GAUGED LIME MORTAR

Gauged lime mortar shall be composed of 2 parts by volume of lime putty to 12parts by volume of sand measured in specially prepared gauge boxes and mixed dry on clean and approved mixing platforms with water added afterwards until all parts are thoroughly incorporated and brought to a proper consistency.
The mortar shall be mixed 7 to 10 days before it is required for use and shall be stacked in a neat heap well smoothed off, covered with wet sacks and allowed to mature.
Immediately after use 1 part by volume of Portland Cement shall be added to 9 parts by volume of lime mortar, the whole being remixed with the addition of extra water until all parts are completely incorporated and brought to a proper consistency.
The gauged, mortar must be used within 45 minutes of being mixed and the use or retempering of wholly or partially set mortar will not be allowed.
Above ground floor slab 1 part cement to 3 parts lime to 15parts sand.

CONCRETE BLOCKS

Concrete blocks shall be hollow or solid as required and shall be hard, true to size and shape with sharp arrises in accordance with B.S 2028 type 'A'. They are to be obtained from and approved manufacturer and shall be equal in every respect to a sample to be deposited with and approved by the Architect. Blocks must be cured at least 4 weeks before delivery to the site and the Contractor is to order his entire stocks as soon as the contract is signed. Before bulk delivery commences and thereafter, if the Architect so directs, the Contractor shall dispatch twelve samples blocks to the M.O.W.Materials testing Labaratory.Should tests indicate that the blocks do not comply with the specifications, the batch from which they were taken shall forthwith be removed and re-executed or otherwise rectified at the Contractors expense. Block shall be generally 390mm long, 190mm high and of the thickness required for the walling to be built. Blocks of other sizes will, however, be required to form proper bondings at corners, around openings, etc.and the like positions and the Contractor must make or cut blocks to all the varying sizes required for these purposes.

LOAD BEARING CONCRETE BLOCKS

Blocks described as load bearing shall have the minimum compressive strengths specified for each block, determined and tested in accordance with the appropriate B.S and to the entire satisfaction of the Architect. Blocks of the various strengths shall be differentiated by means of an approved colour code marking.

COLOURED CONCRETE BLOCKS

Concrete blocks described as coloured shall contain colouring pigment mixed integrally with the materials to produce the required tint or shade. The mix of materials contained in the blocks is to be adjusted as and if necessary to maintain the materials to produce the required tint or shade. The mix of materials contained in the blocks is to be adjusted as and necessary to maintain the specifications of strength etc. unless otherwise described blocks are to be laid jointed and pointed in mortar containing pigment mixed integrally to produce a tint or shade matching that of the blocks. The mix of materials contained in the mortar is to be adjusted as and if necessary to maintain the specifications of strength, etc.

HOLLOW CLAY BLOCKS

Hollow clay blocks are to be hard, well burnt, true to size and shape with sharp arises and keyed faces and joints in accordance with B.S. 1190 Type 'A'. They are to be equal in every respect with a sample to be deposited with and approved by the Architect. The hollow clay blocks are to be bedded and jointed in gauged mortar.

FAIR FACED CONCRETE BLOCKWORK

Fair faced concrete blockwork shall be built in ordinary blocks selected for their uniformity and appearance and shall be free from holes or any other deformities and shall
have clean, sharp arises. The blocks shall be built in mortar as described and raked out and pointed with a neat flush joint as the work proceeds, unless otherwise stated. All arises shall be plumb and square, and all joints properly bonded and true to line.

STONE WALLING

The stone for walling shall be sound and hard throughout free from all defects and shall be obtained from a quarry approved by the Architect. Samples shall be submitted for approval and, if approved, shall be regarded as the standard for the work generally. All stone rejected by the Architect shall be removed immediately from the site. Stones shall be laid on their natural beds and properly lapped and bonded and thoroughly wetted before laying and again after laying for at least three days. Stones shall be chisel dressed into true rectangular blocks with each surface even and at right angles to all adjoining surfaces and shall generally be not less than 390mm long, 190mm high and of the thickness required for the walling to be built. Extra over for fair face shall mean 'fine or medium butched chisel dressed' to an even surface, built with a fair face and raked out and pointed with a neat recessed joint as the work proceeds. All arrises shall be plumb and square and all joints properly bonded and true to line. Fine or medium butched chisel dressed walling shall be in regular courses.

If required by the Bills of Quantities, coloured stone walling and fair face dressing shall be as described below: -
1) Fine butched stone shall be either chisel dressed or machine dressed – dress the external face of each stone to the finest practically obtainable and finish to a fine rubbed plane surface.
2) Medium butched chisel dressed stone-chisel dress the external face of each stone so that chisel marks are approximately the same width, with ridges between adjacent marks approximately in the same plane.
3) Quarry faced stone – do not work the external face of each stone.
4) Random rubble stone facing-stones of random shape, colour, and size as facing to backing wall.
5) Random squared medium butched chisel dressed stone –stones of random shape, colour, size and thickness squared and dressed as before described.
6) Stone walling of approved colour – Walling to be built using grey and mixed blue and grey coloured stones.
7) Stone walling of variegated colours –walling to be built using multi colour stone approved by the architect and mixed in proportions approved by the Architect.
8) Machine dressed stone facing shall be 25mm or 50mm thick as required by the Architect. Machine rotary blade cut stones facing on backing wall.

The finished mortar joint for fine or medium butched chisel dressed stonework is to be 10mm wide and generally 5mm back from the face of the stone. Where directed by the Architect the mortar will be coloured to match the stones.

Stone walling described as load bearing shall have a minimum crushing strength of 10 Newtons per square mm.

On completion all stonework is to be scrubbed down with a wire brush.

BRICK FACINGS

Brick facings shall be of hand scratched bricks size 65mm high x 65mm deep x 230mm long as manufactured by Clayworsks Ltd. P.O Box 48202,Nairobi, with 10mm horizontal joints only raked out 10mm deep as the work proceeds. Wall ties shall be 18 gauge

butterfly shaped galvanized mild steel wire staggered at 450mm centers vertically and 900mm centers horizontally. Support at heads shall be with approved steel angles. Strict supervision of quality will be maintained by the Architect and all work will be in accordance with a sample panel to be approved by the Architect prior to the start of facing works.

WALLING GENERALLY

The Contractor shall provide proper setting out rods and set out all work on same for courses openings, heights e.tc. and shall build the walls, piers, etc, to the widths, depths and heights indicated on the drawings.

Concrete blocks shall be thoroughly wet before being laid and shall be kept wet during that day. Where unfinished work is continued, the completed walling shall be wetted before laying mortar.

All walls through out shall be carried up evenly in200mm courses, no part being carried up more than 1m higher at one time than any other part and in such cases the jointing shall be made in long steps so as to prevent cracks arising and all walls shall be leveled round each stage. All faces of walls to be plastered are to have all the joints raked out as key for plaster. Alternate courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining wall. All walling shall be built entirely solid in blocks, without voids. All perpends, reveals and angles of the walling shall be built strictly true square and all walling shall be flushed up and grouted solid as the work proceeds .

All putlog holes shall not be less than one course deep and carefully filled with a block cut to fit size of opening with beds and joints filled with mortar well tampered in after scaffolding is removed and if in fair faced wall to match facings.

All walling 150mm thick and under is to be reinforcement with one layer of 25mm x 16 B.W.G. hoop iron built into every second course well lapped at joints and intersections and carried at least 115mm into a butting walls at junctions.

Where concrete and stone walling are bonded together at intersections or heading joints the horizontal cement mortar beds shall not exceed 15mm thickness and vertical joints are to be staggered.

DAMP PROOF COURSES

The damp proof is to consist of a 25mm screed of cement and sand (1:2) laid over the area of the walls and finished to a level surface and covered with and including an approved fibre based bituminous damp proof course weighing not less than 2.7 kgs.per square metre and lapped 225mm at all joints and intersections. All walls are to be carefully cleaned and wetted before the screed is laid.

OTHER TRADES

Close co-operation with electrical and plumbing sub- Contractors must be maintained from the very beginning of the job to avoid chases being cut in hollow block or 100mm solid block work or across any fair faced work. If necessary, conduits should be run down the jambs of the door openings behind the door frame and taken to the switch position
through a horizontal joint in the masonry.

ROOFING

SCREEDS

Roof screeds where specified shall be as described in 'Floor Wall and Ceiling Finishes'.

GUARANTEE

The Contactor and the Roofing sub-Contractor are to leave all the roofs complete and waterlight, unmarked with cement or bitumen particularly flashings and external finishes and with joints in straight and even lines.

The contractor must submit to the Employer a ten year guarantee for the roof coverings against leakage. If a sub-Contractor is to execute the roofing the Contractor is responsible for obtaining this guarantee from them for submission to the Employer.

ALUMINIUM EMBOSSED CAP SHEET ROOF COVERING

The cap sheet covering shall be Cabro 42 S.W.G. aluminium embossed cap sheet covering with underlayers of saturated felt, as manufactured by Cabroworks Ltd, P.O BOX 98567,Mombasa,and laid by an approved Sub-Contractor in strict accordance with the manufacturer's printed instructions.

MASTIC ASPHALT ROOFING

All asphalt roofing shall be manufactured and applied in accordance with B.S 988 Mastic Asphalt for roofing (Limestone Aggregate). Proportions of component ingredients shall be generally within the limits laid down in the B.S but the ratio of bitumen to lake asphalt shall be appropriate for use in tropical climates. The asphalt shall be applied in two coats each of 10mm thickness laid to the falls formed in the screeds, by an approved sub-contractor.

The first coat of all horizontal work shall be laid on a single layer of black sheathing felt complying with B.S 747,Table 4A (i) laid and lapped in accordance with the manufacturers instructions. Rates for asphalt shall include for underlay.

All vertical surfaces, tops of parapets, gutter side and bottoms shall be finished with one coat of bituminous aluminium paint. All other surfaces shall have a 12mm layer of black trap chippings graded from 6-12mm,laid loose.

MASTIC ASPHALT TANKING

All asphalt tanking shall be manufactured and applied in accordance with B.S 1097 by an approved sub- contractor.

ASBESTOS CEMENT SHEETING

Asbestos cement roof sheeting and accessories shall be as manufactured by Kenya Asbestos Cement Co. Ltd, P.O BOX 90662,Mombasa, and fixed strictly in accordance with their printed instructions and generally in accordance with International Standard 459.

The sheeting will be fixed to steel purlins with galvanized hook bolts and patent P.V.C. combined capping, rubber washer and metal nut.
Holes shall be drilled through the ridges of corrugations not in the hollows.
Ridges and other accessories shall be fixed to timber purlins as above described.
Fixed bolts and screws shall comply with B.S 1494.
Side laps shall be minimum one and a half corrugations and end laps shall be as specified.

GALVANISED CORRUGATED IRON SHEETING

Roof sheeting and accessories shall be pre-painted galvanized steel as manufactured by Galsheet Kenya Ltd. P.O BOX 78162,Nairobi and fixed strictly in accordance with their printed instructions and generally in accordance with international standards.

ROOFING TILES

The roofing tiles shall be as specified, of approved quality and manufacture, uniform in size, shape and colour, free from twist or other defects to be obtained from an approved manufacturer, supplied and fixed in accordance with the manufacturers specifications and recommendations.

The ridge and hip shall be socketed tiles of approved quality, shape and manufacture, to match the roofing tiles in colour with rebated joints and free from twist and other defects.

The roofing tiles shall be hung on timber/concrete battens and shall be laid to accurate gauge and each roof shall be set out to take an exact number of tiles without cutting.

Hip and ridge tiles to be bedded and jointed in cement mortar (1:4) and pointed at joints and ends and intersections in coloured cement to match colour of tiles. All angles and intersections shall be neatly cut and rubbed to form a close joint.

CARPENTRY, JOINERY AND IRONMONGERY
QUALITY OF TIMBER

The qualities of timber stated hereinafter are to be in accordance with the Grading Rules (Third edition) dated 8th April, 1959,approved by the Forest Department of Kenya.

All timber described as ' Sawn Podocarpus' shall be second (select) Grade Sawn Podocarpus Gracilior.

All timber described as 'Sawn Cypress' shall be Second Grade Sawn Cupressus.

All timber described as 'Wrot Cypress' shall be First (Prime) Grade Wrot Cupressus.

All timber described as 'Wrot Cedar' shall be First (Prime) Grade Wrot Red Cedar (Juniperus Procera).

All timber described as 'Wrot Meru Oak' shall be First (Prime Grade Wrot Meru Oak).

All timber described as 'Wrot Camphor' shall be First (Prime) Grade Wrot Camphor specially selected for straight grain and colouring. No joinery work is to be put in hand until the Architect has seen and approved the colour and grain of the timber.

Where hardwood is specified it shall be Mvuli, Mahogany, Mninga, Camphor, Rosewood, Blackwood or Meru Oak as selected by the Architect at the letting of the contract and all tenderers will be deemed to have allowed for this.
When employed for carpentry work the above timbers shall be well seasoned to moisture content not exceeding 18% of the dry weight.
When employed for Joinery work the above timbers shall be well seasoned to a moisture content not exceeding 6% of the dry weight.

GENERALLY

All timber for permanent work in the buildings shall before use, be dry and be approved by the Architect for quality in accordance with the foregoing specifications for its respective grade. All structural timber shall be in accordance with C.P 112.

All Carpenter's work shall be left with sawn surfaces unless particularly specified to be wrot.Scantlings and boarding shall be accurately sawn and shall be left uniform in width and thickness throughout. All carpenters work shall be accurately set out together and securely fixed in the best possible manner with properly made joints. Provide all brads, nails, screws, bolts, etc. as necessary. Nails shall comply with B.S 1202 and bolts with B.S 916.

Knotting shall comply with B.S 1336

Variations from specified dimensions of scantling shall not exceed the tolerance stated in the aforementioned Grading rules. Boards 25mm thick or less shall hold up to the specified sizes. All timber shall be as long as possible and practicable to eliminate joints.

Ends of timber required to be built into walls shall have 12mm space between same and walling. All ends of timber to be strapped with hoop iron and primed.

All Joiner's work shall be wrot unless otherwise specified.

All mouldings shall be accurately run and finished and all arrises shall be slightly rounded. Framed work shall be cut out, properly tenoned, shouldered etc, and framed together as soon after the commencement of the works as is practicable but should not be wedged up until required for fixing in position and any portions that warp, get in winding, develop shakes or other defects shall be replaced with new. As soon as required for fixing in position the framing shall be glued together with best quality glue and properly wedged or pinned, etc, as described.

Unless otherwise described oval or round brads will be used for fixing all face work, all heads shall be properly punched in. Where described as pellated work shall be countersunk screwed and the screw heads covered with timber pellets to match the adjacent timber.

Should any of the Carpenter's or Joiner's work shrink, warp, wind or develop any other defects within six months after the completion of the works, the same shall be removed and new fixed in its place together with all other work which may be affected thereby, all at the Contractor's cost and expense.

INSECT DAMAGE

All timber, whether graded or ungraded, and including shuttering, scaffolding and the like shall be free of live borer beetle or other insect attack when brought upon the site. The Contractor shall be responsible up to the end of the maintenance period for executing at his own cost all work necessary to eradicate insect attack to timber which becomes evident including the replacement of timbers attacked or suspected of being attacked, not withstanding that the timber concerned may have been inspected and passed as fit for use.

DIMENSIONS

(a) Timber not specified to be wrought shall be as from the saw and full to the nominal dimensions stated. No under sizes shall be permitted but oversize to the following tolerances may be allowed: -
   (i) 1.5mm oversize on dimensions up to 25mm
   (ii) 3mm oversize on dimensions up to 50mm
   (iii) 6mm oversize on dimensions over 50mm

(b) Where 'nominal' dimensions are stated for wrot timber a tolerance of 3mm shall be allowed for each wrot face.

Before putting in hand joinery work, whether built-in or fixed later, the joiner is to ascertain and check on site all dimensions, which affect or govern the joinery work

PRESERVATION OF TIMBER

All timber described as impregnated shall be vacuum pressure impregnated with Tanalith or Celcure preservative in accordance with specification No. 1/56, (Buildings) for the Vacuum/Pressure impregnation of timber with Hickson's 'Tanalith' wood preservative issued by Hickson's Timber Impregnation Co. (G.B) Ltd, or other approved source. Where timber is cut or bored after impregnation the exposed surfaces are to be liberally swabbed with Walmanol.

SPECIES OF TIMBER

Only those timbers specified in these Bills of Quantities are to be used for the works, unless the Architect authorizes alternatives.

SEASONING OF TIMBER

All carpentry timbers are to be seasoned to moisture content of not more than 18% of the dry weight. All joinery timbers are to be seasoned to moisture content of not more than 6% of the dry weight. The contractor is to make available on site a meter for testing moisture content of all timber delivered.

PREPARATION AND PROTECTION OF TIMBER

(a)All timber necessary for the works is to be purchased immediately the contract is signed, and when delivered is to be open stacked for such further seasoning as may be necessary. Preparation of the timber is to be commenced simultaneously with the commencement of the works generally.
(b)All timber and assembled woodwork is to be protected from the weather and stored in such a way as to prevent attack by decay, fungi, termites or other insects.

CLEARING UP

The Contractor is to clear up and destroy or remove all cut-ends, shavings and other woodwaste from all parts of the buildings and the site generally as the work progresses and at the conclusion of the works.

TIMBER IN MASONRY, ETC.

Ends of timber built into walls shall be thoroughly brush treated with creosote or other approved preservatives and clean air space maintained around the timbers where they adjoin the walls.

PRIMING WOODWORK

All woodwork which is to be painted or hidden from view, backs of door frames, etc. are to be primed and painted one coat before fixing. Allow for touching up priming during progress of works.

JOINTING

(a) All joints must be made as specified or detailed and the execution of all jointing shall be to the satisfaction of the Architect.

(b) Joining surfaces of all connections exposed to the weather are to be thickly primed except where glueing is specified. Surfaces are to be in good contact over the whole area of the joint before fastenings re applied.

(c) No nails, screws or bolts are to be placed in any end split. If splitting is likely or is encountered in the course of the work, holes for nails are to be pre-bored at diameters not exceeding 4/5ths of the diameter of the nails. Clenched nails must be bent at right angles to the grain. Lead holes are to be bored for all screws.

(d) Where the use of bolts and washers are specified the holes are to be bored from both sides of the timber and are to be a diameter D+ D/16 where D is the diameter of the bolt. Nuts must be brought up tight but care is to be taken to avoid crushing of the timber under the washers.

(e) Joints in joinery must be as specified or detailed and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, springs, etc., are to be punched and puttied.

(f) Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not be considered and where seated joints are required. All glued joints shall be crosstongued or otherwise reinforced.

(g) Glues for load-bearing joints or where conditions may be damp must be of the resin type. For non-load-bearing joints, or where dry conditions can be guaranteed, casin or organic glues may be used.

JOINERY

(a) All joinery shall be accurately set out on boards to full size for the information and guidance of artisans with all joints, ironwork and other works connected therewith fully delineated. This setting out shall be submitted to the Architect and approved before the work is commenced.

(b) All joinery shall be executed with workmanship of the best quality in strict accordance with the detailed drawings. All mouldings, shall be accurately and truly run and all work planed, sand-papered and finished to the approval of the Architect.

(c) All framed work shall be cut out, properly tenoned, shouldered etc., and framed together as soon after the commencement of the building as is practicable but shall not be wedged up until the building is ready for fixing the same and any portions that warp, wind, develop shakes or other defects shall be replaced with new. As soon as required for fixing in the building the framing shall be glued together and properly wedged or pinned, etc., as directed.

(d) Should any of the joinery shrink, warp, wind or develop any other defects within the maintenance period specified in the Contract the same shall be removed and new fixed in its place together with all other work which may be affected thereby. All at the Contractor's expense.

TOLERANCE

Reasonable tolerance shall be provided at all connections between joinery works and the building carcass, so that any irregularities, settlement or other movements shall be adequately allowed for.

SCRIBING

All cornices, architraves, frames and other joinery works shall be accurately scribed to fit the contour of any irregular surfaces against which they may be required to for a close built connection. In particular, architraves are to be cut to fit against side walls and maintain proper mitres at top corners.

SHRINKAGE

The arrangement, jointing and fixing of all joinery shall be such that shrinkage in any part and in any direction shall be compensated for and not impair the strength or appearance of the work or cause damage to adjacent structures.

VENEERS

All veneers are to be specially selected for grain and colouring and no veneered work shall be put in hand until the Architect has approved the sample of grain and colour.

NATURAL FINISH

When natural finish is specified, the timber in adjacent pieces shall be matched and uniform or symmetrical in colour and grain. The surface finish is to be as specified.

FLUSH DOORS

Flush doors shall be 3mm plywood faced doors with solid or semi-solid cores, in accordance with B.S 459 Part 2, obtained from a manufacturer approved by the Architect and equal in every respect to a sample to be submitted to and approved by the Architect. Doors shall be lipped with hardwood strips on all edges and shall be finished for painting on both faces unless otherwise stated. Plywood for use on external doors shall be of exterior grade as described later.

The proportion of solid area in semi-solid doors shall not be less than 50% of the total and shall be evenly distributed throughout the door.

CHIPBOARD

Chipboard shall comply in all respects with B.S. 2604 for medium density resin bonded wood chipboard and shall be veneered or not as shown on the drawings and as described in the Bills of Quantities. Chipboard of non-British origin shall comply with the tests enumerated in the said B.S. and samples shall be submitted to the Architect for this purpose and for his approval.

BLOCKBOARD

Blockboard is to be of approved quality, solid and glued throughout. Where described as faced it shall be faced with an approved veneer of the timber specified.

PLYWOOD

Plywood shall be in accordance with B.S. 1455 and shall be of second grade and that for use externally shall be of external grade conforming at least to Clause 138 of the B.S.

HARDBOARD

Hardboard shall be oil-tempered or otherwise as specified of the thicknesses specified and is to be glued and fixed with the special hardboard nails supplied by the manufacturer. Sheeting is to be wetted the day before fixing. All sawn edges to be carefully sandpapered.

SOFTBOARD

The softboard is to be of approved quality and manufacture, fixed with galvanized clout nails or an approved adhesive as necessary, or both as specified.

PLASTIC LAMINATE

Plastic laminate shall be as manufactured by Formica Ltd. Or other equal and approved and shall be worked and fixed strictly in accordance with the manufacturer's instructions with the adhesive recommended by the manufacturer. Colours shall be selected by the Architect from samples to be submitted early in the Contract.

PLUGS

All plugs described as fixing for joinery etc., shall be approved plugs such as Rawplugs or Philplugs set into holes drilled in masonry in accordance with the manufacturer's instruction. No wooden plugs are to be used.

PROTECT JOINERY

Any fixed joinery which is liable to become bruised or damaged in any way shall be properly cased and protected by the Contractor until the completion of the works.

SITE DIMENSIONS

Before putting in hand any joinery work, whether to be built in with the carcass or fixed later, the joiner is to ascertain and check all dimensions on the site which affect or govern joinery work.

BILLS OF QUANTITIES DIMENSIONS

All wrot timber dimensions given in the Bills of Quantities are finished sizes unless otherwise stated.

IRONMONGERY

The Contractor is to check consignments of ironmongery upon receipt and store them in safe keeping until required for fixing.

All ironmongery shall be fitted and fixed in accordance with the manufacturer's instructions. Rates for fixing are to include for all cutting, sinking, boring, morticing and fitting in hardwood or softwood and for supplying all necessary and matching screws. Rates for door furniture shall also include for fixing before painting, removal during painting operations and afterwards fixing and for labeling all keys with door references and handing to the Architect upon completion.

All locks, springs and other items of ironmongery with movable parts shall be properly tested, cleaned and adjusted where necessary and left in perfect working order upon completion of the works by the Contractor who shall include for this in his prices for fixing.

GENERALLY

All pencil marks are to be removed before oiling or varnishing joinery work. Leave all joinery work perfect and clean without nail holes; clean up all waste and protect varnished work from staining or damage. Oil all locks and adjust to give a perfect fit and leave clean.

METAL WORK

GENERALLY

All materials shall be of the best of their respective kinds and conform at least to the relevant B.S. where such exists. All work shall be carried out strictly as directed and approved by the Architect before fixing.

WELDING

Welding shall comply with the provisions of B.S. 538.

MILD STEEL

Shall be of approved manufacturer complying with the requirements of B.S. 15. Welding to comply with the requirements of B.S.538, 938 and 1856. Screws, bolts, washers, etc., to comply with the requirements of B.S.916 and 1494.

GALVANISED STEEL SHEET

Shall be of approved manufacturer, free from all defects and shall hold up to the gauge specified. Galvanizing shall be to B.S. 720 Part 7.

BOLTS AND SET SCREWS

All bolts to be the best screw bolts with hexagonal heads and nuts and round washers.

Set screws to be similar but with circular flat slotted head for screwing or with round countersunk slotted head, similar to a wood screw, the threaded end suitable for screwing into tapped steel to the required depth.

ALUMINIUM

Aluminium sheet shall comply with the requirements of B.S. 1470 and be suitable for the purpose required.

Extruded aluminum sections shall be obtained from an approved source and be equal to samples to be submitted to and approved by the Architect. The surface finish shall be matt.

HOOP IRON

Provide 25mm wide 24 gauge hoop iron reinforcement and anchors to be laid where specified under masonry, and anchored in ring beams.

PRICING INFORMATION

Prices for all welded work shall include for preparing, welding and grinding to a smooth finish.

FLOOR, WALL AND CEILING FINISHES

GENERALLY

The whole of the plasterwork and other wall, floor and ceiling finishes shall be executed to the entire satisfaction of the Architect and any work rejected shall be taken down and re-executed by the Contractor at his own expense. All scaffolding, temporary rules and screeds, tools or special appliances required shall be furnished by the Contractor.

CEMENT

Shall be as described in 'Walling'

LIME

Shall be as described in 'Walling'

SAND

Shall be as described in 'Walling'

WATER

Shall be as described in Structural Engineers Specification.

WORKMANSHIP

All concrete beds or slabs shall be thoroughly brushed, cleaned, hacked if necessary and well wetted and flushed over with a cement and sand (1:1) grout immediately before screeds or pavings are laid.

Screeds and cement pavings shall be laid in accordance with the relevant B.S. Code of Practice and in alternate bays generally not exceeding 3m x 3m with neat butt joints and shall be damp cured with sand or sawdust and kept damp for at least 7 days after laying.

Adequate time intervals must be left between successive coats in two coat work in order that the drying shrinkage of the under-coat may be substantially complete. All internal and external angles shall be pencil rounded.

BOARD MARKED FINISH

Board marked finish is to be provided where shown on the drawings and shall be priced against the formwork item of 'Extra over formwork for board marked finish'.

The shuttering boards shall be heavily grained knotty cypress, or similar and approved, well seasoned and free of wind and shakes. The boards shall be in 100mm widths fixed vertically or horizontally as directed. The edges shall be butt jointed to maintain a flat surface. Unless otherwise approved, boards shall have a maximum of four uses and between each use shall be carefully cleaned from adhering grout and lightly oiled with an approved non-staining mould oil.

Every care and attention shall be paid to obtaining and maintaining throughout the course of the works a satisfactory visual appearance, free from blow holes, hungry patches and other blemishes and uniform in colour and texture.

Construction joints shall be as shown on the drawings or otherwise the pour each day shall be as directed by the Engineer.

Samples panels will be required for approval of the Engineer before work commences.

Protective covering is to be applied as necessary where finished concrete is liable to damage or staining.

CEMENT AND SAND PAVING.

Cement and sand paving shall be composed of one part cement to one part sand to three parts of 6 – 3mm gauge black trap grit, applied in two coats to the thickness shown on the drawings. The Contractor shall allow for finishing surfaces perfectly smooth and hard with a steel trowel and dead level or to true falls if so desired.

SCREEDS AND BACKINGS

Screeds and backings shall be composed of one part of cement to three parts of sand unless otherwise specified in the Bills of Quantities by volume and shall be trowelled hard and smooth to the texture required by the finish to be applied.

WATERPROOFING AGENT

Screeds and pavings described as incorporating waterproofing agent shall have Lillington's No. 1 Metallic Liquid or similar mixed in. Mixing and application shall be strictly in accordance with the manufacturer's instructions.

BONDING LIQUID

The bonding liquid shall be Sealocrete Sealobond high P.V.A. content brushed on. Surfaces to be treated shall be thoroughly cleaned down and be free from all loose material, dust, mould, oil, grease and any other foreign matter. The bonding liquid shall be allowed to dry before screeds and renderings are applied. All mixing and application shall be carried out strictly in accordance with the recommendations of the manufacturers, Sealocrete Products Ltd.

HARDENING AGENT

Screeds and pavings described as incorporating hardening agent shall incorporate Sealocrete Double Strength Premix Plus S.R.A. mixed with the gauging water at the rate of 2.3 litres of Sealocrete to every 50 kgms of cement. Mixing and application shall be carried out strictly in accordance with the recommendations of the manufacturers, Sealocrete Products Ltd.

TERRAZZO AND GRANOLITHIC WORK

The whole of the terrazzo and granolithic work is to be carried out by a specialist Sub-Contractor who is to be specifically approved by the Architect and Contractor will be required to make arrangements for the execution of this work and bear all expenses incurred. No change in the rates for this work inserted by the Contractor in these Bills of Quantities will be allowed.

The materials used and method of construction for terrazzo work are to be in accordance with the B.S. Code of Practice C.P. 204/1951.

The surface finish to terrazzo or granolithic is to be brushed, ground or polished as specified. These textures are to comply with samples approved by the Architect.

The terrazzo topping is to be 20mm thick with impo9rted white cement and 12mm marble aggregate, rolled and trowelled to a dense even surface and rubbed down at completion to a grit finished surface free from holes and blemishes. Colours shall be as selected by the Architect. The paving is to be laid in squares divided by plastic strips anchored securely in the screed and having their top edges truly level with the finished floor surface. The terrazzo work is to be laid and finished complete to the approval of the Architect. The screed between the terrazzo topping and the concrete floor is to be cement and sand (1:3) laid by the Sub-Contractor.

The granolithic topping is to be 15mm thick and shall consist of one part coloured cement to two parts aggregate to 6mm gauge mixed with 15% fine dust. Aggregate is to be 70% black trap and remainder approved local coloured stone. Colours shall be as selected by the Architect.

Paving is to be rolled and trowelled to a dense even surface and rubbed down at completion to a grit finished surface free from holes and blemishes.
The paving is to be laid squares divided by plastic strips anchored securely in the screed and having their top edges level with the finished floor surface. The granolithic work is to be laid and polished complete to the approval of the Architect. The screed between the granolithic topping and the concrete floor is to be cement and sand (1:3), laid by the Sub-Contractor.

The Contractor is to twice scrub the topping with soap and water before twice wax polishing and handing over.

MARBLE

Marble floor paving or wall cladding shall be compact and dense with a density of 2700 Kg/m3 as manufactured by Athi River Mining Ltd., P.O.Box 41908, Nairobi or other equal and approved, fixed in accordance with B.S. CP 298:1972 and manufacturer's instructions all to the Architect's approval. For floor paving, marble must be hardwearing and non – slip.
The marble supplier shall prepare fully dimensioned drawings from details supplied by the Architect and from site survey. Key numbers of each store shall be shown, together with details of all metal anchorages. No marble shall be fixed/laid until these drawings are approved by the Architect and the Contractor and local authority if necessary.

Exposed surfaces shall be finished in accordance with an approved sample.

Cramp holes and mortices shall be carefully drilled or cut to avoid stunning or fracture of the material adjacent to the hole or mortice.

The fixing cramps shall be adequately inset into the supporting background, preferably with under cut dowel holes and grouted in (1:3) cement/sand mortar, or other equal and approved epoxy/polyester resin mortars. A cavity between cladding and backing of 20mm minimum should be maintained except where dabs of weak mortar or lime putty are required to position the slabs. The back of slabs shall be coated with "shellac" or other equal and approved paint.

Metal anchorage shall be made from suitable non-ferrous metal and shall be of such size and dimension adequate to support loads imposed on them.

The length and height dimensions of individual dimension of slabs shall be $\pm$ 1mm of the specified sizes. Thickness shall be within 3mm from that specified except on the exposed ends.

Internal wall cladding shall be fixed with tight joints and external cladding shall have 3mm joints. All joints to be fitted with coloured cement and sand mortar to match marble. Paving shall be bedded solid on cement and sand screed.

The whole of marble work is to be executed by an approved Sub-Contractor.

QUARRY TILES

Where indicated lay approved clay quarry tiles bedded in cement. Joints to be 10mm wide and slightly recessed pointed in pigmented cement colour to match colour of quarry tiles to the approval of the Architect. Quarry tiles are to be laid as skirtings to these areas. Cement must not be smeared over the face of the tiles which must be selected for variety of colour and evenness of size.

VINYL ASBESTOS FLOOR TILES

Vinyl asbestos floor tiles shall be of the thickness specified as manufactured by Dunlop Kenya Ltd., or other equal and approved, and of colours to be selected by the Architect and shall be bedded in suitable mastic to a square pattern.

The whole of the floor tiling is to be executed by an approved Sub – Contractor.

Screeds must be perfectly smooth level clean and dry before laying commences and tiling must be laid strictly in accordance with the manufacturer's instructions. Tiles shall comply with B.S. 3260 and 3261 respectively. Prices shall include for giving the floor coverings two coats of an approved emulsion wax floor polish or other approved protective coating.

PARQUETRY

Parquetry is to be 8mm thick on building paper or similar backing bedded in hot bituminous mastic. After laying remove backing paper, sand to a smooth surface and finish with three coats of Polyurethane mall clear sealer.

The whole of the parquetry is to be executed by an approved Sub-Contractor.

Screeds must be perfectly smooth level clean and dry before laying commences and parquetry must be laid strictly in accordance with the manufacturer's instructions.

DIVIDING STRIPS

Dividing strips shall be 3mm thick and of a similar height as the paving in which they are embedded. Strips shall be cut to lengths and embedded in the pavings to form margins or bays to a detailed pattern or between differing floor finishes.

Prices for dividing strips are to include all necessary cutting required to ensure a flush level surface with the paving.

NON-SLIP POLISHED PAVINGS

Where pavings are described as non-slip they shall have carborundum dust sprinkled evenly over the surface at the rate of one kilogram per square metre lightly trowelled in whilst still green.

LIGHTWEIGHT SCREEDS

Lightweight screeds shall be composed of cement, sand and approved lightweight vermiculite (1:4:8) finished with a minimum 12mm thickness of cement and sand (1:5) laid whilst the base course is still green and trowlled smooth to the satisfaction of the roofing or flooring Sub-Contractor. Alternatively an approved pumice aggregate screed may be used to the approval of the Architect.

The Architect reserves the right to delete the lightweight screeds from the Contractor's work and to order their execution by a Nominated Sub-Contractor. No claim for loss of profit will be entertained in this eventuality.

DUST PROOFING COMPOUND

Concrete surfaces to be dust proofed shall have two coats of Sealocrete Concrete Surface Dressing applied in accordance with the manufacturer's instructions.

PLASTERING AND RENDERING GENERALLY

All surfaces to be plastered or rendered shall be brushed clean and be well wetted before plaster is applied. All plaster and rendering shall be kept continuously damp for seven days after application. All arrises shall be finished true and slightly rounded except where otherwise stated, and shall be run at the same time as the adjoining plaster. No partially or wholly set plaster or rendering will be allowed to be used or re-mixed.

The Contractor shall prepare samples of the plastering and rendering as directed until the quality, texture and finish required is obtained and approved by the Architect after which all plastering executed in the work shall conform to the respective approved samples.

The Contractor shall cut out and make good all cracks, blisters and other defects and leave the whole of the work perfect on completion. When making good defects, the plaster or rendering shall be cut out to a rectangular shape with edges undercut to form dovetailed key, and all finished flush with face of surrounding plaster or rendering.

Rates for plastering and rendering are to include for raking out joints of walling or hacking concrete to form a key. Instead of hacking the Contractor will be permitted to treat concrete surfaces, at his own expense, with bonding fluid, such as 'Plastaweld' manufactured by I. Manger and Son Ltd., or other equal and approved applied in strict accordance with the manufacturer's printed instructions.

INTERNAL PLASTER

Internal plaster shall be applied in two coats as follows, overall 12mm thick unless otherwise described:-
(a) 9mm First coat consisting of cement, and sand (1:4) well scratched, wetted and keyed to receive finishing coat.

(b) 3mm Finishing coat consisting of cement and lime putty (1:5) skim coat finished with a steel trowel to a smooth and even surface. Adequate time intervals must be left between successive coats in order that the drying shrinkage of the under coat may be substantially complete. All internal and external angles shall be pencil rounded.

EXTERNAL RENDERING

External rending shall consist of cement and sand (1:8) applied in one coat and finished with a wood float as specified. Unless otherwise described rendering is to be 12mm thick applied in one coat. Rendering described as 20mm thick or over shall be applied in one coat. Rendering described as 20mm thick or over shall be applied in two coats.

TYROLEAN RENDER

Tyrolean render shall be composed of Colocrete or Snowcrete coloured or white cement and a special aggregate supplied as Cullamix and mixed in the proportion of two and a quarter to two and a half parts Cullamix to one part water applied with an approved hand operated machine. A finished thickness of 6mm should be obtained in stages until the crisp texture is obtained completely obliterating the background surface and as approved by the Architect. An equivalent made-up mixture with an approved aggregate similar to Cullamix may be used with the Architect's approval.

JOINTS

At junctions of structure frame and panel walling, cut through the entire thickness of plaster with a trowel leaving a gap of not more than 1mm width.

CRACKS AND DEFECTS

The Contractor shall cut out and make good all cracks, blisters and other defects and leave the whole of the plastering and rendering perfect at completion. When making good defects the plaster shall be cut out to a rectangular shape with edges undercut, to form dovetailed kay, and all finished flush with the face of the surrounding plaster.

BAGGING

All internal and/or external surfaces specified as bagged are to be treated with a complete covering of 1:4 liquid cement/sand wash thoroughly rubbed in with an old sack to fill all cavities.

CERAMIC TILES

Ceramic tiles shall be from an approved manufacturer, and shall conform with the requirements of B.S. 1281. Tiles shall be of standard quality and unless otherwise specifically described shall be size 200 x 250 x 6mm thick for walls and 200 x 200 x 8mm thick for floors. Tiles shall be laid with continuous 2mm wide straight joints with plastic spacers and internal angles shall be butt jointed. Plastic edge beads shall be used at all external angles and at edges of panels. Tiles shall be well soaked in water, bedded in approved tile adhesive, pointed in white cement, and cleaned and polished on completion.

SAMPLES

The Contractor shall without charge prepare samples of work as directed until the quality, texture and finish required are obtained and approved by the Architect, after which all work executed shall conform to respective approved samples.

APPROVED SUB-CONTRACTORS

The Contractor shall state on the form provided and included as a tender document, the names of the Sub-Contractors he proposes to employ, and he shall not employ any other Sub-Contractors for the work without the written permission of the Architect.

PRICING INFORMATION

Prices for paving, beds and screeds shall include for the preparation of the concrete floor and painting with cement grout, as described; for any extra thickness consequent upon the concrete floor not being finished to true levels; and for laying over electrical conduits including reinforcing as necessary to the approval of the Architect.

Prices for plastering and rendering shall include for the preparation of the surfaces including raking out joints of brickwork or blockwork and hacking surfaces of concrete to form key, and for any extra thickness or dubbing out consequent upon any irregularities or inaccuracies in the surfaces to be covered.

Prices for terrazzo and granolithic work shall include for beds and backings, executing in the colours selected by the Architect, laying to panels and designs as may be directed, and floor polishing at completion. Dividing strips forming panels and designs will be measured and paid for separately.

Prices for external finishings shall include for executing work at any height above ground and for any necessary additional scaffolding, ladders, cradles, etc.

If required by the Architect, or if indicated on the drawings prices for internal plastering and external rendering shall include for forming a fair splayed edge at all junctions with fair faced concrete surfaces and for forming 12mm wide grooves with fair splayed edges at junctions of walls with structural members and at soffits of slabs etc. Prices shall also include for V-grooves or rounded grooves, not exceeding 12mm wide, in external rendering to form decorative panels.

Prices for beds and backings are to allow for a true and even finish with a steel float, which is to be scraped clean by the Contactor before receiving the finish, to the satisfaction of the finishing Sub-Contractor.

PROTECTING FLOOR FINISHINGS

The Contractor is to allow for protecting all floor and staircase finishing after laying, whether executed by himself or a sub-Contractor and will be held responsible for any damage to the finishing after laying. All floors are to be cleaned on completion of the building before handing over.

GENERALLY

Protect all fittings, joinery and finishing from plaster and other finishings and clean up all marks on completion.

GLAZING

GENERALLY

All glass shall be of approved manufacture in accordance with B.S. 952, and free from flaws, bubbles, specks, and other imperfections cut to size to fit the opening for which it is required with not more than 1.6mm tolerance all round. All glass to be delivered in proper containers with maker's name, guarantee, type of glass and thickness or weight of glass attached to the outside of the container.

The clear sheet glass shall be Ordinary Glazing (O.Q.) quality sheet glass.

The obscured glass shall be of a pattern approved after the Contractor has submitted samples to the Architect at the beginning of the Contract.

Tempered glass shall be of the thicknesses specified.

The putty for glazing shall be tropical putty of approved manufacture suitable for glazing to metal or wood frames as hereinafter specified.

All putty shall be delivered on site in the original manufacturer's sealed cans or drums. The putty is to be removed from the drum well kneaded with the minimum of linseed oil and left for 24 hours before using.

The rebates and back of handle brackets to metal windows shall be painted one coat before puttying. Before glazing the rebates of all windows shall be adequately back puttied.

Within 14 days the putty must dry and harden without wrinkling of the surface or caking and shall adhere satisfactorily to the surface of the glass and the frame.

The washleather strip shall be approved by the Architect and shall be cut to fit the exact line of bead.
The wires of Georgian wired glass, in adjacent panes, are to align both ways.

PRICING INFORMATION
Prices for glass shall include for all cutting and glazing to frames as described.

PAINTING AND DECORATING

GENERALLY

The whole of the work shall be executed to the entire satisfaction of the Architect, and all work rejected is to be re-executed by Contractor at his own expense. Subject to the foregoing, the method of application adopted i.e. brush, spray, roller, etc. are the discretion of the Contractor, unless otherwise described.

All paints shall be Grade A in accordance with the Ministry of Work approved paint list.

Sumps and drain shall not be used for the disposal of waste or dirty water.

MAINTENANCE

The Contractor shall make good after other trades have carried out maintenance work. In cases where the defective work is not caused by, or the responsibility of the Contractor, or his Sub- Contractors, he should make arrangements for payment with the party concerned. Where cracks have been made good, apply two coats to the new filling and one coat to the whole wall in which the crack has appeared.

MATERIALS

Any deviation from the materials and makes specified must be approved in writing by the Architect to whom application must be made before decoration starts.

IRONMONGERY

All ironmongery already fixed is to be removed before painting doors and refixed on completion of the finishing coat. If any paint should get to ironmongery, it must be removed with chemical solvents and not scratched off.

APPROVED SUB-CONTRACTORS

The Contractor shall arrange for the painting and decorating work to be executed by an approved Sub- Contractor. The Contractor shall state on the form provided and included as a tender document the name of the Sub-Contractor he proposes to employ and he shall not employ any other Sub-Contactor for the work without the written permission of the Architect.

MIXING

All materials shall be delivered on site intact in the original containers and shall be mixed and applied strictly in accordance with the manufacturer's printed instruction. No addition will be allowed to the made locally without the express permission of the Architect.

COLOURS

The priming, undercoats, and finishing coats shall each be of differing tints, the priming and undercoats shall be the correct brands and tints to suit the respective finishing coats, in accordance with the manufacturer's instruction. All finishing coats shall be of the colour and type specified by the Architect.

The Contractor will be required to paint trial panels and will be required to adjust tints as necessary.

AREAS TO BE READY FOR PAINTING ETC.

Before the painting or decorating is started the Contractor shall arrange that all other trades have been completed and other tradesmen removed from the vicinity of the area to be painted. All plaster, mortar, concrete, oil, or stains of any kind shall be removed by the Contractor from work to be decorated before painting commences.

PREPARATOIN

Plastered and rendered surfaces to be decorated shall be allowed to dry for a minimum of four weeks before decoration commences. Plaster with a steel trowel and fair face concrete shall be well rubbed down filled and made good as necessary and thoroughly cleaned down immediately before decoration is applied.

Plaster finished with a wood float or other rough textured surface of a similar nature shall be made good as necessary and thoroughly brushed clean immediately before decoration is applied.

Insulating board or similar surfaces shall be filled and made good as necessary and lightly brushed down to remove all dirt, dust and loose particles.

Metal work to be painted shall be scaled clean and thoroughly wire brushed.
Woodwork to be painted shall be well rubbed down. All knots shall be covered with good knotting before priming and all defects shall be filled with hard stopping after priming. Plywood shall be brush filled over the entire surface

Woodwork to receive finishes other than paint shall have all stains and pencil marks removed, be well rubbed down and have all defects leveled up with hard stopping of a colour to match the adjoining surface.

Woodwork to be clear varnished shall be well rubbed down and the varnish is to be applied with a chamois leather pad, rubbed back with fine graded steelwool between coats and afterwards buffed up to produce an approved finish.

All woodwork to be varnished is to have all pencil and other marks removed and surfaces smoothed down prior to application.

PAINTS

All paints used should be obtained from one of the following manufacturers after obtaining the Architect's approval and of the product specification hereinafter described.

a) Robbialac
b) Crown paints
c) Dulux paints
d) Sadolins

PLASTIC EMULSION PAINTS

Plastic emulsion paint for internal and external application shall be of a manufacture approved by the Architect.

BITUMINOUS SOLUTION

Bituminous solution paint for use on coated pipes shall be obtained from a manufacture approved by the Architect.

PRIMERS

Unprimed steelwork shall be primed with a Red Lead Primer.

Galvanised steelwork shall be treated with a mordant solution and primed with a Zinc Chromate primer.

Woodwork shall be primed with a Pink Wood Primer.

UNDERCOATING

The undercoat for use under enamel finishing coats shall be an approved undercoat.

PRODUCT SPECIFICATION FOR PAINTS

Product specification for paints shall be in accordance with the composition requirements and may be required to be tested by the M.O.W. Materials Testing Branch.

	1st Quality Emulsion Paint	2nd Quality Emulsion Paint	1st Quality Alkyd Gloss Paint
Non-volatile (B.S) Content 3900 B2)	Must not exceed 50% by weight	Not more than 60% by weight	Less than 50% by weight
Pigment Volume Concentration	Not more than 5%	Not more than 70%	Less than 25%
Resin type	Vinyl Acetate/ Acrylic Ester Copolymer	Vinyl Acetate/ Acrylic Ester Copolymer	Long Oil Alkyd minimum oil length not less than 60%
Opacity Requirement (contrast ratio to B.S.3900 D4)]	Not less than 80%	Not less than 70%	Not less than 90%
Pigment/Binder Ratio	Not more than 2:25:1	Not more than 2:75:1	Not more than 2:25:1

PRICING INFORMATION

The numbers of coats stated in the descriptions in these Bills of Quantities shall be applied in addition to any primers, stoppers, fillers, sealers, knotting, stopping, etc. required. The Contractor's prices shall be deemed to include for supplying and applying all such preparatory materials as may be required by the Standard Specification as recommended by the manufacturer of the finishing coat for the particular surface to be covered. The Contractor's prices shall further include for all other preparatory.

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 3
PRELIMINARIES,TENDERING INSTRUCTIONS AND CONTRACTAGREEMENT.

Comprising -:

- **Signature page**
- **Tendering Instructions**
- **Forms of Tender**
- **Form of surety undertaking**
- **Form of performance Bond**
- **Contract Agreement**
- **Preliminaries (To be priced)**

SECTION NO. 3 ——	PAGE NO.
Signature Page	3.2
Tendering Instructions.	3.3 – 1.6
Form of Tender	3.7 – 3.8
Form of surety undertaking	3.9
Form of Performance Bond	3.10
Appendix to Conditions of contract	3.18
Contract Agreement.	3.19 – 3.20
Preliminaries	3.21 – 3.39

SUPPLIED AS PART OF THE CONTRACT FOR THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR

THE
TEACHERS SERVICE COMMISSION
PRIVATE BAG – 00100,
NAIROBI.

The Contract for the above-mentioned works, entered into the …….

…… day of ……..……2019

by the undersigned parties, refers to these Bills of Quantities which shall be read and construed as part of the said Contract.

……..	……
TEACHERS SERVICE COMMISSION (EMPLOYER) PRIVATE BAG – 00100, NAIROBI.	**(CONTRACTOR)**
DATE ……. 2019	**DATE ……2019.**

Signature page

TENDERING INSTRUCTIONS

1. The tenderer is expected to check the number of the pages and should he find any missing or in duplicate or the figures or type indistinct, he must inform the ***Supply Chain Management Division (SCMS), Teachers Service Commission***

2. Should the Contractor be in doubt about the precise meaning of any item, word or figure, for any reason whatsoever, or observe any apparent omission of words or figures, he must inform the ***SCMS (TSC)*** in order that the correct meaning may be decided upon before the date for the submission of the Tender. No liability whatsoever will be admitted or claim allowed in respect of errors in the Contractor's Tender due to mistakes in the Bills of Quantities, which should have been rectified in the aforesaid manner.

1. Further information or clarification may be obtained from ***Supply Chain Management Division Services Division (SCMS), Teachers Service Commission***
at the following address: -
Supply Chain Management Division Services Division (SCMS),
Teachers Service Commission
Upper Hill, Kilimanjaro Road,
Private Bag, 00100
The SCMS will clarify and inform all Tenderers of questions raised and answers to such questions in writing. Verbal explanations will not be binding.

2. The tenderer shall not alter or otherwise qualify the text of these Tender documents. Any unauthorized alterations or qualification shall be ignored and the text of the documents as printed will be adhered to. Any comments which the Tenderer desires to make shall not be placed in the annexed documents, but shall take the form of a separate statement in English Language as briefly as possible and giving reference to page, clause or item number of the Tender Documents.

3. **The tenderer shall price items of preliminaries fully. Should no price be inserted against any preliminary item, it shall be assumed that the tenderer has covered all costs associated with that item elsewhere in the Bills of Quantities and shall nevertheless be required to comply with such and all items of preliminaries.**

4. All items of measured work shall be priced in detail and tenders containing lump Sums to cover trades or groups of work must be broken down to prices of each item before they will be accepted. Lump Sums to cover items of preliminaries shall be likewise broken down if so required.

5. In no case will any expenses incurred by the Tenderer in preparation of this Tender be reimbursed. Tenderers are strongly advised to visit the site to obtain any information that may be helpful in the preparation of their tenders.

6. The Copyright of these Bills of Quantities is vested in TSC and no part thereof may be reproduced without their express written permission.

7. The tenderer shall be solely responsible for the accurate ordering of materials in accordance with Drawings and the Architect's instructions and no claim for any loss or expenses will be entertained for orders for materials based upon the Bills of Quantities.

8. The tender must be priced, cost and totaled in Kenya Currency, i.e. Kenya Shillings and Cents.

3.3

9. Tender Documents: -

Tenderers will be supplied with one complete set of the following tender documents: -

(a) Public Procurement Oversight Authority Conditions of Contract.
(b) Architectural Specifications.
(c) These instructions, Form of Tender, Form of Surety Undertaking, Form of Performance Bond, Appendix to Conditions of Contract, Contract Agreement Form and Preliminaries.
(d) Bills of Quantities.

Further copies of these documents may be obtained from SCMS Division Teachers Service Commission but a charge will be made for them and no refund made on their return.

10. Site Conditions and Visits: -

Notwithstanding the fact that surveys have been made each tenderer must make local and independent examination and inquiries as to the physical conditions prevailing at the Site and each Tenderer shall obtain his own information regarding all matters and things that may in any way influence him in making a tender and fixing the prices to be inserted in these documents. Each Tenderer shall satisfy himself as to the risk, obligations and responsibilities to be undertaken in the Contract to be entered into by him should his tender be accepted**.** ***There shall be pre-tender conference on*** **Thursday 5th September, 2019 at 9.00 am**. All costs and charges incurred by the Tenderer in connection with the above-mentioned visit shall be borne by the Tenderer.

11. Local Legislation: -

Tenderer's attention is drawn to the requirements of **THE FACTORIES (BUILDING OPERATIONS AND WORKS OF ENGINEERING CONSTRUCTION) RULES, 1978, CAP 514** of the Laws of Kenya (as amended from time to time) which are to be strictly complied with at all time.

12. Completion and submission of Tenders: -

Tenders shall be completed in indelible ink on the Form provided herewith and the Form one copy of all documents required to accompany the tender must be submitted. All information called for therein must be inserted and the documents signed and dated as and where indicated.

The completed Tender Documents and all accompanying documents should be enclosed in a sealed double enveloped package. The inner envelope should bear the tenderer's name while the outer one should bear the Tender Name: "**THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTITIONING WORKS ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI**

Addressed to The Commission Secretary/Chief Executive Officer: -
Teachers Service Commission,
PRIVATE BAG – 00100,
NAIROBI.

3.4

So as to be received not later **Thursday 5th September 2019 at 9.00 am**. Tenderers or their representative may be present fifteen minutes in advance if they so wish. Tenders received after the appointed time will be returned unopened.

13. Evaluation of Tenders: -

No Tenderer will be permitted to alter the substances or price of his Tender after tenders have been opened. However, clarifications not changing the substance of the Tender may be accepted and the Employer reserves the right to require the Tenderer to supply such clarifications upon demand.
Unit prices will prevail in case of arithmetical errors in extension.
(See Tender Evaluation Criteria on pages 3.11 – 3.17 ahead)

14. V.A.T: -

Tenderer's attention is drawn to the requirements of Government's VAT (Value Added Tax) or /and other statutory tax requirements, which are to be strictly complied with all times. The contractor must allow for such taxes like VAT and other levies etc. in his tender. VAT shall be allowed for at the summary page. All other levies shall be allowed for in the preliminaries or within the tender rates. The amount of VAT and withholding tax payable will be deducted from every payment and paid directly to the commissioner of VAT.

15. Award of Contract: -

The employer reserves the right to reject any tender without giving a reason and does not bind himself to accept the lowest or any tender.
If the successful Tenderer fails to enter into Contract Agreement or to furnish the Performance Bond within thirty days after letter of notification, the Employer shall be entitled (but not obliged) by notice in writing to withdraw acceptance of the tender and such acceptance if so withdrawn shall thereupon be void and as though it had never been given and the Tenderer shall have no claim against the Employer whether for damage, specific performance or otherwise in respect of such acceptance or withdrawal.

16. Tender Validity Period

The tenders shall remain valid for One and twenty (120) days from the date of tender opening. No Tenderer may withdraw his tender within this period. If one requests that then he will lose his bid security.

17. Tenderer's Obligations: -

The tenderer shall treat the contents and details of these documents as private and Confidential. The Tenderer shall acknowledge receipt of the Tender Documents.

FORM OF TENDER:

TO:

THE COMMISSION SECRETARY/CHIEF EXCUTIVE OFFICER,
TEACHERS SERVICE COMMISSION,
PRIVATE BAG – 00100,
NAIROBI.

Dear Sir/Madam,

THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTITIONING WORKS ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI

1. In accordance with the Conditions of Contract, Specifications, Drawings 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 Project Manager'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 until ……. *[Insert date],* and it 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. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this _____day of _____20_____ Signature _____ in the capacity of_____duly authorized to sign tenders for and on behalf of
……. *[Name of Employer]*
of……. [*Address of Employer]*

Witness; Name_____

Address_____

Signature_____

Date_____

FORM OF SURETY UNDERTAKING

In the event of
……

…….. **(TENDERER)** of ……...……

……... **(ADDRESS)** being awarded the

Contract for the proposed **THE PROPOSED RENOVATION OF THE ROOF AND RE-PARTIONING WORK ON THE 7TH FLOOR AT TSC HEADQUARTER - NAIROBI**

we ……

……. **(SURETY)**

Of …… **(ADDRESS)**

Hereby undertake to provide a guarantee in the form of Performance Bond appended to these Tender document under seal if required for the due performance of the Contract to the extent of ten percentum **(10%)** of the Tender submitted by …….....

…… **(TENDERER)**

Should the said ……...

…… **(TENDERER)** not be awarded the Contract it is understood that this offer shall become null and void.

Signed for and on)
Behalf of Surety) : …….

NAME (BLOCK LETTER) : ……

ADDRESS : ……...

……..

DATE : …… 2019

FORM OF PERFORMANCE BOND

To be used with Agreement and schedule of Conditions of Building Contract KNOW

ALL MEN BY THESE PRESENTS that we …….

……. **(SURETY)**

of …….

ARE BOUND to ……..**(EMPLOYER)**

of ……..

in the sum of **KENYA SHILLINGS** ……

…….. (Kshs……..……)

to by paid by us to the said …… **(EMPLOYER)**

WHEREAS by an agreement in writing dated ……

……**(CONTRACTOR)**

of……

contracted with the said ……**(EMPLOYER)**

to (description of works) …….

……..

In the said agreement; particularly described and conformable thereto. NOW THE

condition of the above – written bond is such that if the said ……

……. **(CONTRACTOR)** his / their executors, administrators, successors or assigns shall conform to the said agreement then

the above – written bond to be void otherwise to remain in full force. Provided always and

it is hereby agreed and declared that the liability of us the said……

under the above – written bond shall not in any way be discharged or impaired by reason of any

breach or breaches (willful or otherwise) or the said agreement committed with or without the

knowledge or consent of the said …… **(CONTRACTOR)** by or on behalf or with the knowledge or consent of the said ……. **(EMPLOYER)**

In witness whereof we have hereunto set our hands this …… day of …….. Two Thousand and Ninteen.

……. ……

Witness Surety

TENDER EVALUATION CRITERIA

After tender opening, the tenders will be evaluated in 3 stages, namely:

1. Preliminary examination;
2. Technical evaluation;
3. Financial Evaluation

STAGE 1: PRELIMINARY EXAMINATION

This stage of evaluation shall involve examination of the mandatory requirements as set out in the Tender Advertisement Notice or Letter of Invitation to Tender and any other conditions as stated in the bid document.

S/No.	Mandatory Requirements	Responsive or Non Responsive
MR1	Be a Registered Company incorporated in Kenya under the Companies Act CAP 486. (Attach copy of certificate of incorporation for Main Contractor and Domestic Sub – Contractors)	
MR2	Must provide an original bid security of 2% of the contract price from an approved reputable commercial bank or PPRA approved insurance company. Any other form of bid bond will not be accepted. The bid security should be valid for 150 days after the date of tender opening. TSC shall seek information of bid security validity from the issuing Financial Institutions or Insurance firms.	
MR3	Must provide a valid copy of Tax Compliance Certificate (for Main and Domestic Sub – Contractors)	
MR4	Must provide copy of valid PIN/VAT Certificate (for Main and Domestic Sub – Contractors)	
MR5	Must provide valid registration certificate and practicing license from National Construction Authority in the following categories: • Main Contractor (Buildings) NCA 6 and above • Electrical NCA 7 and above • Internal Plumbing Drainage and Fire Fighting NCA 8 and above • Air Conditioning and Mechanical Ventilation NCA 8 and above Main contractor and domestic sub-contractors must provide certified copy of registration certificate and Practicing License from the following relevant statutory bodies: • Energy Regulatory Commission (ERC), • Communication Authority of Kenya (CAK), • County Governments, and • Water Management Boards	

	(The certification must be done by the commissioner of oath or issuing authority)	
MR6	Form of Tender must be duly completed, signed and stamped in the format provided by the Director or if delegated, attach a letter of attorney. The form of tender should be with no alteration or cancellation. Alteration and cancellation will lead to disqualification.	
MR7	Copy of audited financial statements of accounts for the last three years (2016,2017 and 2018) signed by an Accountant/Auditor Registered as a member of ICPAK.	
MR8	Must fill, sign and stamp the Confidential Business Questionnaire in the format provided for Main Contractor and Domestic Sub-contractors.	
MR9	Must submit CR12 form from the Registrar of Companies for Main Contractor and Domestic Sub-contractors for Limited Companies and National Identity Card for Sole proprietorship	
MR10	Interested tenderers (Main Contractor and Sub-contractors) must provide a letter of authority authorizing the Teachers Service Commission to seek for confirmation or counter check any of the information provided in the tender document from a relevant source	
MR11	During the pre-tender site visit, tenderers will present their signed and stamped site visit forms downloaded from the tender document for signature by TSC officers.	
MR12	Attach copy of current/valid single business permit/license from the County Government for Main Contractor and Domestic Sub-contractors	
MR13	Must fill, sign and stamp Anti-Corruption Declaration/commitment pledge form.	
MR14	One original and two copies of tender documents properly bound and paginated/serialized/numbered on all pages and attachments.	
MR16	Must fill, sign and stamp Debarment Declaration form in the format provided.	
MR 17	The Bid document must be submitted in the format given out by the procuring entity	
MR 18	The tenderer must submit ONE ORIGINAL COPY AND TWO SETS OF COPIES of the tender document and any other information as may have been instructed in the tender, advertisement/Invitation letter.	

Note: ***Only bids meeting all the above requirements shall proceed to Second phase of Technical evaluation. Bidders who fails to pass the Mandatory requirements shall be eliminated and shall not proceed to financial evaluation stage.***

STAGE 2 TECHNICAL EVALUATION:

The tender document shall be examined based on clause 13 of the 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 and their capability and adequacy of resources to effectively carry out the subject contract. Tenderers shall be required;

a) To fill the Standard Forms provided in the bid document for the purposes of providing the required information.
b) The Contractor shall supply equipment/items that complies with the technical specifications set out in the bid document. In this regard, the bidder will be required to submit relevant technical brochure/catalogues with the tender document, highlighting the Catalogue Number of the proposed items. Such brochures/ catalogues should indicate comprehensive relevant data of the proposed equipment/items which should include but not limited to the following:
   (i) Standards of manufacture;
   (ii) Performance ratings/characteristics;
   (iii) Material of manufacture; and
   (iv) Any other necessary requirements.

The bid will then be analyzed, using the information in the technical brochures, to determine compliance with General and Particular 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's and Items indicating the Country of Origin, Model/Make/Manufacturer and catalogue numbers of the Items/Equipment's they propose to supply.

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

TABLE 1: Assessment for Eligibility

THE TECHNICAL EVALUATION CRITERIA FOR MAIN CONTRACTOR AND DOMESTIC SUB - CONTRACTORS

Item	Description	Point Scored	Max. Point	
i.	**Tender Confidential Questionnaire Form** • Completely filled ---------- 5 • Not filled ---------- 0		5	**5**
ii	**Key Personnel (Attach evidence in form of certificates)**			**20**
	Director of the firm • Holder of degree in relevant Engineering field ---------- 6 • Holder of diploma in relevant Engineering field ---------- 5 • Holder of certificate in relevant Engineering field---------- 3 • Holder of trade test certificate in relevant Engineering field --- 2 • No relevant certificate ---------- 0		6	
	At least 1No. degree holder of key personnel in relevant engineering field • With over 10 years relevant experience ---------- 6 • With over 5 years' relevant experience---------- 4 • With under 5 years relevant experience ---------- 2		6	
	At least 1No Diploma holder of key personnel in relevant engineering field • With over 10 years' relevant experience---------- 4 • With over 5 years' relevant experience ---------- 3 • With under 5 years relevant experience ----------1		**4**	
	At least 2No artisan (trade test certificate in relevant engineering field) • 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 ---- 1		4	
iii	**Contract completed in the last five (5) years (Max of 4No. Projects)- Provide Evidence** • Must have completed four (4) projects with similar nature, complexity and magnitude in the last five (5) years (2014, 2015, 2016, 2017, 2018) each of which must be of a value more than 70% and above of contract price quoted for this project (***Attach signed project contract forms and completion certificates***) @ 5 marks each • Complete two (2) projects of similar nature, complexity or magnitude in the last three (3) years (2016, 2017, 2018) with a value between 50% - 69% of the contract price @ 5 marks each ***(Attach signed project contract forms and completion certificates***) • No completed project of similar nature ----------0		20 10	**30**
iv	**On-going projects – <u>Provide Evidence</u>** • No Project of similar nature, complexity and magnitude -- 8 • Three and below Projects of similar, nature complexity and magnitude –---- ----------4		8 4	**8**
v	**Schedule of contractor's equipment and transport ownership/Lease) Please attach proof e.g. lease agreements or ownership/Logbooks. For each Logbook or Lease agreement 2 marks**		5	

	a) Relevant Transport • Means of transport (Vehicle) ---------- 5 (Provide 5 Logbooks) • No means of transport ---------- 0			**10**
	Please attach proof e.g. lease agreements or ownership/Logbooks. For each Logbook or Lease agreement 2 marks **b) Relevant Equipment** • Has relevant equipment for work being tendered ---------5 (Provide 5 Logbooks) • No relevant equipment for work being tendered ---------- 0 **TSC shall seek confidential information from KRA on validity of the Logbooks and do the same to the Lessor**		5	
vi	**Financial report**			**12**
	a) Audited financial report for the last three (3) years (2016, 2017, 2018) The Audited Financial Reports must be signed by a registered Accountant or Auditor who is a registered member of **ICPAK** • Average Annual Turn-over for the last three years above, greater than or equal to 3 times the cost of the project @ 4 marks • Average Annual Turn-over for the last three (3) years above, greater than or equal to two (2) times the cost of the project @ 2 • Average Annual Turn-over for the last three (3) years above. Less than two (2) times the cost of the project @ 1		12 6 1	
	b) Evidence of Financial Resources (cash in hand, lines of credit, over draft facility etc.) • Must demonstrate access to--or availability to liquid cash/ asset, lines of credit and other financial means sufficient to the construction provide an estimated cash flow for the first 3months, August, September and October of Kenya shillings 10m and above. Provide measurable evidence @ 13 Marks • Has provided evidence of financial resources as per above estimated at a cost of Kenya Shillings Five Million @ 5 Marks • Has not indicated sources of financial resources @ 0 Marks		13 5	**13**
vii	**Litigation History** • Duly Filled ---------- 2 • Not filled ---------- 0		2	**2**
	TOTAL			**100**

The pass marks is 70 %

Bidders who scores less than 70% shall be eliminated and shall not proceed to the financial evaluation

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 the Arithmetic Errors

i) 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 subjected to correction, adjustment or amendment in any way by any person or entity;

ii) Any arithmetical error will directly lead to disqualification.

B) Comparison of rates-

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

The evaluation committee shall evaluate the responses and make an appropriate recommendation to the procuring entity's Head of Procurement 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 demonstrable 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.

RECOMMENDATION FOR AWARD

The successful bidder shall be the tenderer with the lowest evaluated tender price.

APPENDIX TO CONDITIONS OF CONTRACT

Period of Final Measurement	**Six (6) months** after Practical completion
Defects Liability Period	**six (6) months from** Practical completion
Date of possession	to be agreed
Date of completion the date of possession	……. **weeks** from
Liquidated and Ascertained Damages	at the rate of . **Shs.200,000:00=per** Week or part thereof.
Period of interim Certificates	Every four weeks
Period of Honouring Certificates	Within **30days of** presentation of Certificates
Percentage of Certified Value Retained	**10%** of Contract Sum
Limit of Retention Fund	**5%** of Contract Sum
Amount of Surety	**10%** of Contract Sum

CONTRACT AGREEMENT

ARTICLES OF AGREEMENT

Made the ……day of ……..2019

BETWEEN: TEACHERS SERVICE COMMISSION

……

……

(hereinafter called **"the Employer** ") of the one part AND

……

……

……

(hereinafter called **" the Contractor**") of the other part.

WHEREAS the Employer is desirous of the **PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR** (hereinafter called "the Works")

…….

and has caused Drawings and Bills of Quantities showing and describing the work to be done to be prepared by or under the direction of the Architect. **AND WHEREAS** the Contractor has supplied the Employer with a fully priced copy of the said Bills of Quantities (which is hereinafter referred to as "the Contract Bills").

AND WHEREAS THE said Drawings numbered ……..……

…….

…….

……(hereinafter referred to as "the Contract Drawings") and the Contract Bills have been signed by or on behalf of the parties herto.

NOW IT IS HEREBY AGREED AS FOLLOWS

1. For the consideration hereinafter mentioned the contractor will upon and subject to the Conditions annexed hereto carry out and complete the Works shown upon the Contract drawings and described by or referred to in the Contract Bills and in the said Conditions.

2. The Employer will pay to the Contractor the sum of Kenya Shillings…….

   ……

   Kshs ……. Cts …….

   (hereinafter referred to as the Contract Sum) or such other sum as shall become payable hereunder at the times and in the manner specified in the said Conditions.

AS WITNESS the hands of the said parties

Signed by the "said

"Employer"

……. ……

TEACHERS SERVICE COMMISSION

In the presence of:

Name: ……

Address: ……

Description: ……

Signed by the said:

"CONTRACTOR"

……. …….

…… ……

In the presence of:

Name: ……..

Address: …….

Description:……..

PARTICULAR MATTERS

A. **EMPLOYER:-**

The term "Employer" wherever used in these Bills of Quantities and in all other Contract Documents shall mean:-

TEACHERS SERVICE COMMISSION.
PRIVATE BAG - 00100,
NAIROBI.

PROJECT MANAGEMENT TEAM

B. **ARCHITECT: - (OR PROJECT MANAGER)**

SKAIR ASSOCIATES LTD.
P.O BOX 14050 – 00100,
NAIROBI.

C. **QUANTITY SURVEYOR:-**

BEEQUE CONSULTANTS LTD.
P.O BOX 3280 – 00200,
NAIROBI.

D. **STRUCTURAL ENGINEER:-**

MANKAN CONSULTING ENGINEERS LTD.
P.O BOX 57866 – 00200,
NAIROBI.

E. **MECHANICAL AND ELECTRICAL ENGINEER:-**

METROCOM CONSULTANTS LTD.
P.O BOX 27090 – 00100,
NAIROBI.

F. **CONTRACTOR:-**

The term "the Contractor" wherever used hereinafter and in all Contract Documents shall mean the person or persons, partnership firm or company whose Tender for the works hereinafter defined has been accepted by the Employer and who has, or have signed this Contract and shall include his or their heirs, executors, administrators, assignees, successors and duly appointed representative (s)

ITEM	DESCRIPTION	SHS.
(A)	**EMPLOYER'S REPRESENTATIVE: -** Wherever the term "Architect, Quantity Surveyor and Engineers" as defined above are used in all Contract Documents they shall be deemed to imply the "Employer's Representatives" to represent them on behalf of the Employer or the Successor in office of such persons as may be deputed by such representatives to act on their behalf for the purpose of this contract.	
(B)	**LOCATION OF SITE:-** The site of the proposed works is at **TSC House, Kilimanjaro Road Upper hill, Nairobi.**	
(C)	**SCOPE OF CONTRACT:-** The works to be executed under this contract comprise: **Renovation of existing roof of the 7th floor and re – partitioning of 7th floor - including Electrical and Mechanical services.**	
(D)	**DESCRIPTION OF THE WORKS** **1.0 Preliminaries:-** These comprise tendering instructions and Contract Agreement, on section No.1 pages 1.1 to 1.32 of these Bills of Quantities. These shall be fully priced, broken down and VAT allowed, on page 1.32 on that section of the Bills. **2.0 Measured Builder's Works:-** These shall comprise the following:- **BILL NO. 1 – Re – Partitioning Works at 7th Floor:-** **Element No.1 – Preparatory works** – these are demolitions of semi glazed, semi MDF aluminum framed partitions. Removal of timber flush doors with timber frames and removal of ironmongery, hacking existing ceramic floor tiles and preparing the surfaces for new tiles. Removal of floor carpets. **Ceilings**: - removing existing acoustic ceilings complete with its suspension and preparing the surfaces to receive new ceiling finishes. **Electrical Works: -** removal of existing fittings complete with associated wiring and preparing the surfaces to receive new fittings. **Plumbing and Drainage Works: -** New sanitary installation in the disabled persons toilet.	

	Carried to collection **Kshs.**	

ITEM	DESCRIPTION	SHS.
	Element No.2 – **Partitioning** – Comprises: new gypsum board On the lower parts and 6mm glass on the upper side of the partitions all on aluminum frame.	
	Element No.3 – Doors and windows comprises: mahogany door frames, Architraves and Quadrants. Doors shall be – Laminated MDF glazed timber panel doors, solid timber panel doors complete with ironmongery. Windows shall be fitting with new vertical blinds and cleaned.	
	Element No.4 – Internal wall finishes. New ceramic tiles will be supplied and fixed in the kitchen. Existing wall surfaces will be painted three coats of emulsion paint.	
	Element No.5 – Floor finishes – New ceramic tiles will be supplied and fixed in the kitchen. New carpet will be fixed, over the entire floor.	
	Element No.6 – Ceiling finishes – New gypsum plasterboard on screw – up aluminum tee suspension grid including hangers. Fibre acoustic suspended ceiling panels.	
	Element No.7 – Joinery Fittings and some old doors – to be Re - varnished.	
	BILL NO.2 – Renovation of The Roof:- This will be limited to repairing the leaking roof and repairing and painting of parapet walls only	
	3.0 SERVICES: Electrical and Plumbing Works – these will be done by Domestic Sub – Contractors. Main Contractor and his Domestic Sub – Contractors will tender for the same.	
	Carried to collection **Kshs.**	

ITEM	DESCRIPTION	SHS.
	PAYMENTS TO DOMESTIC SUB-CONTRACTORS: -	
A.	The main Contractor will be fully responsible for paying his Domestic Sub-Contractors but the Employer reserves the right in very exceptional circumstances to make such payments direct in the interest of the project where the completion thereof might be jeopardized by any dispute between the Main Contractor and any of the Sub-Contractors.	
	PRELIMINARY ITEMS: -	
B.	(a) All preliminary items shall be consistently priced and no "Front loading" shall be allowed. Any amount in excess of what the Employer, may consider as a fair proportion of the Contract Sum shall be relocated in the measured section of these Bills of Quantities or may, at the discretion of the Employer, render the tenderer liable to disqualification.	
	(b) Lump sums entered against any item of General or Particular Preliminaries will be included in the appropriate valuation and interim certificates according to reasonable assessment by the Quantity Surveyor of actual costs involved in the item.	
	(c) Any balance between this assessment and the figure in the Bills of Quantities will be included in subsequent valuations by Monthly installments over the balance of the Contract period.	
	Bills of Quantities will be included in subsequent valuations by monthly installments over the balance of the contract period.	
	PRICE FLUCTUATIONS:-	
C.	Shall not apply. The contract shall be a fixed price contract	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**DEFINITION AND ABBREVIATIONS:-** Terms used in these Tender Documents shall be interpreted as follows:- **"As described"** shall mean as described in the 'General description of materials and workmanship' here before in the Bills of Quantities and "General specifications for Building works" published by Ministry of public works. **"B.S"** shall mean the current British Standard Specification published by the British Standard Institution, 2 Park Street, London W.1 England. **"B.S.C.P"** shall mean British Standard Code of Practice **"mm"** shall mean linear millimetre(s). "**mm^2 "** shall mean square millimetre(s). **"m or lm"** shall mean linear metre(s). **"sm or m^2"** shall mean square metre(s). **"cm or m^3"**shall mean cubic metre(s). **"Kg"** shall mean Kilogram(s). **"No"** shall mean number. **"Hr"** shall mean hour. **"Pr"** shall mean Pair. **Ditto** shall mean the whole of the proceeding description except as qualified in the description in which it occurs. Where it occurs in brackets, it shall mean the whole of the preceding description which is contained in the appropriate brackets. **M/S** Shall mean Measured Separately **"Approved"** shall mean as approved by the Employer's Representative **"As Directed"** Shall mean as directed by the Employer's Representative **Carried to collection Kshs.**	

ITEM	DESCRIPTION	SHS.
A.	**DEFINATION AND ABBREVIATIONS (CONT'D):-** **"Selected"** Shall mean selected by the Employer's Representative **"Singular and Plural"** Words importing the singular only shall also include plural and Vice-versa where the context required. **"100 – 200"** shall mean over 100 but not exceeding 200. The same shall construed for all similar descriptions.	
B.	**PRICING BILLS OF QUANTITIES: -** The Contractor shall price out individually and in detail all items in these Bills of Quantities and under no circumstances will Lump Sums be allowed. All rates and figures entered in the Bills of Quantities must be done in ink. Without authority, the Contractor shall not alter or otherwise qualify the text of the Bills of Quantities, otherwise such alterations may render the tender liable for disqualification and in any case will be ignored.	
B.	**SITE LEVELS: -** Before commencing work, the Contractor must arrange for and agree with the Architect and Quantity Surveyor the existing site levels and similarly establish and agree a bench mark.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**SETTING OUT:-** The Contractor shall set out the works in accordance with dimension and levels shown on the drawings and shall be responsible for the correctness of all dimensions and levels so set out by him and will be required to amend all errors arising from inaccurate setting out at his own cost and expense. In the event of any so set out by him and will be required to amend error or discrepancies these shall be reported by the Contractor to the Architect for his immediate attention. No work shall commenced by the Contractor until he has received instruction from the Architect to adjust such discrepancies which may be proved. Upon receipt of such instructions, the Contractors shall thereupon be responsible for adjustments necessary. No claim for extra expense or relief from the provisions of Clause 5 of the Conditions of Contract based on any discrepancy or error in the dimensions or levels shown on the Drawings may me made thereafter. Before any work is commenced by the Sub-Contractors or specialists firms, dimensions must be checked on the site and/or building and agreed with the Contractor irrespective of the comparable dimensions shown on the drawings. The Contractor shall be responsible for the accuracy of such dimensions.	
B.	**TOOLS, PLANT AND SCAFFOLDING:-** All materials and workmanship used in the execution of the works shall be of the best quality and description unless otherwise described. Any materials condemned by the Architect shall be immediately removed from site at the Contractor's expense. The standard of workmanship shall be inferior to Current British code of practice and/or equivalent Kenya Building Standards. No material for use in the permanent construction are to be used for any temporary or other purpose other than that for which they are provided. The Contractor shall provide all materials necessary, cranes, hoists and other plant including ladders, staging, access gangways, tarpaulins, tools, moulds, template etc necessary for the proper executions of the works and properly maintain them during the Contract period.	
	Carried to Collection **Kshs.**	

ITEM	DESCRIPTION	SHS.
A.	**SANITATION FOR THE WORKS:-** The Contractor shall provide and maintain proper sanitation of the works to the satisfaction of the Local Authorities, labour Department and the Architect.	
B.	**SECURITY OF WORKS:-** The Contractor shall be entirely responsible for the security of all the works, stores, materials, plants, personnel, etc both his own and sub-contractors and must provide all necessary watching, lighting and other precautions as necessary to ensure security against theft, loss or damage and the protection of the public. All articles and materials supplied by the Employer must be signed for by the Contractor at the time taking delivery as having received them in good order and thereafter the Contractor shall be responsible for any damage or loss of the same.	
C.	**SUPERVISION AND WORKING HOURS:-** The works shall be executed under the direction and reasonable satisfaction of the Architect who shall at all times during normal working hours have access to all works or any other places where such work is being prepared for the contract. Working hours shall be those generally in force in the Building and civil Engineering Trades in Kenya. No work shall be carried out at night or gazette holidays unless the Architect shall so direct. No work shall be covered up nor shall any concreting be carried out in the absence of the clerk of works without the prior approval of the Architect in writing.	
D.	**DISTURBANCE OR NUISANCE:-** The Contractor shall allow for taking all necessary precautions in the order of execution of the works so as to avoid causing disturbance or nuisance to the occupants of any existing buildings on or adjacent to the works and to the public and for complying with the Architects instruction in this project.	
	Carried to Collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**LABOUR REGULATIONS & FAIR WAGES:-** The Contractor shall comply with the Regulation of Wages and Conditions of Employment Act and pay wages and other emoluments and observe working hours and Conditions of labour not less favourable than the minimum remuneration and conditions of employment applicable in the district in which the work is carried out.	
B.	**ADVERTISEMENTS:-** Any form of advertising upon the works or any place which the Contractor has possession for the purpose of carrying out this contract shall not be allowed except with express and written consent of the Architect and the Contractor shall not take, publish or advertise any photographs or use the name of any Consultants without consent granted in the aforesaid manner.	
C.	**HOARDING:-** Hoarding will be required. Provide erect and maintain all necessary scaffolding, sufficiently, strong and efficient for due performance of the works including sub-contract works, provide special scaffolding as required by sub-contractors, alter and adopt all scaffolding as when required during the works and remove on completion.	
D.	**PLANT AND LABOUR RETURNS:-** The Contractor shall prepare and deliver to the Architect or his representative detailed returns showing the number and category of his supervisors, numbers of the several classes of labour and plant employed on the works together with those of all his Sub-contractors. The Contractor shall keep a visitors book on the site and shall ensure that the names of all visitors to the site are duly recorded.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**TRANSPORT TO AND FROM THE SITE:-** The Contractor shall include in his tender price for the transport of materials, workmen, etc, to and from the site of the proposed works, at such hours and by such routes as are permitted by the Authorities.	
B.	**BLASTING OPERATIONS:-** Blasting will only be allowed with express permission of the Architect. All blasting operations shall be carried out at the Contractor's sole risk and in accordance with any Government Regulations laid down by the Architect governing the use and storage of explosive.	
C.	**INSURANCES:-** The Contractor shall ensure as required in clause 30 – liability and insurance of the conditions of contract. No payment on account of the work executed shall be made to the Contractor until he has satisfied the Architect either by production of an insurance policy or an Insurance Certificate that the provisions of the foregoing insurance Clauses have been complied with. Thereafter, the Architect shall from time to time ascertain that premiums are duly paid by the Contractor who shall, if called upon to do so, produce receipted premium renewals for the Architect's inspection. The Contractor shall maintain as required throughout the execution of the works and make good any damage, at his own expense, to public and private roads arising from or consequent upon the execution of the works to the satisfaction of the owners and the Architect.	
D.	**WATER FOR WORKS:-** The Contractor shall provide at his own risk and cost all necessary clean and fresh water for the works including that required by the Sub-Contractors on site; and for any temporary plumbing, meter and storage facilities and clear away on completion and make good works disturbed. No guarantee is given or implied that sufficient water will be available from the mains and the Contractor must make his own arrangements for augmenting this supply at his own cost if necessary. Nominated Sub-Contractors are to be made liable for the cost of any water or any installation specially provided for their own use.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**LOCAL REGULATIONS AND BY-LAWS:-** The Contractor is to comply with all local regulations and by laws of the Local Authority including serving of notices, paying of fees including all stamp charges.	
B.	**POLICE REGULATIONS:-** The Contractor shall at all times observe police and traffic Regulations including those regarding the loading or unloading of or waiting by vehicles on the Public Highways and Contract Sum shall be deemed to include for strict compliance therewith.	
C.	**LIGHTING AND POWER FOR THE WORKS:-** The Contractor shall provide at his own risk and cost for the required electricity supply for the works including that required by Sub-Contractors and others on site, and pay all fees and obtain all permits in connection therewith. Nominated Sub-contractors are to be made liable for the cost of any electrical power used and for any installations provided specially for their own use.	
D.	**EXISTING PROPERTY:-** The Contractor shall make all precautions to avoid damage to all existing property including roads, cables, drains and other services and he will be held responsible for and shall make good all such damage arising from the execution of this Contract at his own expense to the satisfaction of the Architect.	
E.	**ACCESS TO SITE AND TEMPORARY ROADS:-** Means of access to the site shall be agreed with the Architect prior to commencement of the work and the Contractor must allow for construction and maintaining the necessary temporary access roads culverts, crossing etc. removing them and making good and reinstating all works and surfaces disturbed to the satisfaction of the Architect.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**AREA TO BE OCCUPIED BY THE CONTRACTOR:-** The area of the site which may be occupied by the Contractor for use as storage and for the purposed of erecting workshops etc, shall be defined on site by the Architect.	
B.	**LABOUR CAMPS:-** No labour may be housed on site with the exception of watchmen. The Contractor shall, erect and maintain satisfactorily housing for the watchmen and shall remove the same on completion of the works. Unless the Architect otherwise agrees the Contractor is to recruit locally all his unskilled labour and as much as possible of his skilled labour.	
C.	**TELEPHONE:-** The Contractor shall apply for and arrange for the installation of modern telephone and pay all charges therewith. The telephone will be available for use by the Consultants free of any cost during working hours.	
D.	**SITE OFFICE:-** The Contractor shall erect and maintain a temporary site office for the sole use of the Consultants having a minimum floor area of 30 square, metres with a concrete or timber floor, glazed windows and equipped with desk with lockable drawers, table and chairs sufficient for site meeting and plan chest for drawings. Provisions shall be made for lighting and cleaning facilities for the duration of the works. The Contractor shall also construct and maintain a lock-up pedestal type water closet or other acceptable toilet facilities for the use of the Consultants and pay all connection, maintenance and disconnection charges arising therefrom.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**SITE OFFICE (CONT'D):-** The Contractor shall also provide on the site as and when required by the Architect, a modern and accurate level together with a leveling staff, ranging rods and one 30 metre tape. The Consultants site office and the closet shall be completed before the Contractor is permitted to commence the works. Upon completion of the works the Contractor shall remove the site offices, clear away, make good and reinstate the works to the satisfaction of the Architect.	
B.	**STORAGE OF MATERIALS:-** The Contractor shall erect and maintain (for his own use and that of his sub-contractors) temporary office, mess rooms and weather proof lock-up stores for materials for the works and shall remove them on completion of the works making good damaged or disturbed surfaces to the satisfaction of the Architect. Nominated sub-Contractors shall be made liable for the cost of any storage accommodation provided specially for their own use.	
C.	**PROTECTION OF THE WORKS:-** The Contractor shall protect or cover-up all finished work liable to damage including provision of temporary roofs, gutters, drain etc during the progress of the works and until the completion of the works. Any damage occurring to the works, materials, drains, paths or other works due to weather or want of protection during the progress of the works shall be made good by the Contractor at no extra cost.	
	Carried to Collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**SIGN BOARD:-** The Contractor shall provide and erect a sign board on the site showing the title of the project, the name and address of the Employer consultants, nominated suppliers and sub-contractors and such information as may be required by the Architect. A drawing of the sign board may be inspected in the offices of the Architect	
B.	**PROGRAMME/PROGRESS CHART:-** Within ten days of signing the Contract, the Contractor shall prepare a full detailed programme and progress chart in the form of bar chart precedence diagram or net-work analysis showing completions dates of various sections of work. If the Contractor proposed sectional completion of the works, he must plan this deal including access roads and services and this programme shall be reflected on the chart. Upon letting of the Sub-contract works the Contractor shall incorporate times and details of each Sub-contractor's work – which information is to be agreed with the Sub-Contractor concerned and the chart shall be so designed to accommodate this information. At the end of each week the Contractor shall mark on the chart in a different colour the actual time taken to complete the respective stages and sections of the works. The Contractor shall also show upon the chart the anticipated weekly labour strength required, divided into labourers and craftmen, and shall similarly mark up the actual numbers employed. The Contractors shall supply approved copies of the chart to the Architect, Quantity Surveyor and Engineer. The Contractor shall liaise with the Architect, Nominated Sub-Contractors and Nominated suppliers to ensure that contract completion date remains unchanged.	
	Carried to Collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**PROGRESS PHOTOGRAPHS:-** The Contractor shall allow for providing one copy of approved progress photographs to the Architect taken during the period of the Contract.	
B.	**PROVISIONAL WORK:-** All work measured provisionally shall be left uncovered for a reasonable time to allow all measurements needed to be taken by the Quantity Surveyor. The Contractor shall immediately notify the Quantity Surveyor when such work is completed. Should the Contractor default in these respects, he shall, if the Architect so directs the contractor will uncover the work at his own expense to enable measurements to be taken.	
C.	**ATTENDANCE UPON OTHER TRADESMEN, ETC (CONT'D):-** The Contractor shall perform such carting away for and making good after the work of such tradesmen of persons as may be ordered by the Architect and the work will be measured and paid for to the extent executed at rates provided for in these Bills of Quantities.	
D.	**TERMINATION BY EMPLOYER:-** In the event of the employment of the contractor being terminated in accordance with the provisions of Clauses 25 (1) and (2) of the conditions of contract, then in addition to the rights and duties set out in Clause 25 (3) of the Conditions of contract, the Employer shall have the right to complete the works on his own in which case the amount of expenses properly incurred by the Employer referred to in Clause 25 (3) (d) of the conditions of contract shall include an allowance to cover the cost of supervision, interest and depreciation on plant and all other usual charges profits as would have been incurred had the work been carried out by another contractor.	
	Carried to Collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**REMOVING OF RUBBISH AND CLEANING:-** The Contractor shall remove all rubbish and debris from the buildings and site as it accumulates and on completion of the works. All plants, scaffolding and unused materials must also be removed on completion of the works. Before final inspection and handing over date, the Contractor must clean the buildings both internally and externally to make the works perfect and fit for immediate occupation by the Employer.	
B.	**SAMPLES:-** The Contractor shall furnish at his own cost any samples of materials or workmanship or any tests that may be called for by the Architect unless otherwise provided in these Bills of Quantities. Any workmanship or materials not complying with the specific requirements or approved samples or which have been damaged contaminated or have deteriorated, must be immediately removed from site and replaced at the Contractor's expense, as required. Any approved samples shall be the minimum standard for the work to which they apply.	
C.	**NOMINATED SUPPLIERS:-** The cost of "Fix Only" materials to be obtained from Nominated Suppliers which are covered by Prime Cost or Provisional Sums shall include for taking delivery where directed, checking with invoices or indents, reporting and claiming damages for shortages and damaged goods, defraying demurrage, signing for as having been received in good order, transporting, unloading, storing, covering and protecting until the time of fixing, unpacking, replacing anything lost or damaged, sorting, assembling, hoisting to required levels and fixing as described. Before placing any orders with Nominated Sub-contractors or nominated Suppliers the Contractor must ascertain that the terms and conditions of the quotations and the dates of delivery of materials or execution of works comply with the terms of contract and the progress schedule	
	Carried to Collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**CONCRETE CUBE TESTS:-** The Contractor shall allow for the cost of preparing, delivery and testing of concrete samples required by the Engineers and shall obtain test certificates of concrete test cubes, each cube size 150 x 150 x 150mm or such other size as may be directed by the Engineer. The Contractor is to insert a rate here below and extend. Only successful tests will be considered. 80 sets of four (provisional) @ Kshs. 500/=	
B.	**TRAINING LEVY:-** The Contractor's attention is drawn to legal Notice No. 237 of October, 1971 (or such subsequent edition as may be current) together with the latest amendments (if any) which requires payment by the Contractor of a Training levy at the rate of ¼% (or Quarter per cent) of the Contract sum on all contracts of more than Kshs. 50,000.00 in value and his tender must include for all costs arising or resulting therefrom. Proof of payment of this levy will be required.	
C.	**PROTECTIVE CLOTHING:-** The Contractor shall provide all protective or any other special clothing of equipment for his employees that may be necessary. This shall include, inter alia, safety helmets, gloves, goggles, earmuffs, gumboots, overalls etc, according to the type of work. The Contractor shall ensure that safety helmets are worn by all staff on site at all times.	
D.	**PROPRIETY MATERIALS:-** Where propriety materials are specified hereinafter, the contractor any propose the use of materials of other manufacturer but equal quality for approval by the Architect. All materials and goods where specified to be obtained for a particular manufacturer or supplier are to be used in accordance with their instructions.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
A.	**PERFORMANCE BOND:** Before commencing contract signing, the Contractor shall provide one surety, from an established Bank and shall be bound to the employer in the sum equivalent to ten per (10%) of the contract price for due performance of the contract until the certified date of practical completion. Teachers Service Commission shall not sign the contract until the performance bond is submitted. Failure to provide the said bond, the TSC will be award tender to the second lowest bidder.	
B.	**PRIME COST RATES:-** Where description of items includes P.C rate per unit, this rate is to cover the net supply cost of the unit only. The Contractor's price must include for the cost of the unit at the rate stated, plus waste, taking delivery, storage, fixing in position, profit and overheads. The actual net cost per unit will be adjusted in the final account against the P.C. rate stated.	
C.	**NATIONAL CONSTRUCTION AUTHORITY** The National Construction Authority is a state corporation established under the national construction authority Act No.14 of 2011. The broad Mandate of the Authority is to oversee the construction industry and coordinate its development. The National Construction Authority Regulations 2014 with an effective date of 6th June 2014, regulation 25,	
D.	**COPYRIGHT:-** The copyright of these Bills of Quantities is vested in the Teachers Service Commission and not part thereof may be reproduced without their express permission given in writing.	
	Carried to collection Kshs.	

ITEM	DESCRIPTION	SHS.
	COLLECTION PAGE:- From Page 3.21 " " 3.22 " " 3.23 " " 3.24 " " 3.25 " " 3.26 " " 3.27 " " 3.28 " " 3.29 " " 3.30 " " 3.31 " " 3.32 " " 3.33 " " 3.34 " " 3.35 " " 3.36 " " 3.37 " " 3.38	
	SUB-TOTAL PRELIMINARY COSTS KSHS.	
	ADD 16% VAT "	
	SECTION NO. 3 - PRELIMINARIES **TOTAL CARRIED TO GRAND SUMMARY PAGE (GSP/1) KSHS.**	

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 4

MEASURED BUILDER'S WORKS.

THE PROPOSED TSC HOUSE
RENOVATION OF THE ROOF AND RE - PARTITIONING WORKS AT 7TH FLOOR:

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO. 4 - MEASURED BUILDER'S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	ELEMENT NO.1 - PREPARATORY WORKS - DEMOLITIONS AND ALTERATIONS:-					
	NOTES:					
A.	Useful material arising from the demolitions shall be handed over to Client and shall be delivered to Client's stores as directed. All debris arising therefrom shall be carted away from site.					
B.	The Contractor shall be entirely responsible for any breakage or damage which may occur during the process of removing items unless it is certified by the Consultant or Client that such damage or breakage was inevitable or is as a result of the condition of the item concerned.					
C.	All items of blocking up openings shall include for new masonry or concrete blockwork in cement and sand (1:3) mortar, properly cut, toothed and bonded to the existing walling.					
D.	All items of cutting openings through walling shall include for temporarily supporting the existing structure above, building up jambs,making good plaster both sides to reveals (including plastering sides and soffits of new reinforced concrete lintols where applicable)					
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
A.	The Contractor is to allow for all temporary protection required during the works, including ordinary and special dust screens, hoarding, barriers, warning signs etc as directed by the consultant and as necessary for the protection of the existing structure. All protective devices are to be removed on completion of the works and any necessary making good consequent upon this is to be executed to the satisfaction of the Consultant.					
B.	The works shall be propped, strutted and supported as necessary before the alteration work is commenced. Prices shall include for all preparatory work to structure and finishes and making good as necessary whether or not specifically directed.					
C.	The works shall be executed in such order and sequence as the consultant may direct and as little disruption and inconvenience as possible shall be caused to the adjacent offices. No demolitions shall be commenced without the express instruction of the Consultant.					
	Carefully remove as described in the following partition:-					
D.	75 mm Thick semi glazed semi mdf aluminium framed partitions (total approximate area:540m²)		Item			
	Carefully remove as described from the structure the following existing doors:-					
E.	29 No. Mdf glazed doors (as partitions) overall size 900 x 2100 high complete with frame and ironmongery.		Item			
F.	Hack existing glazed wall tiles and prepare surface to receive new (Kitchen area only)(total approximate area:25m²)		Item			
G.	Hack the following existing floor tiles, cart away debris and prepare floor to receive granito tiles (Kitchen area only)(total approximate area:10m²)		Item			
H.	Carefully remove existing executive carpet and hand over to Client. (approximately 400m²)					
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
A.	**Ceiling Finishes:** Carefully remove accoustic ceiling complete with suspension and prepare the same to receive new. (total approximate area:938m²)		Item			
B.	**Electrical Works:** Carefully remove existing fittings complete with associated wiring as necessary and prepare the same to receive new. (45No. total approximate lighting points)		Item			
	Carried to collection below			Shs.		
	COLLECTION					
	From Page No. 4.1.1					
	From Page No. 4.1.2					
	From Above					
	ELEMENT NO. 1 - PREPARATORY WORKS **TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1 -**			**SHS.**		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO. 4 - MEASURED BUILDER'S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	ELEMENT NO. 2 - PARTITIONING					
	Partition Type "A"					
	In Heavy duty powder coated aluminium as supplied by Ms General Aluminium fabricators Ltd or other equal and approved					
A.	75 x 50 x 3mm Horizontal railing or framing to take gypsum panel. (measured separately)	490	lm			
B.	75 x 50 x 3 mm Vertical studs or framing, ditto.	413	lm			
C.	Extra-over ditto for extended sections to anchor to roof base.	34	lm			
D.	30mm Wide "U" channel.	1053	lm			
	Dry wall partitions					
	In resin coated wood grain beech laminate medium density fibre board (mdf) to aluminium frame (measured separately), all to Architect's details:-					
E.	20mm Thick partition	395	sm			
	Cladding					
F.	Supply and fix particle board as manufactured by PG Bison or other equal and approved, including forming grooves and inserting horizontal aluminium strips, on gypsum backing with and including self tappping stainless stain screws (to exposed columns in corridors/offices)	70	sm			
	Padding					
G.	Supply and fix artificial leather padding in approved colour and pattern, including buttons, on gypsum backing (to partition type "A" interiors)	291	sm			
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	Skirting in Aluminium (Provisional)					
A.	3mm Thick x 75mm high skirtings screwed to 75 x 50 x3mm thick base member (m.s) with and including screws.	57	lm			
	In wrot mahogany					
B.	100 x 25mm Thick timber cladding or beading with two labours, to Architect's approval.	2428	lm			
C.	200 x 10mm Thick skirting to Architect's approval.	238	lm			
	Partition Type "B"					
	In Heavy duty powder coated aluminium as supplied by Ms General Aluminium fabricators Ltd or other equal and approved					
D.	75 x 50 x 3mm Horizontal railing or framing to take mdf panel. (measured separately)	318	lm			
E.	75 x 50 x 3 mm Vertical studs or framing, ditto	269	lm			
F.	Extra-over ditto for extended sections to anchor to roof base.	20	lm			
G.	30mm Wide "U" channel, to receive mdf.	272	lm			
H.	Ditto, but 8mm wide to receive glazing.	427	lm			
I.	10mm Bead or glazing beads.	1,397	lm			
	In resin coated wood grain beech laminate medium density fibre board (mdf) to aluminium frame (measured separately), all to Architect's details:-					
J.	25mm Thick partition to aluminium framework (measured separately)	78	sm			
	Glazing supplied and executed by approved specialist, as impala or other equal and approved, all edges polished					
K.	6mm Thick clear sheet glass and glazing in aluminium glazing beads (measured separately) with and including approved black rubber stripsor bead on both sides, in panes not over 0.50 square metres.	17	sm			
L.	Ditto but one-way silver premium reflective sun filmed sheet glass and glazing in panes over 1.0 but not exceeding 1.5 sq mtrs.	51	sm			
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
A.	Extra-over glazing for sand-blasting with "TSC' Logo to clear glass partition walls (along corridors)(Total approximate area:10m2)		Item			
	In Aluminium louvre-end frames					
B.	Set of 8-blade frames, 1200mm high.	60	No.			
C.	2mm Thick aluminium louvre slats, fixed at angle to frame, 150mm wide. (In 344No. Lengths)	337	lm			
	Partition Type "C"					
	In Heavy duty powder coated aluminium as supplied by Ms General Aluminium fabricators Ltd or other equal and approved					
D.	75 x 50 x 3mm Horizontal railing or framing to take mdf panel. (measured separately)	452	lm			
E.	75 x 50 x 3 mm Vertical studs or framing, ditto	402	lm			
F.	Extra-over ditto for extended sections to anchor to roof base.	60	lm			
G.	30mm Wide "U" channel, to receive mdf.	461	lm			
H.	Ditto, but 8mm wide to receive glazing.	725	lm			
I.	10mm Bead or glazing beads.	2,372	lm			
	In resin coated wood grain beech laminate medium density fibre board (mdf) to aluminium frame (measured separately), all to Architect's details:-					
J.	25mm Thick partition to aluminium framework (measured separately)	122	sm			
	Glazing supplied and executed by approved specialist, as impala or other equal and approved, all edges polished					
K.	6mm Thick clear sheet glass and glazing in aluminium glazing beads (measured separately) with and including approved black rubber stripsor bead on both sides, in panes not over 0.50 square metres.	27	sm			
L.	Ditto but one-way silver premium reflective sun filmed sheet glass and glazing in panes over 1.0 but not exceeding 1.5 sq mtrs.	87	sm			
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
A.	Extra-over glazing for sand-blasting with "TSC' Logo to clear glass partition walls (along corridors)(Total approximate area:32m2)		Item			
	Carried to collection			Shs.		
	COLLECTION					
	From Page No. 4.1.4					
	From Page No. 4.1.5					
	From Page No. 4.1.6					
	From Above					
	ELEMENT NO. 2 - PARTITIONING TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1 —			SHS.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO. 4 - MEASURED BUILDER'S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	ELEMENT NO.3 - DOORS AND WINDOWS:					
	Internal doors					
	The following as per wood makers or other equal and approved maker and supplier					
A.	Laminated MDF glazed timber panel doors size 900 x 3100mm high comprising mdf panel size 800 x 1050mm;/6mm thick glazed panel of similar size; including 900 x 250mm high fanlight, including approved aluminium door lock, chrome - plated handles fixed with matching screws and powder - coated frame, all as per Architect's details. (D3b)	14	No.			
B.	Ditto but with and including 900 x 1000mm high fanlight in 2 No. equal partitions; 1 No. size 900 x 250mm glazed panel and 900 x 750mm fixed aluminium louvres, including approved aluminium door lock, chrome - plated handles fixed with matching screws and powder - coated frame, all as per Architect's details. (D3)	7	No.			
	In wrot mahogany:-					
C.	50 x 20mm Architrave with two labours.	52	lm			
D.	25mm Quandrant bead.	52	lm			
E.	200 x 50mm Frame with three labours plugged	52	lm			
F.	Door size 900 x 2050mm high comprising 65 x 50mm stiles, top and intermediate rail and 150 x 50mm bottom rail, infilled with and including 2 No. 39mm thick arched solid timber panels size 400 x 600mm high at upper part; 1No. panel size 850 x 350mm high at middle and 1No. size 850 x 650mm lower panel, to Architect's details.(Exec wc) (D4)	2	no.			
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
A.	Door size 900 x 2050mm high comprising 65 x 50mm stiles, top and intermediate rail and 150 x 50mm bottom rail, infilled with and including 8no. 39mm thick solid timber panels size 280 x 300mm high, to Architect's details. (D2)	8	no.			
B.	Extra-over door surface for fix artificial leather padding in approved colour and pattern, including buttons, on gypsum backing (to type "A" interiors)	11	sm			
	Ironmongery					
	Supply and fix the following ironmongery with matching screws to wood (all iron mongery to be from Assa Abloy catalogue-or other equal and approved) :-					
C.	100mm Pressed heavy duty brass butt hinges.	15	prs.			
D.	Approved heavy duty cylinder lock CC-3802-SSS, complete with lever furniture 146-SSS.	8	no.			
E.	Ditto but horizontal cylinder light duty mortice lock, complete with approved pull handles. (toilet doors)	2	no.			
F	Approved magnetic door lock for man-trap door	1	Pr			
G.	Cylinder door stop as Union DS-C1 SS.	10	no.			
H.	"Male" or "Female" signs (to existing door)	4	no.			
I.	"Disabled" sign (ditto)	1	no.			
J.	300mm Wide x 900mm long silver anodised aluminium kicking plate.	10	no.			
K.	Overhead linear-power size 2 overload protected door closer as SIL 7724.	10	no.			
L.	Hat/coat hook with rubber tip as Union.	2	no.			
M.	150mm Flush bolt as Union FB-150SN.	2	no.			
	Carried to collection			Shs.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	Window boards					
	In Wrot mahogany					
A.	180 x 25mm Board with one labour (CEO's office or boardrooms)	28	lm			
	Windows fittings					
	Vertical blinds					
B.	Approved louvre drapes 100mm wide as selected by the Architect, the sliding track fixed on brackets to face of window openings supplied and installed complete with all operating gear to approval.	107	sm.			
	Painting and Decorating					
	On Woodwork					
	Knot, prime, stop, prepare and apply three coats clear varnish to:-					
C.	Surfaces over 200 but not exceeding 300mm girth.	80	lm			
D.	General surfaces of existing doors (both sides measured flat overall) (including joinery fixtures in kitchen)	85	sm.			
E.	Ditto but to surfaces of new doors (both sides measured flat overall)	33	sm.			
	Rub down wood surfaces and prepare and apply two gloss finishing coat enamel paint internally to:-					
F.	General surfaces of doors existing doors (both sides measured flat overall)	99	sm.			
	Carried to collection below			Shs.		
	COLLECTION					
	From Page No. 4.1.8					
	From Page No. 4.1.9					
	From Above					
	ELEMENT NO. 3 - DOORS & WINDOWS — TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1			SHS.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO.4 - MEASURED BUILDER'S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	ELEMENT NO. 4 - INTERNAL WALL FINISHES					
	200x 250 x 8mm Coloured ceramic wall tiles as supplied by Tiles & Carpets, or other equal and approved, with and including cement paste or proprietary adhesive and horizontal aluminium strips in every tile course, on:-					
A.	Prepared existing stone walls. (kitchen only)	25	sm			
	Painting and Decorating:-					
	Rub down existing surfaces, Prepare and apply three coats of first quality silk vinyl paint internally on:-					
B.	Prepared existing wall surfaces.	651	sm			
	ELEMENT NO. 4 - INTERNAL WALL FINISHES — TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1			SHS.		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO. 4 - MEASURED BUILDER'S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	Granito tiles on existing prepared cement and sand (1:4) beds, screeds or backings:-					
A.	10mm Thick non-slip granito floor tiles size 600 x 200mm laid in approved colour fixed with and including cement paste or a proprietary adhesive on prepared screed (Kitchen only)	10	sm			
	Carpet					
B.	8mm Thick Executive Wilton Wool red carpet, obtained from "Tile and Carpet" or other equal and approved of highest quality with deep compact underfelt office carpet, fixed to existing floor finish with and including all accessories, in approved colour	363	sm			
C.	Ditto but 10mm thick.	327	sm			
	ELEMENT NO. 5 - FLOOR FINISHES **TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1**			**SHS.**		

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO.4 - MEASURED BUILDER;S WORKS					
	BILL NO. 1 - RE-PARTITIONING WORKS AT 7TH FLOOR:					
	ELEMENT NO. 6 - CEILING FINISHES					
	Flush plastered gypsum plasterboard suspended bulkheads as supplied by Ms Classic Mouldings or other equal and approved.					
A.	12.5mm Thick gypsum plasterboard on screw-up aluminium tee suspension grid including hangers.	166	sm			
B.	Extra over ceiling for 450mm drop to suspended gypsum ceiling.	265	lm			
C.	150mm Moulded cornices.	265	lm			
	Fibre accoustic suspended ceiling panels with and including white powder coated horizontal aluminium T-grid system and all accessories to approval					
D.	19mm Thick "Amstrong fissured minatone accoustic tile ceiling in 600 x 600 panels, comprising v - carriers, 3mm galvanised steel wire hooks, suspension hangers spaced at 200mm, aluminium profile frame flush jointing and trap door with matt finish, all as per "Tile & Carpet, Hebatullah or other equal and approved.	938	sm			
E.	Extra-over accoustic tile ceiling for louvred aluminium size 600x600mm panel, including flush jointed frame	25	No			
	Painting and Decorating					
	Prepare and apply three coats first quality emulsion paint on the following surfaces, internally					
F.	General surfaces of skimmed suspended ceilings.	285	sm			
	ELEMENT NO. 6.- CEILING FINISHES — TOTAL CARRIED TO SUMMARY AT END OF BILL NO.1			SHS.		

Item	Description	Shs.	Cts.

SECTION NO.4 - MEASURED BUILDER'S WORKS

BILL NO.1 - RE - PARTITIONING WORKS AT 7TH FLOOR:

SUMMARY:

ELEMENT NO.	DESCRIPTION	FROM PAGE NO.
1.	PREPARATORY WORKS	(4.1.3)
2.	PARTITIONING	(4.1.7)
3.	DOORS & WINDOWS	(4.1.10)
4.	INTERNAL WALL FINISHES	(4.1.11)
5.	FLOOR FINISHES	(4.1.12)
6.	CEILING FINISHES	(4.1.13)

SUB-TOTAL KSHS.

7. ADD: 16% VAT "

BILL NO.1 — SUMMARY

TOTAL CARRIED TO MAIN SUMMARY (PAGE MS/1) AT END OF SECTION NO. 4 — SHS.

THE PROPOSED TSC HOUSE
RENOVATION OF THE ROOF AND RE - PARTITIONING WORKS AT 7TH FLOOR:

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO.4-MEASURED BUILDER'S WORKS					
	BILL NO. 2 - ROOF RENOVATION:					
	NOTES:					
A.	The Contractor shall be entirely responsible for any breakage or damage which may occur during the process of roof repair unless it is certified by the Consultant or Client that such damage or breakage was inevitable or is as a result of the condition of the item concerned.					
B.	Contractor shall make independent investigations of the leaking points of the roof. Careful repair shall be done and certified leak proof.					

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	ROOF REPAIRS:					
A.	Identify leakage areas at "J"-bolts locations or other identified areas, seal with approved sealant (Total approximate area: 120m² - being 10% of total roof area)		Item			
B.	Circular cutting, 450mm diameter, to existing roofing sheets to receive vent cowls.	8	No.			
	Cyclone turbine ventilator					
C.	Cyclone 600 throat rotating roof ventilators fixed to roof structure	8	No.			
	Roof Drainage					
D.	1000mm Wide metal flashing, shaped as required.	78	lm			
	Gutter outlet					
E.	"Terrain" or other equal and approved vertical spigot outlet type (ref. 2171.3) with domed grating cast in reinforced concrete gutter bottom.1000mm Wide metal flashing, shaped as required.	4	No.			
	PAINTING TO PARAPET WALLS:					
	Painting and Decorating:-					
	Rub down existing wall surfaces, repair cracks, prepare and apply three coats of first quality emulsion paint externally on:-					
F.	Prepared existing wall surfaces.	409	sm			
	SUB-TOTAL					
	ADD: 16% VAT					
	BILL NO. 2 - ROOF RENOVATIONS **TOTAL CARRIED TO MAIN SUMMARY PAGE (MS/1)** ——			**SHS.**		

Item	Description	Shs.	Cts.

SECTION NO.4 - MEASURED BUILDER'S WORKS

MAIN SUMMARY:

BILL NO.	DESCRIPTION	FROM PAGE NO.
1.	RE-PARTITIONING OF 7TH FLOOR	(4.1.14)
2.	ROOF RENOVATION	(4.2.2)

SECTION NO. 4 — SUMMARY — TOTAL CARRIED TO GRAND SUMMARY PAGE (GSP/1) — SHS.

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 5

ELECTRICAL INSTALLATION

SECTION 1

QUALITY OF MATERIALS

AND

WORKMANSHIP

5/ 1

PART ONE

QUALITY OF MATERIALS AND WORKMANSHIP

1. GENERAL

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

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

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

(ii) The Licence's by-laws.

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

(iv) The Specification.

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

(vi) The Engineer`s instructions.

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

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

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

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

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

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

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

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

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

2. SWITCHGEAR

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. CABLES AND CONDUCTORS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4. **WIRING**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

5. CONDUIT, TRUNKING AND ASSOCIATED FITTINGS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Phase colours shall be clearly marked.

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

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

6. EARTHING

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

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

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

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

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

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

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

7. TESTING ON SITE

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

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

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

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

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

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

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

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

SECTION 2

PARTICULAR SPECIFICATION

SECTION TWO

PARTICULAR SPECIFICATION

1. EXTENT OF WORK

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

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

The supply, installation and testing of: -

(a) All consumer units and splitter units.

(b) All main and Sub-Main cables.

(c) All power and lighting circuits.

(d) All final circuit switches.

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

(f) All earthing requirements.

(g) All underground cabling and tiling.

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

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

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

(k) Excavation of earth mats.

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

(m) Cable ducts for underground cables.

2. ELECTRICITY SUPPLY

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

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

3. TELEPHONE SERVICES

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

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

All accessories shall be as MK or equal and approved.

4. MANHOLES AND DUCTS

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

Earthing Manhole

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

5. DISTRIBUTION BOARDS AND CONSUMER UNITS

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

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

6. POWER INSTALLATION

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

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

Socket outlets	300 mm a.f.f.l

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

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

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

All accessories shall be as MK or equal and approved.

7. INTERNAL LIGHTING

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

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

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

Tubes shall be either warm white or daylight.

All accessories shall be as MK or equal and approved.

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

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

8. INTERNAL TELEPHONE INSTALLATION

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

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

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

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

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

9. INTERNAL TV CONDUIT INSTALLATIONS

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

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

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

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

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

10 STREET LIGHTING

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

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

These columns shall be painted to an approved colour.

11 LANTERNS

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

12. EARTHING

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

GENERAL SPECIFICATIONS
FOR
STRUCTURED CABLING
INSTALLATION

Table of Content

INTRODUCTION

Structured Cabling is a set of standards that determine how to wire a data center, office or building for data or voice communications, using Category 5 or Category 6 cable and RJ45 sockets. These standards define how to lay the cabling in a star formation, such that all outlets terminate at a central patch panel (which is normally 19 inch rack-mounted), from where it can be determined exactly how these connections will be used. Each outlet can be 'patched' into a data network switch (normally also rack mounted alongside), or patched into a 'telecoms patch panel' which forms a bridge into a private branch exchange (PABX) telephone system, thus making the connection a voice port.

Lines patched as data ports into a network switch require simple straight-through patch cables at the other end to connect a computer, whereas voice patches to PABXs require an adaptor at the remote end to translate the RJ45 pin config into a 6-pin BT socket. Depending on the type of PABX, these may need to be 'master' or 'secondary' adaptors.
It is normal to see different colour patch cables used in the patch panel to help identify which type of connection is being carried, though the structured cabling standards do not require this, except in the demarcation wall field

The standards demand that all eight connectors in the Cat6 cable are connected, resisting the temptation to 'double-up' or use one cable for both voice and data. This is generally a good thing as it means that they fully support features such as Power over Ethernet which require the so-far unused brown cables.

GENERAL SPECIFICATIONS

1. AIM OF THE PROJECT

a. To implement structured cabling in compliance with TIA/EIA 568B and IEEE regulations for LANs in buildings
b. To supply standard active components, configure and set them up to used on the LANs.

2. REGULATIONS GOVERNING STRUCTURED CABLING

Materials, products and installations must comply with the mandatory provisions of all applicable industrial standards viz ISO/IEC, CCK, ATM CENELEC 11801, ANSI/EIA/TIA 56, latest IEEE regulations, KEBS, Electric Power Act and rules made there under:

3. CABLING

a) All cables must pass through conduits or trunking.
b) All cables and connectors shall be labelled.
c) No distortion due to kinks, sharp bends or excessive hauling tension shall be allowed.
d) Cables shall be run in a manner eliminating any possibility of strain on the cable itself or on the terminations.
e) Cables shall have no joints or splices.
f) Cables shall be kept at a minimum distance of 150mm from items liable to become hot or cold.
g) Bending radii shall be not less than eight times the overall cable diameter.
h) The manufacturers hauling tension shall not be exceeded.
i) All cable ties and fixings shall be tightened to support the cable loom without distortion of the cable sheath.
j) The fibre optic cable shall be multi-mode optimal speed and with graded index, and of nominal size 62.5/125 micron.
k) Fibre optic cable shall have a core/cladding diameter on nominal 850nm and 1300nm optical wavelength.
l) The optic cable shall be of appropriate core with each core terminated on both ends.
m) The enhanced UTP 4 pair shall be of cat 6 grade and exceed ANSI/TIA/EIA-568-Aj and ISO/IEC 11001standards. Cat 6 structured cabling shall be used throughout the entire installation.

4 Metal Trunking

All metal trunking used shall be spray painted to approval and shall be fabricated from mild steel not less than 18swg (gauge) and have three compartments.

Network Servers

5. PATCH PANELS

a) Shall conform to ANSI/TIA/EIA-568A and rack mounted.

b) Shall be equipped with RJ45 contacts of UTP with maximum ohms sockets with capacity of 12, 24 or 48 ports.
c) Shall be earthed.
d) Fibre optic patch panels shall be configured to the number of strands terminated at each location.
e) Fibre Optic patching shall be done from the cabinet housing optic boxes/ panels as well as the optic electronic equipment.
f) Fibre Optic patch panel shall have a sliding tray.
g) Except for patch cords used to connect NICs to the RJ45 sockets, all patch cords shall be labelled at each extremity with PVC support and intelligible marking. For other components the label shall be of stiff plastic PVC type.

6. NETWORK CONTROL EQUIPMENT

a) Active devices used at the LAN edge shall have 12, 24 or 48 ports for connection to the horizontal cabling.
b) Active devices shall be rack mounted.
c) Active devices for horizontal cabling shall support autosensing 10/100mbps and backbase cabling at 1000mbps.
d) Active devices used at aggregation layer of LAN shall support IP routing.
e) Active devices used at the LAN edge must be stackable and shall attach to the backbone cabling at 1000mbps.
f) Where more than one active device is required to satisfactorily serve the floor data outlet distribution requirements they shall be stacked using interface operating at the backbone speed.

7. EQUIPMENT CABINETS

a) The main cabinet shall be of appropriate size.
b) All cabinets for active devices shall conform to ANSI/TIA/EIA-568A specifications with forced cooling.
c) Cabinets shall have adequate room for additional components typically 3U free space.

8. NETWORK CABINETS

a) Floor/ Block cabinets shall be metallic with front clear glass at least 22U and of good finish and conveniently accessible by technical personnel for maintenance.
b) Main cabinet in the network centre to be at least 42U or equivalent and easily accessible during maintenance.
c) Power to the cabinets shall be switched off from within the cabinets. Proper power socket cables to be supplied with the cabinets.
d) All cabinets to conform to ANSI/TIA/EIA-568B with forced cooling and their location shall be determined on site.
e) Support small factor pluggable (SFP) and industry leading density up to 240 of IEEE 8033 for 1000 Base-SX ports per system.

9. ETHERNET EDGE SWITCHES

a) Each floor edge switch connecting to the backbone must include at least two ports of 1000 Base X Gigabit Ethernet with GBIC support, QOS,

Multiple queues with weighted round robin (WRR) scheduling and layer 3 switching and routing of IP, IPX and IP multicast traffic.

b) Each switch in the set up should give 10/100/MBPS to the desktop.

c) There should be adequate switches to cater for the total number of data points.

d) The switches connecting as a backbone shall have additional 1000Base X port that shall be connected as a backup and shall be configured for automatic load balancing.

10. ETHERNET CORE SWITCH

The following are the minimum requirements for the core switch:

a) The Backbone switch should provide minimum (10/100/1000 ports) of 24 ports of IEEE802.32 1000 Base X.

b) The minimum switching capacity of 150 GBPS (fabric) and 45 million packets per second.

c) Be able to run industrial standard IP multi cast at wire speed.

d) Non blocking integrated layer 2/3/4 switching performance.

e) Multi layer IOS software services with IP routing, advanced QOS, traffic management and comprehensive security.

f) Shall be rack mounted in standard rack/cabinets.

g) Shall have a redundant power supply for each edge switch connecting to the backbone.

h) Shall support BGP switching.

i) Shall support both data and voice.

j) Shall support security features.

11. ETHERNET GATEWAY ROUTER

The following are the minimum requirements for the router;

a) Ability to route both voice and data

b) Should provide minimum three (3 No.) 1000Base T ports

c) Should provide minimum of two (2 No.) ISDN ports.

d) Should be mounted on standard rack /cabinet

e) Should have dual processor (voice/data)

13. LABLING

a) Horizontal and backbone cables shall be labelled at each end. The cable or its label shall be marked with its identifier.

b) A unique identifier shall be marked on each faceplate to identify it as connecting hardware.

c) Each port on the face plate shall be labelled with its identifier.

d) A unique identifier shall be marked on each piece of connecting hardware to identify it as a connecting hardware.

e) Each port on the connecting hardware shall be labelled with its identifier.

f) A unique identifier shall be marked on each **port** on the connecting faceplate to identify it as a connecting hardware.

14. DRAWING

Working drawings shall be supplied to the PM for approval showing the location of identifiers for all Horizontal cabling routes and Terminations, Backbone Routing and Terminations, Data Outlets/ Connectors and Active components etc.

15. RECORDS

All records shall be created and turned over to the PM at the completion of work. The format shall be computer based and both soft and hard copies shall be part of the As-built package with minimum requirements including:

a) Cable records complete with identifiers, cable type, length, termination position at both ends, manufacturer and part number.
b) Connecting hardware records complete with identifier, type of hardware and position.
c) Connecting hardware positions complete with identifiers, type of position and cable identifier attached to it.
d) Any other items that are necessary for maintenance *********

16. REPORTS

All reports shall be generated from the computer based programme used to create the records above. These reports shall include but not limited to:

a) Cable reports
b) Cross connect reports
c) Connecting hardware reports

17. TESTING

General

Testing of entire cabling system as per ANSI/TIA/EIA-568B for UTP Ethernet cables shall be performed prior to system handover.

Fibre Optic Testing

Testing of fibre optic shall be as per IEEE 802.32 and ANSI/TIA/EIA-568B for 1000 Base-LX/ 1000 Base-SX

18. WARRANTY

The cabling installation shall carry a warranty of at least 15 years and the contractor shall issue the PM with certificate from the cable manufacturer upon completion. The cost of the certification if any shall have been included in the prices. You have to specify in both technical and financial proposals the duration the issuance of the certificate will take after completion and commissioning of the installation.

19. TRAINING

Training of system administrators

20. TECHNICAL PROPOSAL

The tenderer shall provide a workable, cost effective and elaborate technical solution (proposal) to realize the installation. The proposal shall include but not limited to the following:

a) Detailed schematic design for each floor, showing the components and their description/ identification and connectivity.
b) Detailed network layout diagrams of the proposed solution showing interconnectivity of the building / floor layout showing switches, Routers, DTO equipment etc.
c) Proposal for network management.
d) Detailed work plans for the project, listing tasks, activities, datelines, persons/ teams assigned lead responsibilities for the project activities and tasks.
e) Detailed experience and past performance of the bidder on works of similar magnitude within the last 5 years and details of current work on hand and any other contractual commitments.
f) Qualifications and experience of key personnel proposed for administration and execution of contract, both on and off site.
g) Detailed coloured manufacturer's Brochures detailing Technical Literature and specifications on all the active equipment they intend to supply.
h) Technical schedule of items – Form F/2.

21. FINANCIAL PROPOSAL

Bidders are required to provide a separate Financial Proposal which must include the following:

a) Valid Tax compliance certificate
b) Price schedule for all floors
c) Price schedule for the backbone link between buildings / floors.
d) Price summary as indicated in the tender document

22. IN ADDITION THEY WILL BE REQUIRED TO GIVE:

a) Form of Tender dully completed signed and witnesses
b) Tender security form
c) Confidential Business Questionnaire form
d) Evidence of financial resources
e) Financial reports for the past 5 years

21. LEGEND

ANSI	-	American National Standards Institute
TIA	-	Telecommunications Industry Association
EIA	-	Electronic Industries Association
ISO	-	International Standards Organization
IEC	-	International Electro-technical Committee

SECTION 1

QUALITY OF MATERIALS AND WORKMANSHIP

1. GENERAL

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

The Sub-contract works must be carried out strictly in accordance with the following documents:-

i) The Communications Authority of Kenya guidelines to contractors for Supply Installation and maintenance and Telecommunication wiring and terminal equipment.

ii) The Communications Authority of Kenya guidelines to contractors for supply, installation and maintenance of External Telecommunications wiring.

iii) The Licensee's by-laws.

iv) Relevant British Standard Specifications and Codes of Practice published by the British Standards Institution (hereinafter referred to as B.S. and C.P respectively). Relevant International Standards ISO, IEEE and ANSI

v) The specification

vi) The working drawings, produced by the Telecommunications Sub-contractor and approved by the Engineer.

vii) The Engineer's instructions.

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

Materials and/or apparatus supplied by others for installation and/or connection by the Telecommunications Sub-contractor shall be carefully examined on receipt. Should any defects be noted the Telecommunications Sub-contractor shall immediately notify the Consulting Engineer.

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

It is particularly necessary that all the Telecommunications Sub-contractor's proposals and Working Drawings for and in connection with the works shall be submitted early in the Contract period to facilitate co-ordination with others.

All plants, apparatus, equipment, valves, distribution cabinets, terminals and cable cores shall be securely and properly labelled to the approval of the Engineer.

The labelling shall clearly show the identification of the circuit. Labels shall be of Traffalyte sheet or equal fixed with screws or rivets.

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

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

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

2. CROSS CONNECTION CABINET

Modular construction shall be used wherever practicable and provision Shall be made for simplified servicing, replacement and maintenance throughout without major dismantling.

All modules shall be of **Siemon** type and shall be labelled in agreement with the Engineer using engraved plastic labels.

Where spaces in cabinets are provided for future modules to be installed as shown on the drawings. Frames shall be provided and installed so that in the future modules may be installed and connected with the least possible inconvenience. The cabinet shall comprise modules, wiring, High Voltage Protectors and a suitable entry shall be provided at the bottom of the cabinet as appropriate.

All wiring within the cabinet shall be orderly laced and bonded to the cabinet structure, the wiring insulation being coloured according to the ISO Standards colour scheme.

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

Cable entries shall be provided at the bottom end of the cabinet to allow for Service provider Cable Connection.

Modules shall be left in place for the termination of the Service Provider cable.

Where wiring is installed by Service Provider to the cabinet, the final connection to the modules shall be carried out as part of this contract.

The cabinet shall be fitted internally with circuit lists and a schematic drawing showing the routing of the cable network mounted on a glazed frame.

3. CABLES

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

Cable dimensions shall conform to ISO Standards and with the information given on the drawings or in the specifications.

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

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

Common saddles shall be used where cables are grouped. All cables shall be terminated with suitable Box Terminals of the correct size.

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

The Telecommunication Sub-contractor, who is to include for the supply and installation of all jointing materials, cable supports, steel racking and making all the necessary cable joints, shall carry out all work except builder's work. The cable shall be installed and tested in strict accordance with the appropriate clauses of the ISO Standards and CCK. specifications.

Cables shall at all times be handled with care and every effort made to avoid damage. Unloading, rolling to position and mounting of cable drums shall be carried out efficiently and carefully in the recognised manner and cable shall be pulled from the top of drum. Twisting shall at all times be avoided.

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

The Telecommunication Sub-contractor shall take particular care to avoid damage to other services, which may run adjacent, or across the route of the cable being installed.

Cables shall be installed with a minimum clearance as stated in the CCK guidelines to Contractors for Supply, Installation and Maintenance of External Telecommunications Wiring.

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

Aerial cables shall not be installed within a minimum clearance as stated in the Communications Authority of Kenya guidelines to Contractors for supply, Installation and Maintenance of External Telecommunication Wiring, Clause 14.6.1.

Trenching, laying, and backfilling will be carried out by the Telecommunications Sub-contractor.

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

These shall be laid at minimum depth of 85mm and extended at a distance of 600mm on either sided of the road.

The Telecommunications Sub-contractor shall supply and install concrete marker posts at each cable entry into a building, each change of direction, each location of buried joints, each road or pathway crossing and throughout the length of the cable at intervals not exceeding 50 metres.

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

The Main Contractor will supply UPVC ducts but it is the responsibility of the Telecommunications Sub-contractor to lay the ducts as indicated on the relevant drawings.

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

The Telecommunications Sub-contractor's attention is drawn to the fact that all cable sizes given in the Specification and/or Contract Drawings are based on the use of cables with copper conductors unless specifically specified to the contrary.

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

4. **BLOCK TERIMINALS**

The Block Terminals will be provided in accordance with Service Provider. Specifications.

Where modules are used this shall be of **SIEMON** type.

5. **MDF**

The MDF shall comprise of **SIEMON** type modules mounted of frames and suitable High Voltage protectors.

Modular construction shall be used and provision shall be made for simplified servicing, replacement and maintenance without major dismantling.

All wiring within the MDF shall be orderly, laced and bonded to the frame structure, the wiring insulation being coloured to the ISO standard colour scheme.

Cable entries shall be provided to allow for the entry of Underground cables with the appropriate number of modules being left in place to allow for the cable connection.

The MDF shall be fitted with circuit lists and a schematic drawing showing the cable routing.

8. **BLOCK WIRING**

Block wiring cables shall run from the MDF to the Floor Distributor. The cables shall be of approved telecommunication type, PVC sheathed and insulated. The Sub-contractor shall terminate the cables at both ends.

9. **FLOOR DISTRIBUTOR**

The Floor distributor shall comprise of **SIEMON** type or approved equivalent modules installed in wall mounted vertical frames inside the Telecommunications Riser Duct at each floor.

10. **PRE-WIRING**

Cables shall run from wall outlets to the Floor distributors. Wiring shall be carried out in an approved type of PVC sheathed and insulated cables as FTP Category 6A of the ISO/IEC 11801 Standards.

The colours of the cores shall comply with the colour code requirements of the ISO Standards.

Cables shall be drawn in at outlets, distribution cabinets and Block Terminals after the erection of the conduit system.

Under no circumstances shall it be permitted to draw cables into an incomplete section of the conduit installation. The wiring shall be carried out on the Block Terminals and Telecommunications outlets. No joints shall be made in boxes unless in approved transition points.

The cable shall run in the conduit so as not to exceed the capacities as set out in the IEEE/CCK Guidelines to Contractors for supply, installation and maintenance of Telecommunication Wiring and terminal equipment.

The arrangement and size of Telecommunication conduits shall be such as will accommodate the number of circuits as indicated on the contract drawings.

Where conduits enter adaptable boxes each conduit is to be numbered to indicate the outlet point which it feeds. Unless otherwise stated on the drawings, conduits will terminate in standard metal boxes to B.S 1363 with flush fitting twin RJ45 cover plate.

Draw-in boxes are required in telephone conduits as stated in the ISO Standards.

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

11. **CONDUIT, TRUNKING AND ASSOCIATED FITTINGS**

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

Sunken conduits run in chases in walls shall be fixed by means of mild steel pipe hooks or non-metallic saddles spaced not more than 0.9M. Where conduits are concealed behind plaster it shall be sunk to a depth of either 15mm below finished plaster level, or installed flush with the structural wall level before application of plaster, whichever is the lesser depth. Conduit cast-in-situ shall be frequently secured to the steel reinforcement work, with heavy binding wire to prevent movement of the conduit and conduit boxes during the pouring and vibrating of the concrete.

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

Conduits shall be installed after the first grid of steel reinforcement work is securely fixed and all open ends of conduit shall be protected by couplings plugged with a suitable non-metallic stopping plug. The number of right angle bends in conduit cast-in-situ shall not exceed two between boxes.

Where straight runs of conduit are installed, draw-in boxes shall be provided at distances not exceeding 15 Metres.Immediately prior to installing the wiring all conduit and fittings shall be dried and cleaned out by drawing through a cloth swab. Conduits shall be installed in such a manner as to prevent interference with other services and shall be kept at least 150mm clear gas or water pipes, and heat in excess of 70^0C.

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

Steel-Conduits shall be of heavy gauge Class B Welded to British Standard Specification B.S 31. In no case will conduits smaller than 25 mm diameter be used on the works. Conduits installed within buildings shall be black enameled finish except where specified otherwise. Where installed externally or in damp conditions they shall be galvanised. Conduit fittings, accessories or equipment used in conjunction with galvanised conduits shall also be galvanised or otherwise as approved by the Consulting Engineer.

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

The conduit shall be bent and formed strictly in accordance with the manufacturer's instructions. Small size i.e. 25 mm diameter shall be bent cold by inserting the correct size bending spring.

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

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

Joints shall be made watertight by the use of cement applied with a brush or rag. Cement shall be applied to the complete circumference of the conduit.

Conduits shall be thoroughly cleaned at the ends to ensure a good adhesion to the ends fittings. Cement shall not be permitted to enter into the conduit.

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

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

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

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

All sections of trunking shall be rigidly fixed together and attached to the framework or fabric of the building at intervals of not less than 1.2M. Joints in trunking shall not overhang `fixing points by more than 0.5M.

All trunking shall be made electrically continuous by means of 25x3 mm copper links across each joint and where the trunking is galvanized, the links shall be made by galvanized flat iron strips.

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

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

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

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

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

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

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

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

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

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

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

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

12. EARTHING

The earthing of the installation shall comply with the requirements laid down in IEE regulations.

An earth electrical system shall be installed at a point adjacent to the main MDF and at Every distribution Point. Each earth electrode shall be a 12 mm diameter copper rod driven to depth of 1300 mm. In rocky soil conditions, where depth is difficult to obtain, the Telecommunications Sub-Contractor shall obtain written approval from the Consulting Engineer for an alternative earth electrode system.

The electrode shall be connected via a green PVC insulated 25 sq.mm copper wire to an earth terminal adjacent to the MDF to which all cable armouring, conduit, trunking, Distribution Points etc., shall be bonded together.

Earthing arrangements and the resistance of the earth continuity conductor shall comply with IEE requirements.

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

13. TESTING ON SITE

The Telecommunications Sub-contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the ISO Standards and CCK regulations.

Guidelines to Contractors for supply, installation and maintenance of Internal and External Telecommunication Wiring.

Tests shall be carried out to prove that all Telecommunications outlets are connected.

Tests shall be carried out on completion of the installation to ensure continuity throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Telecommunications Sub-contractor will be required to issue to the Consulting Engineer the requisite certificates upon completion as required by the Regulations referred to above.

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

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

The Sub-contractor shall test to the Consulting Engineer`s approval and as specified elsewhere in this Specification or in the Standards and Regulations already referred to, all equipment, plant and apparatus forming part of the net-work.

SECTION 2

PARTICULAR SPECIFICATION FOR STRUCTURED CABLING

1. **EXTENT OF WORK**

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

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

The supply, installation and testing of:-

a) Main Distribution Frame

b) All Floor Distributions and Communication cabinets.

c) All earthing requirements.

d) All Block Wiring.

e) All Pre-Wiring.

f) All Telecommunication Outlets.

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

2. **TELEPHONE SERVICES**

Incoming telephone services to the Main Distribution Frame shall be carried underground by Sub-Contractor registered with CCK.

Connection to the building shall be by an underground cable in accordance to the drawings.

All telecommunication wiring shall be carried out by the Telecommunication Sub-Contractor. Others shall install a 25mm diameter plastic conduit system with draw-wires from the telecommunications riser duct to the telecommunications outlets.

3. **MANHOLES AND DUCTS**

a) **TELEPHONE MANHOLES AND DUCTS**

All manholes and ducts shall be supplied and installed by others.

b) **EARTHING MANHOLES**

The standard earth electrode manholes shall be precast units with internal dimensions 450 x 450 x 300 deep. These shall be supplied and installed by the Telecommunication Sub-contractor.

4. **INTERNAL CABLE INSTALLATION**

The Telecommunications Sub-contractor shall allow for a complete cabling as shown on the drawings and confirm the following:-

a) All conduits to Telecommunications outlets shall be 25mm diameter PVC concealed in floors and walls of the building.

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

c) The Telecommunications outlet shall comprise a standard flush steel box complete with moulded Telecommunications outlet plate as Siemon mounted at 300mm a.f.f.l. All adaptable boxes shall be standard switch boxes complete with cover.

The Telecommunications Sub-contractor shall allow for cabling to facilitate the connection of computer equipment (PCs, printers, etc.) and telephones by others to every network wall outlet.

The Telecommunication Sub-Contractor shall provide twin RJ45 moulded Telecommunications outlet plates as SIEMON mounted at 300mm a.f.f.l. All of these shall be cabled to the Floor Distributors.

From a Computer point of view, the wiring shall be **compliant with international standards ISO, IEEE and/or ANSI**. Whichever kind of media is used, it **shall at least be compliant to the future ISO Category 6 up to 200 MHz**

Wall outlets, patch panel outlet and any other type of connectors used will have the same level of quality and performance as the rest of the cabling scheme.

Screened Twisted Pair 0.6mm with individual Pair Foils + Overall Braid Enhanced Category 5 cables shall be provided with **RJ45 (Screened and with shutter) category 5 connectors** (for maximum flexibility in cabling modification).

Distribution of internal telephone lines shall use the same cable as for the Computer connections. It is therefore necessary that the wiring be fully compatible with **international standards (ISO/IEC 11801 and EIA/TIA 568 standards)** and meet the future ISO Category 6 up to 200MHz.

All Floor Distributor cables (data and telephone) and wall outlets shall be **labelled** so as to clearly identify the correspondence between Floor Distributor and wall outlets.

5. **BACKBONE CABLE DISTRIBUTION**

From the MDF the Telecommunication Sub-Contractor shall supply and install sets of 100 ohm 0.5 Multipair Backbone Media cables drawn in ducts to the Floor Distributor as indicated in the drawings.

6. **FLOOR DISTRIBUTOR**

The Floor Distributor shall comprise of wall mounted distribution box, housing **SIEMON** type disconnection modules mounted on vertical frames and OF splice trays. The frames shall leave a 50% capacity in reserve for installation of modules in the future.

7. **MAIN DISTRIBUTION FRAME (MDF)**

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

The MDF shall be complete with frames, modules and High voltage protectors and shall be adequately earthed.

The Main Distribution Frame shall comprise of a free standing cabinet with an integrated cable entry, which allows a setting up on false floor.

The cabinet shall accept a combination of splice trays and Twisted Pair **SIEMON** type modules.

The Bills of Quantities gives the equipped capacity only but the MDF shall have a reserve capacity such that the total capacity has four (4) pairs to every Telecommunication outlet.

8. **TECHNICAL SPECIFICATIONS**

The Telecommunications sub-contractor shall include a **full technical specification and description** of the proposed computer and telephone cabling installations, giving prominence to the minimum requirements.

A complete technical documentation for all components involved shall be furnished.

9. **FUNCTIONAL DIAGRAM**

The Telecommunication sub-contractor shall submit a **functional diagram** describing the network. The diagram shall clearly identify each component by tag numbers.

10. **BILLS OF QUANTITIES**

The Bills of Quantities in this document shall be priced. The prices shall be given including all statutory Government tax at the current rate.

11. **WARRANTY**

The tenderer shall submit **type, duration and conditions of warranty** for the devices installed and the work executed.

12. **TESTING**

The testing of the functioning of the network and the calibration of the nominal transmission rates shall be clearly specified and defined and their prices included in the quotation. **Report of these tests** shall be given at the final stage.

13. **MAINTENANCE CONTRACTS**

A **description of maintenance contracts** shall be proposed with detailed description for each service provided as follows:-

- The service(s) offered
- Their limitations

- Responsibility of the client
- Time limits for interventions
- Cost per year

14. **EARTHING**

All the DPs and other metal parts shall be properly earthed. Electrical and mechanical continuity shall be preserved throughout the whole system from the MDF to the remotest DP and the earth resistance must not exceed 0.5 ohms.

ELECTRICAL INSTALLATIONS

BILLS OF QUANTITIES

SCHEDULE OF PRICES

GENERAL NOTE

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

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

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

   4. Supply of all materials, equipment, apparatus, fittings, spares and tools

   b) Insurance

   c) Clearing and forwarding

   d) Delivery and storage at site

   e) Packing for storage

   f) Replace any defective or damaged item

   g) Installation

   h) Testing

   4. Painting

   j) Commissioning

   k) Maintenance during the defects liability period

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

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.1.00	**LIGHTING POINTS AND FITTINGS** **Supply, install, test, commission and maintain:-**				
1.1.01	Lighting points wired in 1.5sqmm PVC insulated single core (SC) copper wires drawn in 20 mm HG PVC conduits concealed in walls and floors,one way switched with all accessoriesbut excluding switch and fitting	No.	68		
1.1.02	Ditto, for two way lighting points	No.	126		
1.1.03	10A wide rocker plateswitch 1 gang two-way SP as MK K4781WHI	No.	18		
1.1.04	10A wide rocker plateswitch 2 gang two-way SP as MK K4782WHI	No.	14		
1.1.05	10A wide rocker plateswitch 3 gang two-way SP as MK K4783WHI	No.	2		
1.1.07	MK Architrave switches,1G2W	No.	10		
1.1.08	600 x 600mm x 60 mm LED Panel Lights,45W as ROBUS complete with LED lamps and all other accessories Type L4	No.	66		
1.1.09	Ditto but c/w emergency conversion kit	No.	4		
1.1.10	Philips 30957 Slim LED 24x0.5W Flush Mount Ceiling Lamp, Type L3	No.	26		
1.1.11	GU10 silver mains voltage reccessed downlighter fiting complete with aluminium reflector and 6W GU10 lamp as Micromark MM 31225, Type "L1"	No.	79		
1.1.12	Maintained emergency exit luminare illuminated by L.E.D.s with 3hr NiCd battery backup with extruded aluminium support rail enclosing l.e.d's on linear PCB, supported by chains, suspended from ABS injection moulded housing, enclosing battery and electronic control circuits,Type "EXIT"	No.	4		
1.1.13	LED Tape Striplights Kit 5M 12W Warm White complete with Transformers	LM	108		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 5/ 43				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.2.00	**POWER POINTS AND OUTLETS**				
	Supply, install, test, commission and maintain:-				
1.2.01	13 Amp ring twin socket outlet points wired in 3 x 2.5sq mm PVC SC copper cables drawn in 20mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the socket outlet plate	No.	112		
1.2.02	Ditto but for fused spur/hand dryer/undersink/ fan circuit	No.	3		
1.2.03	Cooker circuit wired in 3 x 6sq mm PVC SC copper cables drawn in 25mm HG PVC conduits concealed in the wall and floors complete with all accessories but excluding the cooker control unit	No.	1		
1.2.04	Ditto but for cooker connection unit	No.	1		
1.2.05	Air Conditioning unit power points comprising wiring in 3x4mm2 PVC/SC CU cables drawn in 32mm diameter concealed HG PVC conduits	No.	5		
1.2.06	20A flush DP switch with pilot lamp as MK K5213	No.	8		
1.2.07	20A flex outlet as MK K 1090 WHI	No.	8		
1.2.08	13A flush 2 gang switchsocket-outlet as MK K 2476WHI	No.	112		
1.2.09	45A DP cooker control unit with switchsocket-outlet as MK K 5236	No.	1		
1.2.10	Flush cooker connection unit as MK K 5045 WHI	No.	1		
1.2.11	250 x 50mm three compartment trunking surface mounted prepainted and baked steel trunking made out of 16 swg sheets and frame complete with cover, switch boxes, cross over bridges, fixing accessories and face plates	LM.	425		
1.2.12	32A flush DP switch with neon lamp as MK K5423D1WHI	No.	1		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 5/ 43				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.3.00	**TELEPHONE AND PUBLIC ADDRESS SYSTEM**				
	Supply, install, test, commission and maintain :-				
1.3.01	Telephone/CCTV outlet points comprising of 25 mm diameter HG PVC conduits and draw wire concealed in walls and floor with all accessories excluding outlet plate	No.	48		
1.3.02	300 x 300 x 75mm prepainted steel adaptable box	No.	3		
1.3.03	50mm dia. H.G PVC conduit for linking the adaptable box concealed in the wall or floor with all accessories	LM.	100		
1.3.04	TV outlet points comprising of 25 mm diameter HG PVC conduits concealed in walls and floor with all accessories excluding outlet plate	No.	6		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 5/ 43				

ITEM	DESCRIPTION	UNIT	QTY.	RATE SHS.	AMOUNT SHS.
1.4.00	**SUB-MAINS AND DISTRIBUTION**				
	Supply, install, test, commission and maintain :-				
1.4.01	16-way TPN distribution board "DB S1" as Schneider with a 160A TP integral Isolator as complete with the following as :- 8 No. 10A SP MCB 8 No. 20A SP MCB 16 No.30A SP MCB 6 No. Blanking plates	No.	1		
1.4.02	Sub-mains comprising of 4C 35 sq mm PVC/SWA/PVC CU cable drawn in 50 mm HG PVC conduits from the Stabilizer to the Distribution board S1	LM	85		
1.4.03	Cables glands and lugs for the 35 sq mm 4 Core PVC SWA PVC cables complete with shroud	No.	4		
1.4.04	160A MCCB as Schneider	No.	1		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE No. 5/ 43				-

ITEM	DESCRIPTION	UNIT	QTY	RATE SHS.	AMOUNT SHS.
	BROUGHT FORWARD FROM PAGE No. 5/ 39				
	BROUGHT FORWARD FROM PAGE No. 5/ 40				
	BROUGHT FORWARD FROM PAGE No. 5/ 41				
	BROUGHT FORWARD FROM PAGE No. 5/ 42				
	TOTAL CARRIED FORWARD TO SUMMARY PAGE NO 5/ 49				

PROPOSED PARTITIONING WORKS AT SEVENTH FLOOR TSC BUILDING, NAIROBI
CCTV INSTALLATIONS

ITEM	DESCRIPTION	UNIT	QTY.	RATES KSHS.	AMOUNT KSHS
	Supply, install, test and commission the following:-				
1.1.01	Camera outlet point comprising wiring with 4-pair UTP- 0.5mm plain copper wire PVC insulated and PVC sheathed drawn into installed ducts and conduits to meet category 6 of TIA PN - 3727 and class E of ISO/ IEC 11801 requirements but excluding outlet plates, all accessories included, as Siemon or equivalent	No.	3		
1.1.04	Indoor dome HD ,IP HIK VISION vandal-resistant indoor mini dome IP camera with full HD 1080p, true day/night, PoE and mobile viewing with 4.0MP Image sensor and complete with all mounting brackets and accessories	No.	3		
1.1.05	Complete CCTV control centre comprising of 16 No. channel HD NVRs with 6 TBytes HDD fitted with SONY MPEG or equal and approved with recording facility of hard disc ,CD Back-up and Quad modulator.The NVRs should also allow for mobile viewing	Item	1		
1.1.06	45" high resolution performance colour monitor as Samsung LED HD or equal and approved c/w all mounting brackets and accessories	Item	1		
1.1.08	Workstation complete with a 24'TFT display, Dual core 4GB RAM 3.5GHZ CPU with 1Terabyte Hard disk	No	1		
1.1.09	Cisco Catalyst 2960-X Series Switches 2960X-24PD-L (24-Port PoE with 8 x 1GSFP uplink ports); c/w 4no MM Fiber tranceivers and 4no RJ45 uplink ports	No.	1		
1.1.10	CAT 6A shielded loaded Patch Panel - 24 ports as Siemon flat 1 U black (Z6AS-PNL-U48K)	No.	1		
1.1.10	1 KVA UPS as APC complete with all accessories to faciltate installations	No.	1		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE NO 5/ 46				

PROPOSED PARTITIONING WORKS AT SEVENTH FLOOR TSC BUILDING, NAIROBI
CCTV INSTALLATIONS

ITEM	DESCRIPTION	UNIT	QTY.	RATES KSHS.	AMOUNT KSHS
	Supply, install, test and commission the following:-				
1.1.11	8 core siemon outdoor optic fibre cable (Multimode - 9F5D4-4A1.00) to link the blocks to the server room and terminated using J4858C transceivers modules	LM	150		
1.1.12	CAT 6A one metre shielded patch cords with RJ45 as Siemon ZM6A-SO1M-02B	No.	7		
1.1.13	Networking Accessories comprising of masking tapes,labels, cable ties etc	LOT	1		
1.1.14	1U patch cord organisers as Siemon or equal and approved	No.	2		
1.1.15	Fluke test for all the outlet points	Item	1		
1.1.16	Any other item required to complete the works	LOT	1		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE NO 5/ 46				

SUMMARY PAGE
PROPOSED PARTITIONING WORKS AT SEVENTH FLOOR TSC BUILDING, NAIROBI
CCTV INSTALLATIONS

	DESCRIPTION		AMOUNT KSHS
	COLLECTION PAGE		
A	Total Brought Forward From Page No. 5/ 44		
B	Total Brought Forward From Page No. 5/ 45		
	TOTAL CARRIED FORWARD TO SUMMARY PAGE No. 5/ 49		

ITEM	DESCRIPTION	UNIT	QTY.	RATES KSHS	AMOUNT KSHS
	Supply, install, test and commission the following:-				
	Alarm system & Acess Control				
1.1.01	Wiring of outlet points comprising 2.5sq. Mm 4 core PVC PVC copper cable drawn in conduits laid by others complete with all accessories but excluding contacts	No.	28		
1.1.02	PIR Motion Sensor as Rosslare	No.	5		
1.1.03	Magnetic Door Contact	No.	5		
1.1.04	Siren kit, flasher and Enclosure	No.	1		
1.1.05	Premier Alarm Panel as Secolink complete with LCD screen	No.	1		
1.1.06	12V 3A PSU with battery	No.	1		
1.1.07	10 door access controller system complete with onboard TCP/IP LAN Port and Programming keypad (complete with power supply and metal case housing) 10 IN and 10 OUT interface unit (complete with power supply and metal case housing) supported by SK800-NT Only	Item	1		
1.1.08	7.5Amp Battery	No.	1		
1.1.09	Magnetic door contacts and brackets	No.	5		
1.1.10	12V DC power supply unit complete with wiring to the control panel	No.	1		
1.1.11	Buzzer unit, reset box to be installed in the server room	No.	1		
1.1.13	Connection relays	Item	5		
1.1.14	Biometric, PIN and Proximity controller List No. AYC-W6500	No.	5		
1.1.15	Request to exit switch	No.	12		
1.1.16	Key switch	No.	5		
1.1.17	Break glass switch	No.	5		
1.1.18	Installation and configuration testing and training	Item	1		
	TOTAL CARRIED FORWARD TO SUMMARY PAGE NO 5/ 49				

PROPOSED PARTITIONING WORKS AT SEVENTH FLOOR TSC BUILDING, NAIROBI
MATV SYSTEM INSTALLATIONS

ITEM	DESCRIPTION	UNIT	QTY.	RATE KSHS	AMOUNT KSHS.
	Supply, install, test and commission the following items. The installations to be tested using Network scanner, documented and labelled				
1.1.01	TV outlet point wired in low loss high resolution co-axial cables drawn in existing PVC conduits complete with splitters, outlet plates and all other necessary accessories	No.	6		
1.1.02	Grid UHF Aerials with mounting kit	No.	1		
1.1.03	VHF Aerials with mounting kit	No.	1		
1.1.04	Mast head amlifier complete with power supply unit and double UHF combiner	No.	1		
1.1.05	3 legged aerials clamp and 6.5 metres aluminium aerial mast	No.	1		
1.1.06	90cm diameter digital satellite dish complete with analogue and digital signal combiner as well as the mounting clamp kit and all necessry accessories but an integrated receiver decoder (KU-Band)	No.	1		
1.1.07	2 gang TV Coaxial socket outlet as MK K 3521 WHI	No.	6		
1.1.08	6 way splitters for 5 - 2300 Mhz	No.	1		
1.1.09	DSTV Decoder	No.	2		
1.1.10	9X16 Multiswitch as FTE or equal and approved	No.	1		
1.1.11	100 Pair Discase as FTE or equal and approved	No.	1		
1.1.12	Line amplifiers as FTE or equal and approved	No.	1		
1.1.13	Any other Item required to complete these works	Item	1		
	TOTAL CARRIED FORWARD TO SUMMARY PAGE NO 5/ 49				-

ITEM	DESCRIPTION	AMOUNT
A	Total For Electrical Installations Brought Forward From Page No. 5/ 43	
B	Total For CCTV Installations Brought Forward From Page No. 5/ 46	
C	Total For Alarm System & Access Control Installations Brought Forward From Page No. 5/ 47	
D	Total For MATV Installations Brought Forward From Page No. 5/ 48	
	SUB-TOTAL FOR ELECTRICAL SERVICES INSTALLATIONS CARRIED FORWARD TO GRAND SUMMARY PAGE	

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 6 – INTERNAL PLUMBING AND DRAINAGE INSTALLATION.

PART B1

GENERAL MECHANICAL SPECIFICATION

INDEX

PART B1

GENERAL MECHANICAL SPECIFICATION

1. GENERAL

This section specifies the general requirements for plant, equipment and material forming part of the Sub-Contract Works and shall apply except where specifically stated elsewhere in the specification or on the contract Drawings.

2. QUALITY OF MATERIALS

All plant, equipment and materials supplied as part of the Sub-contract works shall be new and of first-class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-Contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connected by the Sub-Contractor shall carefully be examined on receipt and stored. Should any defects be noted, the Sub-Contractor shall immediately notify the Engineer

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

3. REGULATIONS AND STANDARDS

The Sub-Contract Works shall comply with the current edition of the following:-

(a) The Kenya Government Regulations

(b) The United Kingdom Institution of Electrical Engineering (IEE) Regulations for the electrical equipment of buildings.

(c) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.

(d) British Standards and Codes of Practice as published by the British Standards Institution (BSI).

(e) The Local Council By-laws.

(f) The Electricity supply Authority By-Laws.

(g) Local Water Authority By-Laws.

(h) The Kenya Building code of Regulations.

4. ELECTRICAL REQUIREMENTS

Plant and equipment supplied under this Sub-Contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where Control Panels incorporating several starters are supplied, they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-Contractor. All other wiring shall be as described in the "Particular Specification".

The Sub-Contractor shall supply three copies of all schematic, cabling and wiring diagrams for the Engineer's approval.

The starting current of all electric motors and equipment shall not exceed the maximum permissible starting currents described in the Kenya Power and Lighting Company's (KP & LC) By-Laws.

All electrical plant and equipment supplied by the Sub-Contractor shall be rated for the supply voltage and frequency obtained in Kenya, that is 415 volts, 50HZ, 3-phase or 240 volts, 50HZ, 1-phase as specified in the "Particular Specification".

Any equipment that is not rated for the above voltages and frequencies may be rejected by the Engineer

5. TRANSPORT AND STORAGE

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

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

Adequate measures shall be taken by the Sub-Contractor to ensure that plant and equipment do not suffer any deterioration during storage.

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

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

6. SITE SUPERVISION

The Sub-Contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

7. INSTALLATION

Installation of all special plant equipment shall be carried out by the Sub-Contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or his appointed agent in accordance with the best standards of modern practice and to the relevant regulations and standards described under Clause 3 of this section.

8. TESTING

8.1 General

The Sub-Contractor's attention is drawn to Part "A", Sub-Clauses 1.44 and 1.45 Page A/13 of the "Preliminaries and General Conditions".

The following sub-clauses are intended to define the Sub-Contractor's responsibilities with respect to testing and inspection.

8.2 Material Tests

All material for plant and equipment to be installed under this Sub-Contract shall be tested, unless otherwise directed, in accordance with the relevant B.S. specification concerned.

For materials where no B.S. specification exists, tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer, having regard to the particular type and application of the materials concerned.

The Sub-Contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specifically manufactured for the plant and equipment specified is used, then the Sub-Contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

8.3 Manufactured Plant and Equipment - Works Tests

The rights of the Engineer relating to the inspection, examination and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer

The Sub-Contractor shall give two week's notice to the Engineer of the manufacturer's intention to carry out work tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The costs of such tests and inspections shall be borne by the Sub-Contractor.

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

Plant and equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the Sub-Contractor's own risk and should the test and inspection certificates not be approved, new tests may be ordered by the Engineer at the Sub-Contractor's expense.

8.4 Pressure Testing

All pipework installations shall be pressure tested in accordance with the requirements of the various section of this specification. The installations may be tested in section to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. All tests must be witnessed by the Engineer or his representative and the Sub-Contractor shall give 48 hours notice to the Engineer of his intention to carry out such tests.

Any pipework that is buried or concealed before witnessed tests have been carried out shall be exposed at the expense of the sub-contractor and the specified tests shall then be applied.

The Sub-Contractor shall prepare test certificates for signature by the Engineer and shall keep a progressive and up-to-date record of the Sections of the work that have been tested.

9. COLOUR CODING

Unless stated otherwise in the Particular Specification all pipework shall be colour coded in accordance with the latest edition of B.S. 1710.

10. WELDING

10.1 Preparation

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfections due to shearing or flame cutting operation, etc., and shall be free from rust, scale, grease and other foreign matter.

10.2 Method

All welding shall be carried out by the electric arc process using covered electrodes in accordance with B.S. 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer

10.3 Welding codes and Construction

All welded joints shall be carried out in accordance with the following specification:-

(a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

(b) General welding

All welding mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

10.4 Welders Qualifications

Any welder employed on this Sub-contract shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriated certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the Sub-Contractor to replace him by a qualified welder.

PART B2

GENERAL PLUMBING AND DRAINAGE SPECIFICATIONS

PART B.2

GENERAL PLUMBING AND DRAINAGE SPECIFICATIONS

INDEX

SECTION B2

GENERAL PLUMBING AND DRAINAGE SPECIFICATIONS

2.1 MATERIALS AND STANDARDS

2.1.1 GENERAL

This section specifies the general requirements for plant, equipment and materials forming part of the Plumbing and Drainage Installations.

PIPEWORK AND FITTINGS

Pipe materials are to be used as follows:-

2.1.2 Cold Water Mains

Unplasticised PVC or galvanised steel medium or heavy grade, as specified on the drawings.

2.1.3 Black steel Pipework

All black steel pipework up to 65 mm nominal bore shall be manufactured in accordance with B.S. 1387 Medium Grade, with tapered place threads in accordance with BS 21. All fittings shall be of malleable iron and manufactured in accordance with BS 143.

Pipe joints shall be screwed and socketed and sufficient couplings union shall be allowed so that fittings can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved by the Engineer.

All black steel pipework, 80mm nominal bore up to 150mm nominal bore, shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace unions and couplings for the joining of pipes to valves and other items of plant.
All flanges shall comply with the requirements of BS 10 to the relevant classification contained hereinafter under section C of the Specification.

2.1.4 Galvanised Steel Pipework

Galvanised steel pipework shall be manufactured to comply in all respects with the standards described for black steel pipework in paragraph 2.1.3 above.

Galvanised shall be carried out in accordance with the requirements of BS 1387 and BS 143 respectively.

2.1.5 Copper Tubing

All copper tubing shall be manufactured in accordance with BS 2871 from C.160 "Phosphorus De-oxidized Non-Arsenical Copper" in accordance with BS 1172.

Pipe joints shall be made with soldered X] fittings and connections to equipment shall be with compression fitting manufactured in accordance with B.S. 864.

Short copper connections tubes between galvanised pipework and sanitary fitments shall not be used because of the risk of galvanic action.

If, as may occur in certain circumstances, it is not possible to make the connection in any other way than by the use of copper tubing, then a brass straight connector shall be positioned between the galvanised pipe and the copper tube in order to prevent direct contact.

2.1.6 Cast Iron Pipework

(a) Internal Services

Cast iron pipework and fittings for use above ground in connection with internal building services, shall be manufactured with spigot and socket joints of the weight required by the local authority and shall comply fully with the requirement of B.S. 416.

All joints on cast iron spigot and socket pipes shall be made with an approved cold caulking compound and so installed as to allow for any expansion or contraction, which may take place.

All cast iron pipework, branches, tees, bends and other fittings shall be supplied complete with inspection covers for cleaning purposes. These inspection covers shall be included as part of the fittings and shall comply with the requirements of B.S. 416.

(b) External Services

Cast iron pipework, which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirements of B.S. 1211.

All buried cast iron bends, elbows swept tees and other fittings, shall comply with the requirements of B.S. 1130.

Jointing on external cast iron pipes shall be carried out in accordance with one of the methods described in B.S. Code of Practice 301, Clause 505C (v), to the approval of the Engineer.

2.1.6 Pitch Fibre Pipework

Pitch Fibre Pipework and fittings for use in connection with external drainage services shall be manufactured in accordance with the requirements of B.S. 2760. Pipes shall be connected by means of purpose tapered joints manufactured in accordance with B.S. 2760.

Until such time as the use of pitch impregnated fibre is covered by a code of practice, the jointing laying and cutting of these pipes shall be carried out in accordance with the requirements of the notes contained under Appendix C of B.S. 2760.

2.1.7 Concrete Pipe

Where concrete pipe and fittings are used in connection with the conveyance surface water of sewage under atmospheric pressure, they shall be manufactured in accordance with the requirement of B.S. 556, Class l, except where otherwise stated. The joints of concrete pipe and fittings may be one of the following depending application and conditions:

(1) Flexible spigot and socket type.

(2) Flexible rebated type (Storm water drainage only)

(3) Ordinary spigot and socket type.

(4) Ordinary rebated type (Storm water drainage only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufactured in accordance with B.S. 2494 except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S. 3514.

Joints (3) and (4) shall be made with approved cement mortar mix.

2.1.8 Asbestos Cement Pressure Pipes

Where asbestos cement pressure pipes and fittings are used in connection with external, above ground or buried water services, they shall be manufactured in accordance with the requirement of B.S. 486.

The classification of these pipes fall into classes:

A.,B.,C., and D., respectively, and the class to be used shall depend upon the pressure conditions pertaining at site.

Where cast iron detachable joints are used for connecting pipes, the material comply with the B.S. Specification, then the materials used shall be of a quality not less than that required by this standard.

Rubber jointing rings shall be used for sealing purposes and shall comply with the requirements of B.S. 2494, except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S 3514.

2.1.9 Concrete Pipe

Where concrete pipe and fittings are used in connection with the conveyance of surface water or sewage under atmospheric pressure, they shall be manufactured in accordance with the requirement of B.S. 556, Class l, except where otherwise stated.

The joints of concrete pipe and fittings may be one of the following depending upon application and conditions:

(1) Flexible spigot and socket type

(2) Flexible rebated type (Storm water drainage only)

(3) Ordinary Spigot and socket type

(4) Ordinary rebated type (Storm water drainage only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufactured in accordance with B.S. 2494 except where they are likely to be contaminated by oil products, which case the gaskets shall be manufactured in accordance with B.S. 3514.

Joints (3) and (4) shall be made with an approved cement mortar mix.

2.1.10 Asbestos Cement Pressure Pipes

Where asbestos cement pressure pipes and fittings are used in connection with external, above ground or buried water services, they shall be manufactured in accordance with the requirement of B.S.486.

The Classification of these pipes falls into four classes:

A.,B.,C., and D., respectively, and the class to be used shall depend upon the pressure conditions pertaining at Site.

Where cast iron detachable joints are used for connecting pipes, the material shall comply with B.S. Specifications, and then the materials used shall be of a quality not less than that required by this standard.

Rubber jointing rings shall be used for sealing purposes and shall comply with the requirements of B.S. 2494, except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance B.S. 3514.

2.1.11 P.V.C. (Hard) Pressure Pipe and Fittings

All P.V.C. pipes and fittings shall be manufactured in accordance with B.S. 3505: 1968 or the relevant Kenya Standard.

Fittings shall comply in all respects with British Standard 4346 Part 1: 1969 or the relevant Kenya Standard. Pipes shall be supplied in plain-ended lengths.

Thickness

The Minimum acceptable wall thickness of pipe and fittings shall be as follows:-

Nom. Dia. (mm)	10	12	20	25	32	40	50	75	100
Thickness (mm)	1.5	1.7	1.9	2.2	2.7	3.1	3.9	5.7	7.3

Jointing

The method of jointing to be employed shall be that of Solvent welding, using the pipe and manufacturers approved cement. Seal rings joints shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of the water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Workmanship

The installation method of jointing shall be solvent welding; and both jointing and fixing shall comply in all respects to the manufacturer' site-work instructions. The maximum intervals between pipe supports at 200C shall be as follows:-

Pipe Diameter	10mm	15mm	20mm	25mm	32mm	40mm	50mm	75mm	100mm
Horizontal	0.75m	0.90mm	1.05m	1.20mm	1.35m	1.65m	1.80m	Do	do
Vertical	1.50m	1.80m	2.10m	2.40m	2.70m	3.30m	3.60m	Do	do

Pipes passing through walls or floors shall be sleeved to allow unrestricted movements.
The works shall be inspected and tested during installation.
All work, which will be concealed, shall be tested before it is finally enclosed and verified by the Clerk of Works.

Any other test may be demanded upon completion for soundness and performance to the satisfaction of the Local Water Authority.

Pipe Bed

Pipes shall be uniformly laid on a 75mm thick bed, (Sand or red soil) and must not be allowed to rest on the joint or on stones etc.

Supports to Fittings

In underground installations care shall be taken to ensure that heavy components such as valves are fully supported so that the pipeline carries no weight.

Backfilling

For the protection of the pipe initial backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine grained material thoroughly compacted around the pipe and consolidated to depth of 6" above the crown of the pipe at no time shall heavy rocks, stones or other objects be included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

Testing

Pipelines shall be tested in sections under an internal water pressure normally one and a half times the maximum allowable working pressure of the class of pipe used. Testing shall be carried out as soon as practicable after laying and when the pipeline is anchored. Precautions shall be taken to eliminate all air from the test section and to fill the pipe slowly to avoid risk of damage due to surge.

2.1.12 MuPVC Waste Systems

All pipes and fittings shall be manufactured in accordance with B.S. 5255: 1968 or the relevant Kenya Standard.

Pipes shall be supplied in plain-ended lengths.

Thickness

The Minimum acceptable wall thickness of pipe and fittings shall be as follows: -

Size (in)	Size (mm	Pipe and Fittings Wall Thickness (mm)
11/4	32	1.8
11/2	40	1.9
2	50	2.0

Jointing

The method of jointing to be employed shall be that of Solvent welding, using the pipe and manufacturers approved cement. Seal rings joints shall be introduced where it is necessary to accommodate thermal expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of the water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Workmanship

The installation method of jointing shall be solvent welding; and both jointing and fixing shall comply in all respects to the manufacturer' site-work instructions. The maximum intervals between pipe supports at 200C shall be as follows:-

Nominal Size (in)	Nominal Size (mm)	Horizontal (mm)	Vertical (mm)
11/4	32	500	1200
11/2	40	500	1200
2	50	900	1200
3	80	900	2000
4	100	1000	2000
6	150	1000	2000

Pipes shall be fixed in straight runs and horizontal runs shall be laid to gradients in conformity with BS 5572 Code of Practise for Sanitary Pipework and in any event not less than 18mm/m unless otherwise specified.

Pipes passing through walls or floors shall be sleeved to allow unrestricted movements.

The works shall be inspected and tested during installation at any stage in accordance with BS 5572. All work, which will be concealed, shall be tested before it is finally enclosed and verified by the Clerk of Works.

Any other test may be demanded upon completion for soundness and performance to the satisfaction of the Local Water Authority.

Pipe Bed

Pipes shall be uniformly laid on a 75mm thick bed, (Sand or red soil) and must not be allowed to rest on the joint or on stones etc.

Supports to Fittings

In underground installations care shall be taken to ensure that heavy components such as valves are fully supported so that the pipeline carries no weight.

Backfilling

For the protection of the pipe initial backfilling shall be carried out as soon as possible after laying. The initial backfill shall be fine grained material thoroughly compacted around the pipe and consolidated to depth of 6" above the crown of the pipe at no time shall heavy rocks, stones or other objects be included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

Testing

Pipelines shall be tested in sections under an internal water pressure normally one and a half times the maximum allowable working pressure of the class of pipe used. Testing shall be carried out as soon as practicable after laying and when the pipeline is anchored. Precautions shall be taken to eliminate all air from the test section and to fill the pipe slowly to avoid risk of damage due to surge.

2.1.13 A.B.S. Waste System

Where indicated on the drawings and schedules, the Sub-contractor shall supply and fix A.B.S. Waster pipes and fittings.

The pipes, traps and fittings shall be in accordance with the relevant British Standards, including B.S. 3943, and fixed generally in accordance with manufacturer's instructions, and B.S. 5572 : 1978.

Jointing of pipe shall be carried out by means of solvent welding. The manufacturer's instructions, and B.S. 5572 : 1978.

Jointing of pipe shall be carried out by means of solvent welding. The manufacturer's recommended method of joint preparation and fixing shall be followed.

Standard brackets, as supplied for use with this system, shall be used wherever possible. Where the building structure renders this impracticable the Sub-contractor shall provide purpose made supports,

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

2.1.14 P.V.C. Soil System

The Sub-contractor shall supply and fix P.V.C soil pipe and fittings as indicated on the drawings and schedules.

Pipes and fittings shall be in accordance with relevant British Standards, including B.S. 45l4 and fixed to the manufacturer's instructions, and B.S. 5572.

The soil system shall incorporate synthetic rubber gaskets as provided by the manufacturer whose fixing instructions shall be strictly adhered to.

Connections to W.C. and pass shall be effected by the use of a W.C. connector gasket and cover, fixed to suit pan outlet.

Suitable supporting brackets and pipe clips shall be provided at maximum of metre centres.

The Sub-contractor shall be responsible for the joint into the Gully Trap on Drain Trap as indicated on the drawings.

2.1.15 uPVC Square Rainwater System Pipe and Gutter

Gutters shall be a rectilinear section 116mm or 137mm wide.

Gutters shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm.

Rainwater pipes shall be square in section 58mm or 75 mm internal diameter.

Rainwater pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness or rainwater pipes shall be 1.80mm.

Pipe support brackets must be adequate to screen expansion gaps.

The grade of uPVC used for gutter and pipe shall have a minimum softening point of 75^{o}C when tested by the Vicat method as described in B.S, 2782.

The pipe and gutter shall be colour grey, to BS 5252, 10.A.07, black, white or rustic.

2.1.16 uP.V.C. Rainwater Fittings

All fittings shall be injection moulded and shall be compatible with pipe and gutters and shall conform to BS 4576 or the appropriate Kenya Standard.

All gutters, pipe and fittings shall be colour grey to British Standard 5252, 10.A.07, or black, white or rustic.

Gutter connecting fittings shall have integrally moulded seal retaining cavities housing a rubber seal of hollow section.

The fitting shall incorporate a gutter-retaining clip.

Gutter shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of gutter shall be 2.20mm.

Rainwater pipes shall be circular in section, 65mm nominal diameter complying in all respects to British Standard 4576 or the relevant Kenya Standard.

Rainwater pipes shall be supplied in plain-ended lengths. The minimum acceptable wall thickness of rainwater pipes shall be 1.80mm

Pipe support brackets must be adequate to screen expansion gaps.

The grade of uPVC used for gutter and pipe shall have a minimum softening point of 75oC when tested by the Vicat method as described in B.S. 2782.

The pipe and gutter shall be colour grey, to BS 5252, 10.A.07, black, white or rustic.

2.1.17 uP.V.C. Underground Drainage System

(a) Pipes and fittings

The pipes and fittings shall comply in all respects to British Standard 4660 & 5481 or the relevant Kenya Standards.

Pipes shall be supplied in plain-ended lengths.

The minimum acceptable wall thickness of pipe and fittings will be as follows:

110mm pipe	3.0mm	
160mm pipe	3.9mm	
110mm junction only	3.50mm socket	3.80mm body
All other fittings	3.20mm socket	3.40mm body
160mm all fittings	4.30mm socket	4.70mm body

The method of jointing to be employed shall be by lip seal socketted fittings. Jointing to other materials shall be made in the manner specified by the manufacturer.

The grade of uPVC used for the pipe shall have a minimum softening point of 82oC when tested by the `Vicat` method 102D as described in British Standard 2782, and for fittings 79oC.

The pipe and fittings shall be of colour golden brown approximating to British Standard 381C:No.414. The seal retaining caps shall be black polypropylene.

The natural rubber for lip seal joints shall be to British Standard 2494:1976.
Holderbats shall be made of mild steel protected from corrosion by galvanising or search coating for optimum fit to pipe supports a special purpose made P.V.C. packing pieces may be used.

The base of soil and vent stack connection to the below ground drain shall be made with a bend of minimum centre line radius of 250mm.

Minor changes of direction where permitted shall be made with a variable bend that has a constant effective length

(b) Excavation of Trenches

The installation, method of jointing shall conform in all respects to the manufacturer's site work instruction.
Trenches shall be excavated to a sufficient depth to allow a 50mm minimum bed below the underside of the pipe. Trench width shall be not less than the outlet diameter of the pipe plus 300mm and not wider than necessary.

(c) Trench Invert

The base of the trench shall be such that even support is given to the pipe for its full length. Soft spots shall be removed and replaced with compacted granular material as described below. High spots and rock shall be removed to allow full 50mm bed depth.

(d) Pipe bed

The bed shall be composed of granular material to the specification called for below and shall for below and shall cover the full trench width and length and boned to gradient

(e) Laying and jointing

Pipes and fittings shall be laid true to gradient in straight lines and jointed in accordance with manufacturer's instructions. All pegs used for alignment and other purposes must be removed after use and before sidefilling. All joints shall be watertight complying with CP.301, Clauses 5:3.

Pipe barrels shall be in continuous contact with the trench bed when laid.

(f) Side Filling

The side filling of pipes shall be composed of hard granular material, which shall be to the requirements below.

Side fillings must be placed equally on both sides of the pipe and compacted, so as to buttress the pipes against the trench walls. Side filling shall continue up to pipe crown level as a minimum and above this level if required by the Engineer.

(g) Back Filling

The first 300mm of backfill above crown level shall be taken from selected trench spoil all passing 25mm sieve. It shall be placed in two 150mm layers each firmly tramped. Above the 300mm level mechanical filling and compaction may be used.

Where cover is less than 450mm the pipe shall be covered with 75mm of selected material laid to support a concrete tile or slab indicating the presence of a service.

(h) Granular Material for Bed and Side Fill

All material for bed and side fill shall be hard and granular passing 20mm sieve and shall contain not more than 5 per cent fines passing 3mm sieve.

The material may be composed of crushed stone, clinker, quarry scalping, ballast,

gravel, shingle or all-in aggregate to British Standard 882.

The material shall have a compaction factor of 0.3 or less.

2.1.18 VALVES

(a) Draw-off Taps and Stop Valves (Up to 50mm Nominal Bore)

Draw off taps and valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitment shall be manufactured in accordance with requirement of B.S. 1010.

(b) Gate Valves

All gates valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be of cast iron construction, in accordance with the requirement of B.S. 3464. All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 12l8.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S. 1952.

The pressure classification of all valves shall depend upon the pressure conditions pertaining to the Site of Works.

(c) Globe Valves

All globe valves upto and including 65 mm nominal bore shall be of bronze construction in accordance with the requirements of B.S. 3061.

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the Site of Works.

(d) Check or Non-Return Valves

All check or non-return valves 80mm nominal bore and above shall be of the swing check type of cast iron construction in accordance with the requirement of B.S. 4090.
The pressure classification of all check or non-return valves shall depend upon the pressure conditions pertaining to site of the Works.

(e) Ball Valves

All ball valves for use in connection with hot and cold water services shall be of the Portsmouth type in accordance with the requirements of B.S. 1212, constructed from bronze or other corrosion resistant materials. These valves fall into three pressure classifications as follow:-

(i)	Low Pressure	3.52Bars maximum
(ii)	Medium Pressure	7.72Bars maximum
(iii)	High Pressure	12.62Bars maximum

The pressure classification required for each ball valve will be designated in the description of its associated equipment contained in section C of the specification

(f) Manually Operated Mixing Valves

Mixing valves for shower fittings and other appliances being provided under the Sub-contractor Works shall be manufactured in accordance with the requirements of B.S. l4l5 from bronze or other corrosion resistant materials.

2.1.19 WASTE FITMENT TRAPS

(a) Standard and Deep Seal P & s Traps

Where standard or deep seal traps are specified they shall be manufactured in suitable non-ferrous materials in accordance with the full requirements of B.S. 1184.

In certain circumstances, cast iron traps may be required for cast iron baths and in these instances bath traps shall be provided which are manufactured in accordance with the full requirements of B.S. 1291.

(b) Anti-Syphonic Traps

Where anti-syphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hughes Ltd., Deacon Works Littlehampton, Sussex, England.

The trade name for traps manufactured by this company is "Grevak".

2.1.20 PIPE SUPPORTS

(a) General

This Sub-clause deals with pipe support securing pipes to the structure of buildings for above ground application.

The variety and type of support shall be kept to a minimum and their design shall be such as to facilitate quick and secure fixings to metal, concrete, masonry or wood.
Consideration shall be given, when designing supports, to the maintenance of desired pipe falls and the restraining of pipe movements to a longitudinal axial

direction only.

The Sub-contractor shall supply and install all steelwork forming part of the pipe support assemblies and shall be responsible for making good any damage to builders work associated with the pipe support installation.
The Sub-contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection work commences.

6/18

The Sub-Contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection work commences.

(b) Steel and Copper Pipes and Tubes

Pipe runs shall be secured by pipe clips connected to pipe hangers, wall brackets, or trapeze type supports. 'U@ bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximate guide to the maximum permissible support spacing in metres for steel and copper pipe and tube is given in the following table for horizontal runs.

Size Nominal Bore	**Copper Tube To BS 659**	**Steel Tube To BS 1387**
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.5m	4.5m
150mm	4.5m	5.5m

The support spacing for vertical runs shall not exceed one and a half times the distances given for horizontal runs.

(c) Cast Iron and Asbestos Cement Spigot and Socket Jointed Pipes

Cast iron and asbestos cement socketed pipes shall generally be supported at every socket joint by means of either holder bats secured rigidly to the structure, or purpose made straps for attachment to rigid steel support brackets.

When holder bats are used, they shall conform to the requirements of B.S. 4l6. Suitable anchors shall be provided at all changes of pipe directions, junctions and tees, to counterpart the effect of end thrust loads.

(d) Asbestos Cement Pressure Pipes

Asbestos Cement pressure pipes with either cast iron detachable joints or asbestos cement screw joints shall be supported and anchored on either side of the joint. The joint shall remain free.

Pipe hangers and trapeze type supports shall not be suitable for the suspension of asbestos pressure pipes unless they are designated with suitable restrictions to prevent swinging while at the same time providing the necessary support requirements.

Within building, asbestos pressure pipes shall be carried either on concrete support on rigidly fixed steel wall brackets.

Suitable anchors shall be provided at all changes of pipe directions, junctions and tees to counterpart the effect of end thrust loads.

(e) Concrete and Pitch Pipes

These pipes shall not be used for above ground application.

(f) Expansion Joints and Anchors

Where practicable, cold pipework systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing that the pipe stresses are contained within the working limits prescribed in the relevant B.S. specification.

The Sub-contractor shall pay particular care when supporting cast iron and asbestos cement pipes in order to ensure that the settlement and building movement do not break the pipe joints.

Where piping anchors are supplied, they shall be fixed to the main structure only. Details of all anchor design proposals shall be submitted to the Engineer for approval before erection commences.

The Sub-contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant.

The Sub-Contractor shall supply flexible joints to prevent vibrations and other movements being transmitted from pumps to piping systems or vice versa.

2.1.21 SANITARY APPLIANCES

All Sanitary appliances supplied and installed as part of the Sub-Contract works shall comply with the general requirements of B.S. Specification.

2.1.22 PIPE SLEEVES

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeve shall be of P.V.C. except where they pass through the structure, where they shall be mild steel.. The sleeves shall have 6mm - 12mm clearance all around the pipe or for insulated pipework all around the installation. The sleeve will then be packed with slag wool or similar.

2.2 INSTALLATION

2.2.0 GENERAL

Installation of all pipework, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The Sub-contractor shall be responsible to the Main contractor for ensuring that all builders work associated with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

2.2.01 ABOVE GROUND INSTALLATION

(a) Water Services

Before any joint is made, the pipes shall be hung in their supports and adjusted ensure that the joining faces are parallel and any fails which all be required are achieved without springing the pipe.

Where falls are not shown on the contract Drawings or stated elsewhere in the Specification, pipework shall be installed parallel to the line of the buildings and as close to the walls, ceilings, columns etc., as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other use equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational equipment are unavoidably installed beyond normal reach or in such position as to be difficult to each from a short stepladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions of facilitate easy removal of valves and fittings, and to enable alterations of pipework to be

carried out without the need to cut the pipe.

Full allowance shall be made for the expansion and contraction of pipework, precautions being taken to ensure that any force produced by the pipe movement are not transmitted to valves, equipment or plant.
All screwed joints to piping and fitting shall be made with P.T.F.E. Tape.
The pump shall maintain the test pressure for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of one gallon per 25mm of diameter, per 1.6 kilometres per 24 hours per 30 metres head, may be considered reasonable but any visible individual leak shall be repaired.

(b) Sanitary Services

Soil, waste and vent pipe systems shall be installed in accordance with the best standard of modern practice as described in B.S. 5572 to the approval of the Engineer.

The Sub-contractor shall be responsible for ensuring that all ground floor waster fittings are discharged to a gully trap before passing to the sewer via manhole.

The Sub-contractor shall provide all necessary roding and inspection facilities within the draining system in position where easy accessibility is available.

Where a branch requires roding facilities in a position to which normal access in unobtainable, then that branch shall be extended so as to provide a suitable purpose made roding eye in the nearest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The Sub-contractor shall be responsible for sealing the roof after installation of the stacks.

The open end of each stack shall be fitted with a plastic coated, or galvanised steel, wire guard.

Access for roding and testing shall be provided at the foot of each stack.

(c) Sanitary Appliances

All Sanitary appliances associated with the Sub-contract works shall be installed in accordance with the best standard of modern practice as described in B.S. 5572 to the approval of the Engineer.

2.2.02 UNDERGROUND INSTALLATION

(a) General

All underground water and drainage service installations shall be carried out in accordance with the best Standard of modern practice as described in C.P. 301

AND C.P. 310 respectively and the following clause.

(b) Sequence of Operation for Underground Service Installation

(1) Setting out

As described in B.S. Code of Practice 301 Cause 502.

(2) Breaking Up Surface (If in Roads)

As described in B.S. code of practice 301 Clause 503.

(3) Excavation and Timbering

As described in B.S. code or practice 301 Clause 503 and the following:-

Excavation shall be made to such depths and dimensions as may be required by the Engineer to obtain prior falls and firm foundations. No permanent construction shall be commenced on any bottom until the excavation to the correct level with concrete l : 4 : 8 to 38 mm maximum aggregate sizes.

The Sub-contractor's price shall have included for excavating in all materials met with, for trimming bottoms to the necessary falls and for any extra excavation required for planking, strutting and working space.

The Sub-contractor shall keep the whole of the trenches or other excavation free from water and shall execute such works and install such pumps as may be necessary to keep the excavation dry at all times.

No sub-soil water shall be discharged into the sewage system without written permission of the Engineer.

(4) Laying of Concrete Beds or Other Support for Pipes (if required)

As described in B.S. code or practice 301 clauses 504 and the following:-

All drains below buildings and roads shall be encased in concrete 150mm thick.

Concrete beds and supports shall be concrete I:3:6 to 25mm maximum aggregate size.

(5) Pipe Laying and Jointing

Drainpipe shall be laid and jointed as described under B.S. code of practice 301 Clause 505.

Pitch fibre drain pipe shall be laid, jointed and cut in accordance with the requirement or the Note contained under Appendix C of B.S. 2760.

Water pipes shall be laid and jointed as described under B.S. code of practice 310, clause 401, 402, 403 and 404.

(6) Manholes

(1) General

All manholes provided under the Sub-contract works shall be constructed or approved materials and in an approved manner.

All manholes shall be watertight and if constructed of brickwork, solid blockwork or stonework, they shall be rendered internally with a cement mortar of at least l2mm thickness and finished with a smooth surface.

The sides of all channels in every manhole shall be brought up vertically to a height of not less than the diameter of the drain and shall be benched in good concrete from the top of the channels at an angle of 30 degree to the horizontal and floated to a smooth hard surface with a coat of I:I cement mortar.

In all other respects, manholes shall be constructed in accordance with B.S. code of practice 301.

(ii) Rectangular and Square Manholes

Rectangular and square straight through manholes shall be constructed from brickwork, solid blockwork, stonework and concrete to comply with the following minimum internal dimensions (millimetres).

Depth below Ground of Outgoing Invert	Internal Access Shaft Dimensions L X W	Size of Main Shaft Diameter	Internal Chamber Dimensions L X W	Height of Chamber above Benching	Wall Thickness
Up to 740	-	100 to 150	610x460	-	150
Up to 740		230 to 460	760x760		150
Up to 1200		100 to 150	760x760		150
160 to 1200	-	230 to 460	910x910	-	150
1220 to1800	-	100 to 150	910x910	-	150

1220 to 1800	-	230 to 460	1070x910	-	150
1830 to 4550	760x760	100 to 150	1370x910	1370	230
1830 to 4550	760x760	230 to 460	1370x1070	1370	230
4570 & Over	760x760	100 to 150	1370x1140	1680	230
4570 & Over	760x760	230 to 460	1370x1140	1680	230

When branches are connected into the manhole, the length and width dimensions of the chamber shall be increased as follow: -

Length

Branch Diameter

l00mm 300mm/branch on the side with most branches.

150mm 380mm/branch on the side with most branches.

230 and 300mm 460mm/branch on the side with most branches.

460mm 610mm/branch on the side with most branches.

Width

Branch Diameter

100mm to 300mm for each side with branches plug

160mm 460mm or the diameter of the main drain which ever is the greater.

(iii) Precast Concrete Circular Manholes

Where specified straight through precast concrete manholes shall be manufactured and constructed to comply with B.S. 556 and the following dimensional requirements, (Dimensions in Millimetres).

Depth Ground Of Outgoing Invert	Internal Access Shaft Diameter	Size Main Channel Diameter	Chamber Diameter	Height Chamber Above Benching
Up to 740	-	100 to 460	910	-
760 to 2410	-	100 to 460	1070	-
2440 to 4550	760	100 to 460	1220	1370
4570 & over	760	100 to 460	1370	2680

When branches are connected into manholes the internal diameter of the chamber shall be increased, as necessary, up to a maximum chamber diameter 1830mm.

(iv) Step Irons and Covers

Access shaft to manhole of depths greater than 760mm shall be provided with approved step irons as suitable intervals.

6/25

Every manhole or manhole access shaft shall be fitted with a removable airtight cast iron cover to adequate size and strength, fixed in a manner that prevents surface water gaining access into the drainage system.

Cast manhole covers and frames shall be manufactured in accordance with the requirements of B.S. 497 and shall generally fall into the following categories:-

Heavy Duty	:	For Carriageways
Medium Duty	:	For Footpaths
Light Duty	:	For domestic premises or other places where they do not have to carry wheeled traffic.

(v) Back Drop Connections

Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop or practice 301.

(vi) Channels

Where the branch channel connects to the main channel in the manhole, the

invert of the branch channel shall be a minimum of 38mm higher than the main channel.

(7) Testing of Pipelines

After pipelines are connected up and joints have been sealed, the pipeline shall be tested before pipes are, if required, hunched or surrounded in concrete.

Methods of testing and inspection shall be in accordance with Clause 4 of the Specification.

(8) Concrete Bedding, Hunching and Surround

Concrete bedding, hunching and surround shall be provided as necessary or where called for by the Engineer in accordance with the requirements laid down in B.S. code of Practice 301, Clause 310.

(9) Backfilling

Backfilling of trenches, heading and around manholes shall be carried out in accordance with the methods described in B.S. code of practice 301, clause 508.

(10) Reinstatement of Surface

Following the final backfilling of all trenches, headings, and manhole surrounds, the surface of the excavated areas shall be fully reinstated to the approval of the Engineer.

Where excavation have been carried out in public highways or other areas are not forming part of the site, the Sub-Contractor shall be deemed to have allowed in his price for all charges associated with the temporary and final reinstatement requirements of the local of highway Authority, whether this is carried out by the Sub-contractor or by the Authority concerned.

No Claims for extra in this respect will be accepted.

(11) Sewer Connection

The Sub-contractor shall pay all charges associated with the connection by the local Authority of the drainage to the Main sewer, including necessary reinstatement.

2.3 TESTING AND INSPECTION

2.3.01 SITE TESTS - PIPEWORK SYSTEMS

(a) Underground Water Mains

After laying, jointly and anchoring, the main shall be slowly and carefully charged with water, so that all air is expelled and allowed to stand full for three days before testing under pressure.

A long main shall be tested in section as the work of laying proceeds and all joints shall be exposed for inspection during the testing.

The open end of the main may be temporarily closed for testing under moderate pressure by fitting a water pipe expanding plug, of which several types are available. The end of the main and the plug should be secured by struts or otherwise, to resist the end thrust of the water pressure in the main.
If the section of main terminates with a sluice valve, the wedge of the valve shall not be used to retain the water, instead the valve shall be fitted temporarily with a blank flange, or if a socket valve with a plug and the wedge shall be placed in the open position while testing. The Sub-contractor shall provide suitable end support to withstand the end thrust of the water pressure in the main.

(b) Above Ground Internal Water Services Installation

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half times the design working pressure.

If preferred, the Sub-contractor may test the pipelines in section. Any such section found to be satisfactory need not be the subject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for leaks and any defects revealed shall be made good by the Sub-contractor and the section re-tested. The Sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests. Any item damaged shall be repaired or replaced at the Sub-contractor's expenses.

(c) Underground Drainage System

A site test shall be carried out on all drainage pipes before concrete hunching or surrounds are applied. These tests shall be carried out preferably from manhole to manhole.

Short branch drains connected to a main drain between manholes shall be tested as one system with the main drain. In long branches a testing junction shall be inserted next to the junction with the main drain and the branch tested separately. After the test has been passed, the testing junction shall be effectively sealed..

All tests on underground drains shall be permitted on cast iron drains at the discretion and to the approval of the Engineer.

Water tests shall be carried out in accordance with the methods described under B.S. code of Practice 301, Clause 601, (b) and (c) and the test pressure shall not be less than 1,520mm head at the highest point in the pipe section and not more than 10,360mm head at any point in the section.

The test pressure shall be maintained for a period of one hour during which time the pipe and joints shall be inspected for sweating and leakage. Any leak discovered during the tests shall be made good by the Sub-contractor and the section re-tested.

In addition to pressure tests, drainpipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods

described in B.S. Code of Practice 301, clause 601 (e).

Testing of manholes shall be carried out in accordance with the methods described under B.S. code of Practise 301, clause 601 (f).

(d) Above Ground Soil Waste and Ventilation System

All soil, waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in B.S. 5572 1972.

Smoke tests on above ground soil, waste and ventilating pipe system shall not be permitted.

Pressure tests shall be carried out before any work, which is to be concealed, is finally enclosed.

In all other respects, tests shall comply with the requirements of B.S. 5572.

2.3.02 SITE TEST - PERFORMANCE

Following satisfactory pressure test on the pipework system, operational tests shall be carried out in accordance with the relevant B.S. code of practice on the systems as a whole to establish that special valves, gauges, control, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

All hot water pipework shall be installed with preformed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe "seating", due to condensation will cause nuisance.
All lagged pipes which run in a visible position after erection shall be given a canvas cover and prepared for a painting as follows: -

(i) Apply a coating of suitable filler until the canvas weave disappears and allow drying.

(ii) Apply two undercoats of an approved paint and finish in suitable gloss enamel to colours approved by the Engineer.

All lagging for cold and hot water pipes erected in crawl ways ducts, and above false ceiling which, after erection are not visible from the corridors of rooms, shall be covered with a reinforced aluminium foil finish and banded in colours to be approved the Engineer.
In all respects, unless otherwise stated, the hot and cold-water installation shall be carried out in accordance with the best standard of modern practice and described in C.P. 342 and C.P. 310 respectively to the approval of the Engineer.
The test pressure shall be applied by means of a manually operated test pump or, in the case of long main or mains or large diameter, by a power driven test pump or, in the case of long main or mains or large diameter, by a power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the required pressure is not exceeded.
Pressure gauges should be recalibrated before the tests.

The Sub-contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this clause of the specification.
The test pressure shall be one and a half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant B.S. specification designates a maximum test pressure as in the case of cast or spun iron pipes, where the test pressure should not exceed 120, 180 and 240 metre/head of clause B, C or D pipes, respectively.

2.4.0 STERILIZATION OF HOT AND COLD WATER SYSTEMS

All underground water mains and above ground water distribution system, cisterns, tanks, calorifiers, pumps , etc shall be thoroughly sterilized and flushed out after the completion of all tests of all tests and before being fully commissioned for handover.

The sterilization procedures shall be carried out by the Sub-Contractor in accordance with the requirements of B.S. code of practice 310, clause 409, to the approval of the Engineer.

2.5.0 WATER MAINS

2.5.1 Piping

All piping shall be plain ended and suitable for use with flexible mechanical couplings (e.g. Viking Johnson, Dresser or Gibault). Steel pipes shall comply with B.S. 534 - Galvanised Steel Pipes for distribution system shall comply with B.S. 1387 - 1967 medium tubes and be supplied with flanges on pipes 75mm diameter and over.

On pipes less than 75mm diameter pipes shall be screwed and socketed, unless otherwise stated.

2.5.2 uP.V.C. Pipes

uPVC piping shall be in accordance with B.S. 3505:1968.

The maximum sustained working pressure to which the pipes and fittings will be subjected is based on water at a temperature of 20ºC .

The Contractor shall submit full details of the colour of the pipe he intends to supply. The colour of the pipe shall be such as to meet the requirements of Clause 2 `Material` and Clause 8.5 `Opacity` of B.S. 3505.

The pipes up to and including 50mm diameter shall be of solvent weld type. the pipe shall be supplied with interchangeable sockets pre-formed at the factory and of such internal diameter that it takes the plain and of the pipe with same nominal diameter.

The joint shall sustain the end thrust to which the pipe shall be submitted. The Contractor shall supply sufficient quantity of the cleaner and adhesive which shall be required to make the joints with the pipes.

The pipes of 75mm diameter and over shall consider of a grooved socket at one end of the pipe. The socket shall be designed to give a clearance fit on the outside diameter of the parent pipe. The sealing medium that shall seat in the groove shall be a rubber

ring.

If the formation of the socket and groove results in the thinning of the original wall thickness of the pipe, it shall be compensated for by shrinking on to the outside of the socket area as reinforcing sleeve of the same material as the pipe.

The socket and groove shall incorporate no sharp angles where the stress points are created.

The joint shall take 10% deformation of the spigot at the point where it enters the socket without leakage from the pipe when subjected to the test pressure specified for the pipe. Thermal expansion of the pipe shall be accommodated in the joint. The joint shall be capable of lineal deflection up to 30o

The sealing ring shall be of first grade natural rubber and the physical properties of the mix shall meet the requirements of B.S. 2494.

The Contractor shall supply sufficient quantity of any lubricant or other material that shall be needed to make the joint, which shall be assembled by hand.

The fittings shall have the same type of joint as for the pipes to be used. The Contractor shall submit full details of the materials, dimensions and test pressures of the fittings offered.

Precautions shall be taken to avoid damage of the pipes and fittings.
In handling and storing the pipes and fittings, every care shall be taken to avoid distortion, flattening, scoring or other damage. The pipes and fittings shall not be allowed to drop or strike objects. Pipe lifting and lowering shall be carried out by approved equipment only.

Special care shall be taken in transit, handling and storage to avoid any damage to the ends.

All jointing of pipes and fittings shall be carried out strictly in accordance with the manufacturer's instructions.

2.5.3 Manufacturer's Instructions

The Contractor shall be responsible for obtaining copies of any manufacturer's instructions for pipe jointing and shall familiarise himself and his employees with these instructions.

All necessary tools and equipment required for the laying, jointing and testing of pipes and joints shall be provided by the contractor at no extra cost.

2.5.4 Fittings and Specials for Galvanised Steel Pipes.

All special shall be of such dimensions will mate with piping supplied. Screw down stop valves shall comply with B.S. 1010. Specials shall comply with B.S. 1740.

2.5.5 Flanged Adaptors and Flanges

Flanged adaptors shall be piece suitable for connecting a flanged sluice valve to the type of piping supplied. All flanges or special shall conform to B.S. 10 part 1 and shall be drilled to Table `C` and machined across the faces. The flanged adaptors shall comply with B.S. 78 and B.S. 3961:1965. All P.V.C. flanges shall be supplied with metal backing rings, jointing of flanges shall be carried out using the joint rings, bolts and washers as necessary.

2.5.6 Tees

The spigot ends of all tees shall be suitable for connection to the pipework supplied using the aforementioned flexible mechanical joints and branches shall be flanges drilled to B.S. 10 Table `C`.

2.5.7 Hydrants

The hydrants shall comprise a 75mm sluice valve and a 75mm Duckfoot bend with gunmetal screw connection to details shown on the detailed drawings. These specials shall comply with the requirements of B.S. 750: 1964.

2.5.8 Gate Valves

All gate valves 80mm nominal bore above, other than those required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 3463. All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S. 1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S. 1952.

The pressure classification of all gate valves shall depend upon the pressure conditions pertaining to the Site of Works.

2.5.9 Air Valves

Air valves shall be of cast iron conforming to B.S. 1452 Grade 14. They shall be suitable for working pressures not less than that specified for the class of pipe to which they are connected.

2.5.10 Ball Float Valves

Ball float valves shall be to B.S. 1212 Parts 1 and 2 shall be suitable for a working pressure not than the working pressure for the class of pipe specified for connection to the ball float valve.

2.5.11 Non-Return Valves

Non-return valves shall be of cast iron with flanges and shall conform to B.S. 4090:1966.

2.5.12 Stop Cocks

Stopcocks up to 50mm diameter shall be brass and shall conform to B.S. 1010 Part 1 : 1959 Part 2 : 1973.

2.5.13 Rubber and Insertion Jointing

Rubber and Insertion Jointing for flange joints shall comply with B.S. 2494 Part 1 and no jointing rings shall be used in the Contract, which have not been supplied by manufacturers approved by the Engineer.

2.5.14 Bituminous Paints

All bituminous or tar paints for protection of buried steel bolts, pipes, specials etc. shall be the best of their respective kinds manufactured by approved makers.

2.5.15 Steel Pipe and Fittings for Rising Main

All piping shall be plain ended and suitable for used with flexible mechanical couplings (e.g.viking johnson, Dresser). The grade of steal used shall comply with the requirements of B.S. 3601: 1964. Pipes shall be welded or seamless and shall conform to B.S. 534: 1966 or an equivalent acceptable standard.

All pipes shall be externally and internally protected with bitumen in accordance with clauses 5.4 and 5.5 of B.S. 534:1966.

The external protection shall be reinforced with oven glass cloth glass tissue wrapping or by other approved material. All sheathed or wrapped pipes, fittings and specials shall be protected during transit by straw, wood wool or by other approved material.

The ends of all bitumen lined pipes, fittings and specials shall be closed by means of discs or other suitable covers firmly held in place.

2.5.16 Drain-Off Taps, Stop Valves for Water Services

Fittings for mains of size 50mm or under shall comply with B.S. 1010. Samples must be submitted to the Engineer for approval prior to installation of fittings.

2.5.17 Storage of Plants and Materials

The Contractor shall, at his own expense, make arrangements for dumps along the route of the pipe line for storage of pipes, his plant and materials, to suit his own convenience, but such arrangements shall be subject to the Engineer's approval.

2.5.18 Loading, Handling and Conveying of Pipes

The Contractor shall before commencing to lay the pipes, valves or other materials examine them and ascertain that they are in perfectly sound condition and he shall be responsible for any pipes, valves and other materials, which may be found damaged after laying. The stocking of pipes and specials on site, loading and unloading etc. shall be carried out to the satisfaction of the Engineer.

2.5.19 Interference with Fences, Drains, Pipes, Property etc

The Contractor shall ensure the proper reinstatement of fences, drains, telephone lines, K P & L. cables etc. where affected by his work. All services shall be adequately

protected and propped to the satisfaction of the Engineer. The Contractor shall be liable for any damage caused to the services due to his failure to provide adequate protection.

2.5.20 Method of Excavation

(a) The Contractor shall excavate the pipe trenches in the line and to the depths indicated by the Engineer. Except where otherwise indicated on the Drawings or directed by the Engineer, it is intended that the trench shall be excavated to such a depth as will allow of a minimum cover of 500mm over top of the barrel of the pipe when laid plus or minus a tolerance of 75mm either way. All trenches shall be excavated in open cuttings.

(b) Where the trench passes through grassland, arable land or garden, whether enclosed or otherwise, the turf, if any, shall be pared off and stacked, and the productive soil shall be carefully removed for a width of 600mm greater than the nominated trench width or equal to the overall width of track of the excavating machine, whichever is greater, and laid aside to be subsequently used in reinstating the surface of the ground after the trench has been refilled.

(c) The bottom of the trench shall be properly trimmed off, and all low places or irregularities shall be levelled up with fine material. Where rock or large stones are encountered, they shall be cut down to a depth of at least 75mm below the level at which the bottoms of the barrel of the pipes are to be laid, and covered to a like depth with materials, so as to form a fine and even bed for the pipe.

(d) Joints holes shall be excavated to suit minimum dimensions as ill allow the joints to be well and properly jointed.

(e) The pipe trench shall be kept clear of water at all times.

(f) The Contractor shall, wherever necessary by means of timbering, or otherwise support the sides of the trench so as to make them thoroughly secure, and afford adequate support to adjoining roads, lands, buildings and property, during the whole time the trench remains open and shall remove such timbering or other work shall be deemed to be included in the rates for excavation. In case the Contractor is instructed by the Engineer to leave any portion of such timber in position, he will be paid for if accordingly.

(g) The clear width inside the timbering in the case of single pipes shall be at least 320mm in excess of the external diameter of the pipe being laid, in order to allow it to be freely lowered into position, in the trench without damage to the external protection.

(h) Where more than one pipe is to be laid parallel, then the clear width inside the timbering shall be at least 520mm in excess of the combined external diameters of the pipes.

(i) Should the excavation be taken out to a greater depth than is specified the bottom shall be made good to the correct level with Mix 1:3:6 concrete or other materials approved by the Engineer. No payment shall be made for any other excavation carried out by the Contractor and the coat of filling up to required levels.

(j) If a mechanical excavator is used by the Contractor, he shall indemnify the Employer against all claims for damage that in the opinion of the Engineer, may be caused by the used of this plant. When a mechanical excavator is used the bottom 230mm of excavation shall be got out by hand to ensure an even bed for the pipes.

2.5.21 Main Laying

Mains shall be laid in straight lines and/or smooth curves as indicated on the Drawings. The vertical profile of the pipes shall be to even gradients. Any pipes not so laid shall be removed if so directed by the Engineer, and relaid in proper manner at the Contractor's expense.

In laying the pipes and specials care shall be taken not to damage the protective linings and the pipes shall be handled with tackle as directed by the Engineer.

The pipes and specials shall be slung and sounded with hand hammer for flaws before they are lowered into the trench. After the pipes or specials have been checked they shall be cleaned internally and carefully lowered into trench and set to proper gradient and line so that there is a continuous rise from each washout to air valve.

2.5.22 Temporary Bench Marks and Sight Rails.

The Contractor shall fix Sight Rails for use with boning rods at intervals of not more than 65 metres and temporary Bench Marks related to the Survey of Kenya Datum shall be provided at intervals as directed by the Engineer.

2.5.23 Curves and Bends

Large diameter curves of main shall wherever possible be formed by giving a set not exceeding 3o to each joint, bends being used only where large diameter curves are not possible.

2.5.24 Cutting of Pipes

The Contractor shall, subject to approval of the Engineer, cut pipes to such lengths as directed. Pipes should be cut off clean and square with the axis. Cuts should be made with an approved from the rotary cutting machine, but the Engineer may approve cutting by oxyacetylene cutters.

2.5.25 Flanged Joints

In laying pipes and specials with flanged joints, flanges shall be brought together and

bolted with the faces absolutely parallel. A rubber jointing ring 3mm thick shall be used in each flange joint and one washer with each bolt. The ring shall be a strip ring lying within the bolt circle and a full flange width ring.

The bolts shall be tightened up gradually and equally in the customary manner in order to distribute the stress evenly over the flange. If it is found necessary to slightly from the normal run of the flange piping, the deflection shall be obtained by means of bevelled gunmetal ring washer between the flanges.

2.5.26 Surface Boxes

Sluice valves, air valves and fire hydrants shall be covered with Surface Boxes in accordance with details as shown on the Drawings. In roads and footpaths the boxes shall be laid flush with the surface.

2.5.27 Fixing of Valves, Air Valves and Washout Pipes.

The Contractor shall fix the sluice valves, air valves, washout pipes complete with iron casing for spindles and surface boxes in accordance with and in position shown on the Drawings. As far as possible the cutting of pipes for this should be avoided.

2.5.28 Support and Anchor Blocks

Concrete mix 1:3:6 shall be placed around and against bends and other specials in trenches.

2.5.29 Colour Coding

All underground pipes are to be wrapped with adhesive plastic tape at each meter in colours blue for drinking water and green for untreated water. All pipework above ground and valves in valve chambers and pits are to be painted in similar colours.

2.5.30 Lettering

a) The lettering for sluice valves, fire hydrants, air valves and washout abbreviated SV, FH, Av and WO respectively shall be in accordance with the detail shown on the Drawings and colour coded as detailed hereafter:-

Untreated water:	White lettering on green background
Drinking water:	White on blue background
Fire Hydrant:	White lettering on yellow background

2.5.31 Testing

(a) The test pressure shall be one and a half the maximum working pressure except

where a pipe is manufactured from a material for which the relevant B.S. Specification designates a maximum test pressure should not exceed 120, 180 and 240 metre/head for Clause B, C or D pipes, respectively.

The pump shall maintain the test pressure for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main that time.

(b) When a section of the main has been jointed, the ends shall be closed with caps, plugs, or flanges, which must be strongly strutted against a solid surface to the satisfaction of the Engineer. The trench shall be properly backfilled and rammed as hereinafter specified and as shown on the Drawings, for its whole length so as to cover the main to a depth of not less than 500mm, except at the joint holes which shall be kept clear of all backfilling, if necessary by the use of timbering, so that each joint is left fully exposed for inspection. No backfilling will be permitted before testing of each section.

As long a section of main as possible shall be tested at one time subject to the maximum length of open trench approved by the Engineer or permitted by the Highway Authority, and the test shall be carried out within 12 working days of the completion of such sections of mains.

Where a main is laid across a road or in such a position as to interfere seriously with the normal use of the road, the Contractor may, with the consent of the Engineer and at his own risk, fill in such joint holes as may be necessary.

He shall, at his own expense, re-excavate any or all joint holes necessary to locate a leak and carry out repair work should the results of his hydraulic test prove unsatisfactory.

The section shall then be filled with mains water, great care being taken to drive out all air through air valves, ferrules or otherwise to the approval of the Engineer.

(c) After the section to be tested has been charged and all air liberated it shall standing under moderate pressure for several days' final airing.

The leakage from the mains and connections from each section tested shall not exceed 4 litres of water per 25mm diameter of main, per 2 km. length each 24 hours, every 30 metres head of pressure, and any visible individual lea shall be repaired.

To determine the rate if leakage, the Contractor shall furnish a suitable hydraulic test pump, pressure gauge, connections and water meter or other appliance, for measuring the amount of water pumped.

If the leakage were at a greater rate than that specified, the Contractor should re-excavate the trench where necessary and shall remake the joints and replace defective work until the leakage shall be reduced to the allowable amount.

(d) The Employer shall charge the Contractor the cost of any couplings required to join up tested lengths of main if, in the Engineer's opinion, greater lengths could reasonably have been tested or if failure under test requires the pipe to be cut, or other methods of laying should have been adopted.

The Contractor shall supply water used by the Contractor in testing the main. The Contractor shall carry out all work, which may be necessary for making temporary connections to the existing mains to obtain water for testing at his own expense.

(e) In carrying out the test for water tightness the Engineer only shall authorise the operation of all valves, but the Contractor shall provide all the necessary labour to assist in the opening and closing of the valves to the Engineer's instructions, and he shall allow in his prices for all his expenses in connection with testing on completion.

The Engineer shall be the sole judge of water tightness.

2.5.32 Cleansing And Sterilizing The Main

When a pipeline is complete and where applicable, has successfully passed the test, it shall be thoroughly washed out using, if possible, an open end. Thereafter it shall be sterilized by being filled with a suitable solution containing not less than 20 p.p.m. of free available Chorine or such other sterilizing agent as the Engineer shall approve. After standing for 24 hours the main shall again be washed out and refilled with mains water prior to the taking of Bacteriological samples.

The Contractor shall provide all necessary stop-ends fittings and chemicals for this work.

Emptying and washing out of the pipes shall be done in such a manner as not damage the trench or cause undue flooding of the vicinity, and the Contractor shall supply and use such piping, specials and/or hose as may be necessary to facilitate the flow of water to the nearest drain or watercourse. Water used for washing out and sterilizing will be supplied by the Employer.

Before any section of the main is put into use a bacteriological sample or samples will be taken by the Engineer`s Representative and only on receipt of a satisfactory Certificate from the Medical Research Laboratory of the Employer will the main or section of main be permitted to be put into supply and be considered as having been substantially completed.

Any expenditure involved in providing facilities or materials for the taking of samples shall be included in the Contractor's tendered rates and the Engineer will specify and shall be the sole judge as to the number of samples required and the points at which they are to be taken.

The cost of the Bacteriological Examination will be borne by the Employer but if the

sample and samples are not satisfactory the cost of any subsequent analyses will be borne by the Contractor.

2.5.33 Clearance of Site

The Contractor shall remove all surplus pipes, specials and other fittings from the side as directed by the Engineer. The site of works shall be levelled and all surplus excavation, debris, cut trees or bushes shall be carted to approved tip sites.

2.5.34 Existing Installations

(a) Cold Water

Where pipes for cold water are to be connected up to existing installations, the condition of the existing installation is to be reported to the Engineer in order to establish if part of the existing installation is to be replaced.

(b) Sanitary Fittings

Where existing sanitary fittings are to be removed or replaced, the fitting is to remove with outmost care and fittings and taps to be handed over to the client.

(c) Sealing Off Existing Drains and Manholes

Existing foul, surface water and subsoil drains exposed during progress of work are to be recorded and reported for investigation by the Architect. Where not required to be removed, seal off with concrete or grout solid as directed. Seal off connection to manholes, demolish walls to 500mm below surrounding ground level and fill remainder of manhole with consolidated approved rubber and cover to level of surrounding ground as directed.

2.6.0 COLD WATER STORAGE TANKS

Cold-water storage tanks shall include the ball valves and connectors for inlet, supply, washout, and overflow and may also include fire reel system supply pipe. The Sub-Contractor shall also include in his pricing the price of the overflow and amount pipes to a place to be indicated by the Engineer. He shall also include the washout valve.

Where paint is required tithe Sub-Contractor shall use the paint, which will not be toxic.

The tanks shall be manufactured to the following British Standards:-

(a) Galvanised Mild Steel tanks to BS 417

(b) Sectional Steel tanks to BS 1564

Where non-standard sizes shall be used, they shall be manufactured to the relevant standard but with the approval of the Engineer.

2.7.0 WATER HEATERS

Electrically Heated

Non-pressure and low-pressure types domestic electric water heaters shall comply with B.S. 843: 1964, high-pressure types shall be of a Standard not less than the appropriate B.S.

Domestic heaters shall, if nothing else is pacified, be supplied with 25mm thick fibre glass lagging and enclosed in the corrosion-proofed steel, finished in white stove enamel and be similar to manufactured `HEATRAE`.

Electric thermostatically controlled immersion heaters shall comply with B.S. 3456: Section A8:1963 and C.P. 324. 202:1948.

Purpose made storage water heaters of the specified sizes shall comply with B.S. 853 and shall be to the specified working and test pressure. The heaters shall be provided with all necessary bosses, coils etc., and shall be hot dip galvanised after manufacture. Insulation shall, if nothing else is specified, be fibreglass to the specified thickness with finish suitable for painting.

Domestic heaters for floor mounting shall, if not provided with legs, be mounted on a minimum 100mm high concrete plinth.

Floor mounted purpose made heaters shall be provided with minimum 225mm high legs of sufficient strength welded to the heaters and to suitable floor plates before galvanising. Wall mounted heaters shall be supplied with all necessary brackets.

PART C

PARTICULAR SPECIFICATIONS

FOR

PLUMBING, DRAINAGE AND FIRE FIGHTING INSTALLATIONS

PART C

PARTICULAR SPECIFICATIONS

FOR

PLUMBING, DRAINAGE AND FIRE FIGHTING INSTALLATIONS

PART C

PARTICULAR SPECIFICATIONS
FOR

PLUMBING, DRAINAGE AND FIRE FIGHTING INSTALLATIONS

3.1 INTRODUCTION

These specifications cover the execution of Plumbing, Drainage and Fire Fighting Installations and should be read in conjunction with other relevant specifications, drawings and contract documents issued to the contractor in conjunction with the Sub- Contract.

3.2 INCLUDED IN THE SUB-CONTRACT

The works include, unless otherwise specified, supply, delivery, installation, testing and commissioning, cleaning-up and setting to work all the installations described in the specifications and as shown on the contract drawings.

The provisions of all labour, materials, tools, instruments, testing apparatus and scaffolding necessary to execute the work in a first class manner, even such labour, materials, instruments or apparatus which are not specifically mentioned in the contract but are necessary for the satisfactory completion of the works, including such elements as: -

- Cold Water supply pipework and fittings to the water storage tanks from the existing water mains,

- Water storage tanks complete with all necessary covers, fittings, washout and overflow pipes and supports. The Sub-Contractor is expected to take the overflow and washout pipes to a reasonable discharge point,

- the water supply pipework to the functional and sanitary fittings as shown on the drawing plus the necessary fixing, supporting and jointing materials from the water storage tanks,

- The sanitary and operational fittings together with the fixing, supports and jointing to the supply and discharge pipes.

- The waste and soil pipework from the sanitary and operational fittings to the first manholes including all fixing, supports and jointing materials.

- All cutting away and all making good will, if nothing else is specified, be carried out by the Main Contractor but it will be the responsibility of the Sub-Contractor to ensure that this work is kept to a minimum, be responsible for the correct marking out of all chases and holes; and will provide all necessary details to the Main Contractor.

- The Sub-Contractor shall also be responsible for ensuring that runs for floor or wall chases, holes to be cut or left will be marked out at the appropriate stage of the structural work.

- The sub-contractor shall undertake all notifications demanded by the Authorities in order to comply with current regulations and produce all certificates, if any, from the authorities without extra charge.

- The Sub-Contractor shall as part of his Tender supply all necessary information such as manufacture, catalogue or type numbers, brochures or copies of catalogue pages, weight, and all other relevant information which are necessary to classify the equipment tendered for.

- All other materials, labour, tools, instruments, scaffolding, etc. which are necessary for final completion in a first class manner of the plants to the Engineers satisfaction. Excluded are only materials and workmanship especially mentioned herein as "Excluded from this Sub-Contract".

- The Sub-Contractor shall include for cables, pipes, etc from central facilities to working area.

- Provide the Engineer for his approval complete working and manufacturing drawings as specified.

- Commissioning and testing of the plants as specified.

- Supply of complete operation and maintenance manuals as specified as well as adequate instruction of the Client's maintenance personnel as specified.

- The Sub-Contractor shall include for full maintenance during initial maintenance period as specified.

3.3 **EXCLUDED FROM THE SUB-CONTRACT**

- All concrete works, inclusive of necessary holes, plinths, etc.

- All block work inclusive of necessary holes (to be marked by the Sub-Contractor) etc.

- All electrical wiring up to and inclusive of isolators and switchboards.

- The Main Contractor will provide central located facilities for supply of water and power during the construction period.

3.4 **EXTENT OF THE SUB-CONTRACTOR'S DUTIES**

At the commencement of the work, the Sub-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 others, are available locally. If not available, the Sub-Contractor shall at this stage place orders for the materials in question and copy the orders to Architect and/or the Engineer. Failure to do so shall in no way relieve the Sub-Contractor from supplying the specified materials and equipment in time.

Any item or material found to be defective shall be replaced by the Sub-Contractor within seven days of his being notified and any result of defective workmanship shall be repaired including supply of new parts if necessary, immediately upon being notified.

The Sub-Contractor shall furnish at his own cost any samples of materials or workmanship required for the Sub-Contract Works, that may be called for by the Engineer for his approval, and the Engineer may reject materials or workmanship not in his opinion up to the approved standard. The Sub-Contractor shall allow in his prices for such samples.

The Sub-Contractor shall when authorized in writing by the Architect or the Engineer, make variations from the specifications and drawings. No profit will be allowed on omitted items or works.

The Sub-Contractor shall submit to the Architect or to the Engineer claims for any work for which he considers demanding extra payment before the beginning of such work.

The Sub-Contractor shall be responsible for verifying all dimensions relative to his work by actual measurements taken on the site.

The Sub-Contractor shall request any alteration to the building structures within 30 days of the awarding of the Sub-Contract. Only such alterations as deemed unavoidable by the Engineer will be considered.

The Sub-Contractor shall collaborate with the Engineer and the Main Contractor in planning the installation before work is commenced. Particular care shall be taken to ensure that there is close collaboration with the other Sub-Contractor's when installing services.

The Engineer and Architect shall have full rights to inspect the work in progress and all materials and equipment for use in the installation prior to its erection whether these are on site or the Sub-Contractor's workshop.

The Sub-Contractor shall allow for all reasonable access to the works for this purpose.

Where large items of equipment are to be installed, the Sub-Contractor shall advise the Main Contractor in good time so that access is provided for installation before work is commenced on site.

The Sub-Contractor or his responsible representative shall participate in all site meetings as and when required, in order to discuss the works, make necessary decisions, receiving relevant instructions, confirm fulfilment of time schedules, etc.

3.5 **FINISH PAINTING**

When all the installations have been set to work, tested and commissioned, the Sub-Contractor shall prime the pipework with an undercoat and paint 2 No. coats of paints in accordance to BS 1710 colour coding and to the satisfaction of the Engineer and the Architect.

PART D

BILLS OF QUANTITIES

SCHEDULE OF PRICES

GENERAL NOTE

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

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

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

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

   b) Insurance

   c) Clearing and forwarding

   d) Delivery and storage at site

   e) Packing for storage

   f) Replace any defective or damaged item

   g) Installation

   h) Testing

   i) Painting

   j) Commissioning

   k) Maintenance during the defects liability period

4. The unit rates shall include **Import Duty, Sales Tax, and VAT** where applicable, and shall be expressed in Kenya Shillings..

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
1.00	**SANITARY FITTINGS** **Supply,deliver, install, test and commission the following sanitary fittings:** **NOTE: Trade names.** Where Trade Names are mentioned below, the tenderer MUST provide the same materials and other brands shall not be accepted without a written authority to supply alternative brands by the Engineer/Architect.				
	Water Closets				
1.01	**Water Closets** Close coupled W.C suite vitreous China as **Duravit D-Code** comprising of W.C. wash down bowl complete with horizontal p-trap,connector, heavy duty matching plastic soft close seat and cover with metal top fixed (Stainless Steel) hinges.These to be flushed by 6 and 3 litres top dual flush Cistern of integrated	No.	3		
1.02	**Wash hand basin - Countertop** 480X420mm Countertop Wash Basin as Duravit "**D-code**" with one tap holes and chain stay hole complete with; Cobra Watertech Ref. No. 308 chrome plated 1 1/4" cast basin waste, 62 mm diameter flange, 80mm long shank, unslotted, Cobra Watertech Ref. No. 340 chrome plated 1 1/4" x 1 ¼" bottle trap with 75 mm deep seal and 200 mm long tail pipe, cap-nut and wall flange.	No	6		
1.03	**WHB Accessories** 1/2 inch time delay push type pillar tap as "Docol" or equal and approved	No.	6		
1.04	**Angle regulating Valve** 15 mm diameter angle regulating valve with a 300 mm long flexible tubing as "**pegler**" or approved equivalent.	No	9		
1.05	**Urinal bowl** 1No. Urinal bowl as **Duravit D-code** or equal with 6 litres cistern complete with concealed trap and spreader with a Pair of bowl supports, 1 ½ inch chrome plated grating with dome . Low pressure urinal flush valve for concealed installation and manual actuation, urinal divisions Inlet connector, as **docol** or equal and approved.	No	2		
	TOTAL CARRIED FORWARD TO SANITARY COLLECTION PAGE 6/47				

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
1.06	**Tissue Dispenser** Tissue dispenser as "Mediclinics" CP Jumbo or equal and approved.	No	4		
1.07	**Soap Dispenser** 1.3 Litre capacity soap dispenser as "Mediclinics" CP or equal and approved.	No.	3		
1.08	**Hand Drier** The hand drier shall be operated by infrared sensor, which switches on when hands are placed under the hot-air outlet. The machine switches off when the hands are withdrawn or after 40 seconds. It shall be capable of delivering 36 litres per second of warm air at 500C above ambient temperature at anaverage air speed of 17 F/s and a relative drying time of 35 seconds. It shall be as Starmix Automatic Hand Dryer Model No. T50E with a Power supply of 2.2 kW 240V 50Hz.	No.	4		
1.09	**Mirrors** 610 x 457 x 6 mm thick plate beveled glass mirrors with chromium plated domed screws.	No	6		
1.10	**Towel Rail** Ø20mm*650mm long chrome plated towel rail screwed to wall	No	1		
1.11	**Towel Ring** Ø100mm approved towel rail, plugged and screwed into the wall	No	2		
	TOTAL CARRIED FORWARD TO SANITARY COLLECTION PAGE 6/47				-

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
0.01	**Disabled Suite** Disabled Water closet suite as "**Doc.M Rimless Super Pack**" with white grab rails and seat PK8146WH, comprising of Avalon Rimless Horizonal Outlet pan and fittings, 4Litres Avalon Rimless Cistern, Fittings and Spatula Lever, Avalon Rimless Seat ring, stainless steel hinges with stability buffers. **Hand Rinse wash hand basin** with 1 Centre Tap hole and Chrome Plated Overflow trim pillar tap TMV3 **5No. avalon support rails** with concealted fixing, Avalon Hinged support rail and toilet roll holder, complete with wall bolts, grid waste, cistern cover clips and any other necessary fitting. 1800 **Watts sensor type fully automatic hand driers as "Vortice"** Model:DJ0030C or equal and approved **0.7 litre capacity soap dispenser** as 'Mediclinic' CP or equal **Wall mirror with bevell edges** 500*700mm The installations to be done as per the manufacturers instructions and Engineers approval	No.	1		
0.02	**Electric Shower Mixer** Shower mixer with a Ø110mm shower head with a surface mounted, Ø22*530mm chrome plated sliding rail, flexible hose pipe of 1.5m, 15mm male water inlet , temperature control knobs, full text digital display including temperature visual indicator, rub clean nozzles and removable spray plates, power on indicator, pressure operating at 1-10 Bars @ 8l/min with a power rating of 8.5kW as 'Amore' or equal and approved.	No	1		
0.03	Allow for careful removal of the existing Sanitary Fittings on 7th Floor and hand over to the client for safe keeping	Lot	1		
	TOTAL CARRIED FORWARD TO SANITARY COLLECTION PAGE 6/47				

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
	SANITARY FITTINGS COLLECTION PAGE				
A	TOTAL BROUGHT FORWARD FROM 6/44				
B	TOTAL BROUGHT FORWARD FROM 6/45				
C	TOTAL BROUGHT FORWARD FROM 6/46				
	TOTAL FOR SANITARY FITTING CARRIED FORWARD TO SUMMARY PAGE				

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
2.00	**INTERNAL PLUMBING**				
	Supply, deliver and install GMS Class B pipework . Tenderers must allow in their pipework prices for all the couplings, connectors, unions, expansion loops, jointing materials etc. as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holderbats plugged and screwed, and pipe sleeves through structural members. The entire plumbing installation should withstand a test pressure of 6 bars.				
2.01	20 mm diameter GMS Pipes	LM	5		
2.02	25 mm diameter Ditto	LM	5		
2.03	32 mm diameter Ditto	LM	5		
2.04	40 mm diameter Ditto	LM	4		
	Extra Over GMS Tubing for the following:-				
	Bends				
2.05	20mm diameter GMS Bend	No.	5		
2.06	25 x 20 mm diameter GMS Bend	No.	5		
2.07	25mm diameter GMS Bend	No.	5		
2.08	32*25mm diameter GMS Bend	No.	3		
2.09	32mm diameter GMS Bend	No.	1		
2.10	40mm diameter GMS Bend	No.	5		
	Tees				
2.11	20 mm diameter GMS Equal Tee	No.	6		
2.12	25 mm diameter GMS Equal Tee	No.	2		
2.13	32 mm diameter GMS Equal Tee	No.	1		
2.14	25 x 20 mm diameter GMS Unequal Tee	No.	5		
	Reducers				
2.15	20 x 15mm diameter GMS Reducer	No.	4		
2.16	32 x25 mm diameter GMS Reducer	No.	1		
2.17	32 x20 mm diameter GMS Reducer	No.	1		
2.18	25x20 mm diameter GMS Reducer	No.	5		
	Transition bends				
2.19	25 x 20 diameter GMS/Brass Female threaded bends.	No.	5		
	Adaptors				
2.20	20 x 1/2" diameter GMS/Brass Female threaded adaptors	No.	5		
2.21	20 x 1/2" diameter GMS/Brass male threaded adaptors	No.	5		
2.22	Allow for careful removal of the existing 4600 litres plastic roof tanks on roof Floor and hand over to the client for safe keeping	No.	3		
	Roof Plastic Tanks				
2.23	Supply deliver and install Rotary moulded cylindrical tanks as "Kentank" or equal and and approved with a capacity of 4600Ltrs, dimensions; Ø1780*2100(h)mm. The tank to have a Ø50mm inlet & outlet connections, Ø63mm overflow, Ø50mm washout and gate valve, backnuts, lid and a Ø50mm high pressure cast brass ball valve and high pressure polypropylene plastic float.	No.	3		
	TOTAL FOR INTERNAL PLUMBING CARRIED FORWARD TO SUMMARY PAGE				

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
3.00	**FOUL WATER DRAINAGE** **Supply and fix uPVC soil system to BS 4660 and BS 4515; and MuPVC waste systems to BS 5255 with screwed and socketed joints to BS 21. Solvent welded joints shall be as per the systems manufacturer's written instructions. Tenderers must allow in their pipework prices for all the couplings, connectors, joints etc as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holderbats plugged and screwed. The installation must comply with BS 5572. MuPVC Waste System conforming to BS 5255 Heavy Gauge Pipework Class 41.**				
3.01	40 mm diameter Ditto	LM	5		
3.02	50 mm diameter Ditto	LM	5		
3.03	100 mm diameter Ditto	LM	10		
	Extra Over MuPVC Waste Pipework for the following:-				
3.04	40 mm diameter 90 degrees Sweep Bend	No.	5		
3.05	50 mm diameter 135 degrees Sweep Bend	No.	3		
3.06	100 mm diameter 90 degrees Sweep bend	No.	5		
3.07	100 mm diameter 90 degrees Sweep Tee	No.	11		
3.08	100 mm diameter short radius bend	No.	5		
3.09	50 mm diameter 135 degrees Sweep Tee	No.	5		
3.10	40 mm diameter 90 degrees Sweep Tee	No.	5		
3.11	40 mm diameter Access plug	No.	5		
3.12	50 mm diameter Access plug	No.	1		
3.13	100 mm diameter Access plug	No.	5		
3.14	100 x 50 mm diameter 4-way Light Grey Floor trap	No.	1		
	TOTAL FOR FOUL WATER DRAINAGE CARRIED FORWARD TO SUMMARY PAGE				

SUMMARY PAGE:

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT Kshs
A	**TOTAL FOR SANITARY FITTINGS FROM PAGE 6/47**				
B	**TOTAL FOR INTERNAL PLUMBING FROM PAGE 6/48**				
C	**TOTAL FOR INTERNAL DRAINAGE FROM PAGE 6/49**				
D	**Testing and Commisioning** Allow for setting to work, testing and commissioning of the whole Installations to the satisfaction of the Engineer				
	TOTAL FOR SANITARY FITTINGS,PLUMBING AND DRAINAGE INSTALLATIONS C/F TO GRAND SUMMARY PAGE				

Grand total amount in words .

Kshs----------

Tenderers's.

Name:----------

Official Stamp:----------

V.A.T. No.:---------- **P.I.N**----------

Witness:----------

Signature:----------

Date:----------

SCHEDULE OF UNIT RATES

ITEM No.	DESCRIPTION	UNIT	QTY	RATE (Kshs)	AMOUNT (Kshs.)
1.01	**Water Closets** Wall hung water closet suite as **'Duravit', D-code** in vitreous China comprising a wall hung WC bowl, WC Connector, heavy duty matching plastic cover & seat in white colour, stainless steel hinges, fixing bolts and nuts.	No.	1		
1.02	**Water Closet Flush Valve** W.C concealed flush valve with integral vacuum breaker,non-hold open feature,11/4" butterfly control inlet,chrome plated wall flange with recommended working pressure between 15-150Kpa complete with piston assembly,plunger assembly,flush pipe coupling nut,washer kit and handle seal.These to be as Docol low pressure flush valve or equal and approved.	No.	1		
1.03	**Single Bowl Kitchen Sink** Associated Steel Ltd single bowl, single drainer sink made out of 18/8 stainless steel of size 1070 x 530 mm with 420 x 355 x 150 mm deep bowl with bright machine polish finish.	No	1		
1.04	**Kitchen Sinks Accessories** Kitchen sink wall type mixer with swivel outlet for cold & hot water, chrome plate, with chain & isolation angle valves, as Cobra or its equivalent	No	1		
1.05	Bricon Ref. No. 316 chrome plated heavy cast 1 1/2" sink grid waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No	1		
1.06	1 1/2" Tubular plastic P-trap, 75 mm seal, with reverse nut entry with BSP thread and universal compression outlet as "Terrain" Ref. No. 631.	No	1		
1.07	**Angle regulating Valve** 15 mm diameter angle regulating valve complete with a 300 mm long non kinking flexible tubing a pegler or approved equivalent.	No	2		
1.08	**Kitchen Instanteneous Undersink Water Heater** Instanteneous water heater with a capacity of 15 litres, power rating at 2kW as 'Ariston', Model: EP15UR or equal and appoved.	No	1		
1.09	**Cleaners sink** as Duravit D-code c/w hardwood pad and stainless grating. cat. no. FC 1033 WH complete with; a bib tap cat. no. SF 5204 CP, grid waste fitting 11/2" cat. no. WF 4343 CP and chrome plate bottle trap 1¼" P trap cat no. WF 8463 CP and wall brackets to fit.	No	1		
1.10	15mm diameter pillar tap as Cobra	No	1		
1.11	15mm diameter bib tap as Cobra	No	1		
1.12	15mm diameter long neck bib tap as Cobra	No	1		

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 7 – AIR CONDITIONING & MECHANICAL VENTILATION.

PART B1

GENERAL MECHANICAL SPECIFICATION

PART B1

GENERAL MECHANICAL SPECIFICATION

INDEX

PART B1

GENERAL MECHANICAL SPECIFICATION

1. GENERAL

This section specifies the general requirements for plant, equipment and material forming part of the Sub-Contract Works and shall apply except where specifically stated elsewhere in the specification or on the contract Drawings.

2. QUALITY OF MATERIALS

All plant, equipment and materials supplied as part of the Sub-contract works shall be new and of first-class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or materials not manufactured by the Sub-contractor shall be products of reputable manufacturers and so far as the provisions of the Specification is concerned shall be as if they had been manufactured by the Sub-contractor.

Materials and apparatus required for the complete installation as called for by the Specification and Contract Drawings shall be supplied by the Sub-Contractor unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connected by the Sub-Contractor shall carefully be examined on receipt and stored. Should any defects be noted, the Sub-Contractor shall immediately notify the Engineer

Defective equipment or that damaged in the course of installation or tests shall be replaced as required to the approval of the Engineer.

3. REGULATIONS AND STANDARDS

The Sub-Contract Works shall comply with the current edition of the following:-

(a) The Kenya Government Regulations

(b) The United Kingdom Institution of Electrical Engineering (IEE) Regulations for the electrical equipment of buildings.

(c) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.

(d) British Standards and Codes of Practice as published by the British Standards Institution (BSI).

(e) The Local Council By-laws.

(f) The Electricity supply Authority By-Laws.

(g) Local Water Authority By-Laws.

(h) The Kenya Building code of Regulations.

4. ELECTRICAL REQUIREMENTS

Plant and equipment supplied under this Sub-Contract shall be complete with all necessary motor starters, control boards, and other control apparatus. Where Control Panels incorporating several starters are supplied, they shall be complete with a main isolator.

The supply power up to and including local isolators shall be provided and installed by the Electrical Sub-Contractor. All other wiring shall be as described in the "Particular Specification".

The Sub-Contractor shall supply three copies of all schematic, cabling and wiring diagrams for the Engineer's approval.

The starting current of all electric motors and equipment shall not exceed the maximum permissible starting currents described in the Kenya Power and Lighting Company's (KP & LC) By-Laws.

All electrical plant and equipment supplied by the Sub-Contractor shall be rated for the supply voltage and frequency obtained in Kenya, that is 415 volts, 50HZ, 3-phase or 240 volts, 50HZ, 1-phase as specified in the "Particular Specification".

Any equipment that is not rated for the above voltages and frequencies may be rejected by the Engineer

5. TRANSPORT AND STORAGE

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

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

Adequate measures shall be taken by the Sub-Contractor to ensure that plant and equipment do not suffer any deterioration during storage.

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

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

6. SITE SUPERVISION

The Sub-Contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

7. INSTALLATION

Installation of all special plant equipment shall be carried out by the Sub-Contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or his appointed agent in accordance with the best standards of modern practice and to the relevant regulations and standards described under Clause 3 of this section.

8. TESTING

8.1 General

The Sub-Contractor's attention is drawn to Part "A", Sub-Clauses 1.44 and 1.45 Page A/13 of the "Preliminaries and General Conditions".

The following sub-clauses are intended to define the Sub-Contractor's responsibilities with respect to testing and inspection.

8.2 Material Tests

All material for plant and equipment to be installed under this Sub-Contract shall be tested, unless otherwise directed, in accordance with the relevant B.S. specification concerned.

For materials where no B.S. specification exists, tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer, having regard to the particular type and application of the materials concerned.

The Sub-Contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specifically manufactured for the plant and equipment specified is used, then the Sub-Contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated herein in which case tests of material may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

8.3 Manufactured Plant and Equipment - Works Tests

The rights of the Engineer relating to the inspection, examination and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer

The Sub-Contractor shall give two week's notice to the Engineer of the manufacturer's intention to carry out work tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The costs of such tests and inspections shall be borne by the Sub-Contractor.

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

7/3

Plant and equipment which is shipped before the relevant test certificate has been approved by the Engineer shall be shipped at the Sub-Contractor's own risk and should the test and inspection certificates not be approved, new tests may be ordered by the Engineer at the Sub-Contractor's expense.

8.4 **Pressure Testing**

All pipework installations shall be pressure tested in accordance with the requirements of the various section of this specification. The installations may be tested in section to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. All tests must be witnessed by the Engineer or his representative and the Sub-Contractor shall give 48 hours notice to the Engineer of his intention to carry out such tests.

Any pipework that is buried or concealed before witnessed tests have been carried out shall be exposed at the expense of the sub-contractor and the specified tests shall then be applied.

The Sub-Contractor shall prepare test certificates for signature by the Engineer and shall keep a progressive and up-to-date record of the Sections of the work that have been tested.

9. **COLOUR CODING**

Unless stated otherwise in the Particular Specification all pipework shall be colour coded in accordance with the latest edition of B.S. 1710.

10. **WELDING**

10.1 **Preparation**

Joints to be made by welding shall be accurately cut to size with edges sheared, flame cut or machined to suit the required type of joint. The prepared surface shall be free from all visible defects such as lamination, surface imperfections due to shearing or flame cutting operation, etc., and shall be free from rust, scale, grease and other foreign matter.

10.2 **Method**

All welding shall be carried out by the electric arc process using covered electrodes in accordance with B.S. 639.

Gas welding may be employed in certain circumstances provided that prior approval is obtained from the Engineer

10.3 **Welding codes and Construction**

All welded joints shall be carried out in accordance with the following specification:-

(a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

7/4

(b) General welding

All welding mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

10.4 **Welders Qualifications**

Any welder employed on this Sub-contract shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriated certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the Sub-Contractor to replace him by a qualified welder.

7/5

PART C

GENERAL SPECIFICATIONS FOR MECHANICAL VENTILATION SYSTEMS

GENERAL SPECIFICATION FOR MECHANICAL VENTILATION INSTALLATIONS

CONTENT **PAGE**

GENERAL SPECIFICATION FOR MECHANICAL VENTILATION INSTALLATIONS

1.0 SCOPE OF WORK

The scope of the works comprises Installation, Testing, and Commissioning of Mechanical Ventilation and Air Conditioning systems in accordance with Specifications and drawings.

All the necessary elements and details for complete system are to be included.
Excluded from the specifications are the following:-

- All concrete works
- All block work
- Electrical wiring, isolators and switch boards, except internal wiring for control system from a local isolator.

2.0 SYSTEM COMPONENTS

Dimensions and capacities of ducts and fans are calculated and based on a specific requirements of air, and on an assumed resistance through grilles, silencers etc. However the installer shall be responsible for the correct functioning of the system. Subsequently it is therefore his duty to size the systems' components with consideration to his offered equipment.

3.0 DRAWINGS

The Engineer's drawings show the main layout and principles for the Ventilation and Air Conditioning Systems. If need for further detailing is required in order to carry out the work, working drawings and details shall be produced for approval by the Engineer before the work is executed.

In preparation of the working drawings are care should be taken to coordinate the Ventilation and Air Conditioning works with other services involved and avoid any interference with these.

4.0 MATERIALS AND WORKMANSHIP GENERALLY

In the specification, equipment is generally described according to capacities and a given standard in order to aid in identification of the particular equipment to satisfy specifications. The equipment selected shall be of reputable manufacture with adequate Back-Up service.

If the Engineer finds it necessary, samples of the materials will be submitted for approval before placing an order. The Engineer shall reject any materials which he finds to be of unsatisfactory quality.

Works shall be carried out by competent workmen under experienced supervision.
The Engineer shall have the authority to have any substandard work or equipment redone and/ or equipment replaced.

5.0 DUCTWORK GENERALLY

5.1 Ductwork

All seams, joints and connections to plant shall be so made as to reduced air leakage to a minimum. Internal roughness and obstructions to airflow will not be accepted. Sharp edges or corners on the outside of ductwork, flanges, supports, etc will not be accepted. Any part of galvanized ductwork where the galvanizing is damaged during manufacture or erection shall be painted with two coats of aluminum, zinc or other corrosion – ressisting paint to the approval of the Engineer.

Where ducts pass through roofs (and external walls where applicable) these shall be fitted with angle flanges and weather cravats to ensure a weather-proof fitting to the building structure.

Connections to equipment shall be made with angle flanged joints. Ductwork which may have to be moved to enable plant to be removed shall incorporate angle flanged joints. For long duct runs, angle flanged joints shall be included at intervals to facilitate any subsequent alternations.

Bends and offsets shall have a minimum throat radius equal to the width of the duct. Where short radius elbows are indicated or agreed by the Engineer as necessary due to site limitations the dimensions and internal vane (s) shall be in accordance with HVCA publication DW/121.

Ductwork shall be constructed by galvanized, cold rolled, close annealed patent flattened sheets. Tests ho
les shall be provided in branch ducts from grilles and there shall be three or four tests holes on side of duct according to duct depth at each test position. At branch positions there shall be one test hole. Air tight swivel type metal covers shall be fitted over the test holes in such a manner that they shall be readily removed as required.

5.2 Rectangular ductwork

Construction of ductwork shall be as per the following Guidelines:

- Up to 300mm longer side – 22 S.W.G.
- over 300mm and up to 460mm longer side – 20 S.W.G.
- over 460mm and up to 900mm longer side 18 S.W.G (stiffening to be 25mm x 25mm x 3mm. M.S angle at slip joints at 180mm spacing)
- Over 900mm and up to 1370mm. longer side 16 S.W.G. (stiffening to be 30mm x 30mm x 3mm M.S angle at 900mm spacing).
- Over 1370mm longer side – 14 S.W.G. (Stiffening to be 40mm x 40mm x 5mm M.S angle at 900mm. spacing

Ductwork constructed from 22 and 20 S.W.G sheet shall have folded locked seams and ductwork constructed from 18, 16 and 14 S.W.G. sheets shall have riveted seam with 8 S.W.G rivets at 2" pitch.

Joints for ductwork having a side greater in width than 610mm shall be flanged by means of 30mm x 30mm x 3mm mild steel angles.

Mild steel used as flanges or stiffeners shall be riveted to the ductwork, with 8 S.W.G rivets at 2" pitch. The joint faces of flanges shall be drilled for 10mm bolts at 75mm pitch.

Air tight access doors shall be provided on the ductwork wherever indicated on the drawings. The access doors, of sufficiently heavy construction to avoid distortion, complete with handles, shall be secured by brass wing nuts screwed into studs provided, on galvanized mild steel stiffening frames riveted, or bolted to the ductwork. The access doors shall be provided with felt or rubber gaskets to ensure that when closed they are perfectly tight.

The ductwork shall be installed with all joints air tight and adequately stiffened and braced shall have the largest radius possible with a minimum throat radius of one diameter if possible. Square or miter elbows will only be allowed where shown on the drawings. Turning vanes shall be fitted in square or miter elbows.

Transformer pieces except where situated on fan suction shall be constructed so that the angle on any side does not exceed 15° to the axis of the duct where possible.

Branch ducts shall enter main ducts expansion sections where possible. Where branch ducts occur, at taper or transformation pieces, the length of such pieces in the main duct shall be symmetrical about the axis of the branch.

6. BRACKETS AND SUPPORTS

Supports and brackets for ductworks shall be made adjustable for height, spaced to ensure support and where practicable shall be fitted at each joint of the ductwork. Vertical ductwork shall be supported at each floor level, horizontal ducts at intervals not exceeding 2280mm and adjacent to fans, canvas joints and other equipment. All members of supports in contact with metal ductwork shall be galvanized after fabrication.
Socketed joints shall have a minimum overlap of 50mm in the direction of flow. The joint shall be made with an approved type jointing compound with bolts or rivets at centres not exceeding 50mm. wherever access cannot be made for riveting or bolting self tapping screw of the shortest length which will give a satisfactory joint shall be used in lieu of the rivets or bolts, on size or diameters up to 530mm. All slip joints on circular ductwork are to have a spigot carefully swaged damper leaves shall be multi leaf type. The quadrants shall be of robust construction and securely fixed to the ductwork. The leaves shall be linked with a connecting rod and the ends of the spindle shall be housed in bearings. Dampers are to indicate the full and closed positions and are to be marked and then locked after air Volume has been set.

7.0 JOINTS

7.1 Flexible Joints

Flexible joints shall be provided on fan inlet and outlet connections and elsewhere on the ductwork where indicated. They shall be over the full cross-sectional area of the mating fan inlet or outlet section. The ends of the duct and fan connections shall be in line.

Flexible joints shall consist of, or be protected by, material having a fire penetrating time of at least fifteen minutes when tested in accordance with BS 476 Part 1 Section 3. The material shall be of the glass fibre cloth type, canvas or other approved material. The width of joints from metal edge to metal edge shall not be less than 80mm and more than 250mm.

All flexible joints other than fan inlet connections shall be between flanged ends. The flexible material flange shall be backed by an angle or flat iron flange and the flexible joint flat iron bar used with fan inlets shall not be less than 5mm thick.

7.2 Flexible Connections.

Where flexible connections are indicated or required between rigid ductwork and particular components or items of equipment, the internal diameter of the flexible duct shall be equal to the external diameter of the rigid ductwork and of the spigot type. The use of flexible duct between rigid sections of sheet metal ductwork to change direction or plane will not be permitted except where indicated or expressly authorized by the Engineer.

The flexible duct shall have a liner a cover of tough tea-resistant fabric equal in durability and flexibility to glass fibre shall be impregnated and coated with plastics. It shall be reinforced with a bonded galvanized spring steel wire helix or glass fibre cord or equal and shall be bonded to cover to ensure regular convolutions.

Alternatively the flexible duct shall consist of flexible corrugated metal tubing of stainless steel, aluminium, tinplated steel or aluminium coated steel. The metal may be lined on the inside or the outside or both with plastics materials.

The joints to rigid spigots shall be sealed with a brush coat of pipe jointing paste or mastic compound. Ducts up to 150mm diameter shall be secured with a worm drive type hose clip complying with BS 3628. Ducts over 150mm diameter shall be secured with band clip.

The frictional resistance to air flow per unit length of the flexible duct shall not exceed 50% more than the frictional resistance per unit length of galvanized steel ducts of equivalent diameter. The radius ratio R/D for bends shall not be less than 2, where R is the centre line radius and D is the diameter of the flexible duct.

Flexible ducts shall be suitable for an operating temperature range of 18oC to 120oC and shall comply with BS 476 Part 1, Section 2, Clause 7 (Clause 1; surface of very low flame spread).

8.0 FINISH PAINTING

Upon completion of the installation and after all tests have been carried out to the satisfactory of the Engineer, the plant, equipment, supports, etc. shall be examined and all priming coats damaged during erection made good.

Any plant or equipment, ductwork, etc., which is to be insulated, shall have had the priming paint protection made good before the application of the insulation. After the above procedures have been carried out to the satisfaction of the Project Manager, the various surface shall be given the necessary preparation as recommended by the paint and insulation manufacturers and finish painted in colours to be agreed between the Sub-Contractor and Project Manager, at a later date. For the purposed of the Specification, however, it shall be deemed that the sub-contractor's tender price was based on the identification requirements for the various services detailed in Code of Practice DW/161 Identification of Ductwork as published by the H.V.A.

9.0 AIR INTAKES AND OUTLETS

Unless otherwise indicated fixed louvers on external walls will be fitted at air intake and outlet positions. A galvanized steel wire mesh screen of 20mm diamond mesh and at 2mm diameter wire and complete with a frame of galvanized steel rod with securing lugs or of flat iron shall also be fitted on the inner side of the louvers.

10.0 FANS

10.1 General

Fans shall capable of giving the specified performance when tested in accordance with BS 848. Although estimated values of the resistance to airflow of items of equipment may be indicated, this does not relieve the Contractor to the responsibility for providing fans capable of delivering the required air volume flow through the system.

The make and design of fans shall be approved by the Engineer and evidence supporting noise levels and fan efficiencies shall be provided. Where fans are supplied with noise attenuations, full details of the attenuations shall be given.

Belt driven fans shall be fitted with pulleys suitable for V-belts; pulleys of the taper lock type may be used for drivers up to 30KW output. Alternatively, and in any case above 30KW output, pulleys shall be secured to the fan and the motor shafts by keys fitted into machined keyways. Pulleys shall be keyed to the fan shaft in the overhung position. Keys shall be easily accessible so that they can be withdrawn or tightened and they shall be accurately fitted so that the gib head does not protrude beyond the end of the shaft.

Machined bolts, nuts and washers only shall be used for the assembly of fans; all bearing surfaces for the heads of bolts or washers shall be count faced. Holding down bolts for fans and meters shall be square section under the head or be fitted with snugs to prevent them tuning in the fan base plate when the nuts are tightened.

Any fan which is too large or too heavy for safe manhandling shall provided with eyebolts or other lifting facilities to enable mechanical lifting equipment to be used.

10.2 Axial Flow Fans

Axial flow fans shall be of either the single stage type or the multi-stage contra-rotating type with each impeller mounted on an independent motor. Casings shall be rigidly constructed of mild steel stiffened and braced to obviate drumming and vibration. Cast iron of fabricated steel feet shall be provided where necessary for bolting to the base or supports. Inlet and outlet ducts shall terminate in flanged rings for easy removal. The length of the fan (s) and motors(s) shall also terminate in flanges in order that the complete section may be removed without disturbing adjacent ductwork. Electrical connections to the motor(s) shall be through an external terminal box secured to the casing. Impellers shall be of steel or aluminium, the blades shall be secured to the hub or the blades and the hub shall be formed in one piece. The hub shall be keyed to a substantial mild steel shaft and the whole statically balanced. Blades shall be of aerofoil section. Shafts shall be carried in two bearings which may be ball roller or sleeve type. Lubricators shall be extended to the outside of the casing.

Where axial flow fans are driven by a motor external to the casing the requirements for pulleys and for V-belt drives and guards shall be met. Unless otherwise indicated a guard is not required for any part of a drive which is within the fan casing. An access door of adequate size shall be provided.

Where axial flow fans of the bifurcated type are indicated the motors shall be out of the air stream. Motors may be placed between the two halves of the casing in the external air or may be placed within the fan casing provided that effective ventilation is given to the motor. Where hot gases or vapours are beings handled the motor and the bearings shall be suitable for operation at the temperature they may experience.

11.0 DAMPERS

11.1 General

Sufficient dampers shall be provided to regulate and balance the system. Dampers on grills or diffusers shall be used for fine or secondary control. All dampers shall be sufficiently rigid to prevent fluttering. Unless otherwise indicated, the air leakage past dampers in the fully-closed position shall not exceed 5% of maximum design air flow in the duct. All duct dampers except fire dampers and self-closing flaps shall be fitted with locking devices and position indicators. Dampers shall be generally in accordance with the appropriate HVCA Specification.

Each Primary control damper shall be fitted with a non-corrodible label stating the actual air flow in M3/S and the cross-sectional area. Alternatively, these figures shall be painted in a visible position on the adjoining ductwork or insulation. The position of a damper as set after final regulation and balancing be indelibly marked on the damper quadrant

11.2 Butterfly dampers

Butterfly dampers shall each consist of two plates edge seamed, and of the same thickness of material as that from which the associated duct is made, and rigidly fixed to each side of a mild steel operating spindle, the ends of which shall be turned and housed in non-ferrous bearings.

11.3 Bifurcating dampers

Bifurcating dampers shall be of 2mm thick sheet for sizes up to 450mm square. For larger sizes, the thickness shall be as indicated. Damper plates shall be rigidly fixed to square section mild steel spindles the ends of which shall be turned and housed in non-ferrous bearings.

11.4 Multi-leaf dampers

Multi – leaf dampers shall consist of two plates of material of the same thickness as the associated duct and rigidly fixed to each side of an operating spindle, the ends of which shall be housed in brass, nylon, oil impregnated sintered metal, PTFE impregnated or ball bearings. The ends of the spindles shall be linked such that one movement of the operating handled shall move each leaf an equal amount. An inspection door shall be provided adjacent to each multi-leaf damper.
On low velocity systems only, multi-leaf damper blades may be of a single plate, at least 1.6mm thick and suitably stiffened, and the blade linkages may be within the duct. Those dampers shall have bearings and inspection doors as specified above.

11.5 Damper Quadrants and Operating Handles

Quadrants and Operating handles shall be of die-cast aluminium with the words ”OPEN” and “SHUT” cast on the Quadrants. Quadrants shall be securely fixed to the damper spindles and shall be close-fitting in the quadrants hubs to prevent any damper movement when the damper levers are locked.

11.6 Self-closing dampers

Self-closing dampers shall be designed so as to present the minimum of resistance to airflow under running conditions, to take up a firm, non-fluctuating position under running conditions and to give a tight shut-off when closed. They shall incorporate rubber stops to prevent rattling and to give a tight shut-off when closed. They shall incorporate rubber stops to prevent rattling.

11.7 Sliding Dampers

Sliding dampers shall be provided only where indicated. They shall be of 2mm. thick sheet steel for size up to 450mm square. For larger sizes the thickness shall be as indicated. They shall run in guides lined with felt.

11.8 Iris type dampers.

Iris type dampers may be used in ducting up to 600mm, dia. Or 450mm square. The control shall be on the outside of the damper. The design shall be such that the leaves of the damper can be easily moved for adjustment.

12.0 GRILLES

12.1 Supply & Return Registers

Supply registers shall be manufactured from high grade, extruded Aluminium sections with lacquered finish and fixing shall be 32mm with bevelled edges.

The registers shall have a front set of blades parallel to the long dimension, of rear set of blades parallel to the short dimension, the blades being at 17mm centres and individually adjustable with opposed blade dampers.

12.2 Extract grilles

Extract grilles shall be similar to the Supply Registers described above with the exception that they have only one set of blades parallel to the long dimension.

12.3 Fresh Air Grilles

These shall be manufactured from sheet steel with steel fixing flanges and shall be galvanized after manufacture. An insect screen shall be fixed downstream.

12.4 Diffusers

These shall be manufactured from high grade extruded sections with lacquered finish, bevelled flanges and removable core. Fixing shall be by self-tapping screws through the duct into neck of the diffuser.

12.5 Louvres

Discharge and Fresh air Intake louvres shall be manufactured from mild steel and be galvanized after manufacture. A screen shall be fixed to the back of the louvres

13.0 ATTENUATORS

13.1 General

Purpose made attenuators and sound absorbing material shall be designed to air flow, have adequate strength and cohesion to resist erosion by air flow and do not produce dust. They shall be free of odour and proof against rot, damp and vermin and shall comply with the requirements as to fire and smoke hazards. Adhesives shall be compatible with the sound absorbent material and should preferably be non-flammable.

Where sound absorbent material and /or special attenuators are indicated they shall either reduce the sound level in the space, due to the equipment, to the

specified value or shall give the specified sound level attenuation over the specified range of frequencies. Purpose made attenuators shall be tested in accordance with HVRA Laboratory Report No. 55 (Code for the measurement of the performance of unit silencers). The insertion loss and generated noise level for each octave band and the pressure loss of the silencer shall be stated.
Attenuators shall be suitable for internal air pressure of 100N/m2, air stream temperatures of up to 40oc and free from air stream erosion for velocities up to 25m/s. The mineral wool lining shall be rot, vermin and fire-proof. Attenuator casing shall be pre-galvanized sheet steel with galvanized pre-drilled flanges.

13.2 Rectangular Attenuators

These shall be rectangular in section with splitters forming air passages in parallel. The mineral wool lining shall be resin bonded.

13.3 Circular Attenuators

Circular section attenuators will have a central pod. The mineral wool lining shall be retained by expanded steel. The end flanges shall be match drilled to suit the fan which they are fixed to.

13.4 Acoustic lining

Where indicated on the contract drawings, the ductwork shall be acoustically lined. The lining shall consist of resin bonded mineral wool 25mm, thick fixed to the ductwork by a suitable adhesive.

14.0 INSTRUMENTS

14.1 General

The instruments, gauges etc, detailed in this section shall be provided in addition to those associated with specific items of plate and detailed elsewhere, they shall be mounted in accessible positions and shall be easily read.

14.2 System Static Pressure Gauge

A system static pressure gauge shall be provided for the system. It shall consist of a small inclined manometer gauge similar to a filter gauge. The edge of the gauge shall be connected to the system and the other end shall be left open to the plant room but where fluctuation of the static pressure in the plant room may occur the gauge shall be connected across the main fan. Such fluctuations may be caused by wind pressure affecting large open air intakes to the plant room.

15.0 VIBRATION, NOISE AND SOUND INSULATION

15.1 Anti-Vibration Mountings

Fans, compressors, motors and any other vibration-inducing equipment shall be isolated from the building structure by anti-vibration mountings which shall be compressed machinery cork, spring or rubber dampers or rubber/metal bearers as indicated.

15.2 Noise

The noise produced by the installation in the spaces served, in any adjacent buildings and in the open air surrounding plant rooms shall be kept as low as possible. This shall be specially considered in the selection of fan motors, grilles and the internal finish and arrangements of extraction ducting.

Noise level information for fans based on octave analysis data, shall be stated. The reference level and the testing technique shall be stated.

The sound level in the spaces served, due to the equipment shall comply with the recommended design criteria given in the IHVE Guide (Table 13.1 of 1965 Edition). The maximum sound pressure level due to ventilation system must not exceed value mentioned below measured by a reference value of $2 \times 10 \times 10^{-5}$ N/m^2 transferred to a logarithmic scale, and measured at any point 1.5 meters above the floor and 1.0 meters from the walls.

The maximum sound pressure level measured at any point 4 metres from the extract point must not exceed 55dB.

The maximum sound pressure level measured at any point 4 metres from fans must not exceed 60dB.

16.0 THERMAL INSULATION

16.1 General Description

All heated, cooled, and recirculated air ductwork shall be insulated.

Insulation shall be of 25mm thick expanded polystyrene sheet, or spray applied polyurethane foam to a uniform thickness of 25mm. Polystyrene shall be fixed so that the edges butt closely without gap and the insulation shall overlap at corners by the thickness of the insulation. The sheet shall be fixed by means of a suitable adhesive and plastic impingement pines attached to the ductwork.

16.2 Ductwork In Plant Room

The insulation described above in Clause 5.1 above shall be finished by the application of a 15mm thick layer of hard setting finish. Insulation shall bevelled thick to angle of 45o at all connecting flanges, access hatches and all other places where operation or maintenance is likely to cause the breaking of the insulation.

The insulation shall then be given a vapour sealing by the application of two coats of anti-condensation paint.

16.3 Ductwork External to plant Rooms

The insulation described in Clause 5.1 above shall finish by the application of two coats of bitumastic.

17.0 ELECTRICAL EQUIPMENT AND WIRING

17.1 Scopes

The responsibility for electrical equipment and wiring shall be as defined as below-:

An on-off starter shall be provided and placed in the appropriate position for connection of the fans required for the installation and within a time agreed with the Engineer fully detailed wiring diagrams for all connections to them shall be availed.

The Installer shall be responsible for the accuracy of all wiring diagrams provided by him and for the correct internal wiring of all pre-wired equipment supplied. The Installer shall reimburse the full cost of abortive or remedial work arising from any error in these aspects.

17.2 General

Unless otherwise indicated all electrical equipment and installation shall be suitable for use in ambient temperatures up to 40^{o}C and relative humidities up to 90%. For tropical climates, electrical equipment shall be suitable for use in the temperature and humidity as indicated; it shall be proof against atmospheric corrosion, including that of saline air where relevant, and materials shall not be susceptible to mould growth or attack by termite and similar hazards.

17.3 Electrical Motors

Electrical motors shall comply with BS 170 2048 or with BS 2613 and BS 3979 as appropriate. All motors shall have Class E insulation (BS2757) and can be continuously rated.

They shall be screen protected (BS2817) unless otherwise indicated. Under all normal conditions without being overloaded. All motors larger than 0.75kw output shall be three phase, for motors above 15kw output the type of motor and method of starting shall be such as to limit the starting and run-up currents to three times the rated full load current unless otherwise indicated. No motor shall run faster than 25 rev/s unless otherwise indicated.

18.0 INSPECTION, COMMISSION AND TESTING

18.1 General

Unless otherwise indicated tests shall be carried out in accordance with the appropriate BS or CP. Test certificates for works tests, site tests and tests required by BS shall be submitted in duplicate to the Engineer.

18.2 Testing

Where an individual inspection or tests take place at outside the site of the works representatives of the Engineer will be required to be present.

Unless otherwise indicated the contract shall include the cost of all tests, necessary instruments, plant supervision and labour both at work and on site. The accuracy of the instruments shall be demonstrated where so directed by the Engineer.

The site test shall be of at least six hours duration. Any defects or workmanship, materials and performance maladjustments or other irregularities which become apparent during the tests shall be rectified by the supplier at his expense and the tests shall be repeated at his expense to the satisfaction of the Engineer.

The Supplier/Installer's representative present at the site tests shall be fully conversant with the operation of the thermostatic controls and shall be expected to explain the operation and safety controls forming part of the installation to the employer's representatives.

18.2.1 Site Tests

The Installer shall supply all instruments and equipment necessary to carry out site tests and shall arrange with other parties for the testing of associated equipment which may affect the performance of the plants installed under these works.

18.2.2 Site Tests-Fans

All fans shall be charged with suitable lubricant and shall be tested upon completion of the auxiliary system erection to ascertain that the performance of each fan complies with the requirements of the specification.

18.2.3 Completion Of Works – Balancing And Commissioning

Following the site tests and prior to handover, Mechanical Ventilation or Air-Conditioning systems shall be balanced by means of grills, dampers and other special controls installed so to give the required air flow rates and where applicable the required temperatures, pressures and humidity conditions in all areas served by the said systems.

The complete system shall be balanced and commissioned as a whole. Sectional balancing and commissioning on any part of the system where this excludes final complete system balancing and commissioning shall not be accepted.

Test volumes within ducts shall be within +5% of the design volumes, and volumes at grills and diffusers shall be within +10% of the design volumes.

When the system has been balanced to the satisfaction of the project manager, it shall be run under complete automatic control for 72 hours continuous operation to ascertain any faults in operation before acceptance and handover. Any faults discovered during this time shall be corrected and another test or tests of 72 hours duration shall be carried out to ensure satisfactory operation, all at the expense of the Supplier/Installer..

During this phase, particular attention shall be paid to:

- The maintenance of cleanliness of all plant and extraction systems during construction and ensuring that extraction systems are cleaned through as part of commissioning.

- The protection of plant, particularly sensitive or fragile items, from the activities of other trades during construction and from dirt and mal operation during commissioning.

- The protection of electrical of electrical equipment from damp during construction and commissioning.

19.0 CONTROL SYSTEM

Particular attention shall be paid to the following features:

- Satisfactory operation of any automatic or manually operated sequence to be used in the event of fire.

- Safety in the event of failure and of sudden resumption of electricity supply.

- Satisfactory operation of safety interlocks designed for the protection of personnel, such as those associated with the high voltage electrically operated plant.

The following items shall be checked and/or tested and recorded on the site Test Certificate:-

- Set devised value of all control devices

- Satisfactory operation of equipment protection devices.

- Satisfactory operation of all sequencing operations and alternate working selections and automatic or manual change-over of duplicate plant.

20.0 NOISE AND SOUND CONTROL

Sound level reading shall be taken with a simple sound level meter using the ‘A’ scale weighting network. The spaces in which readings shall be taken shall be as agreed with the Engineer but will in general be the following:-

- Plant rooms

- Occupied rooms adjacent to plant rooms

- Outside plant rooms facing air intakes and exhaust to assess possible nuisance to adjacent accommodation. If the adjacent accommodation is private residential building

- tests may be required at night.

- In the space served by the first grille or diffuser after a fan outlet.

- In any space where, by the addition of special silencing material or techniques of by classification of use, a low level of noise is clearly required.

Alternatively, sound level reading shall be taken using a sound analyzer to give an octave band analysis of the ground spectrum and to pinpoint the frequency values of peak sound levels. The spaces in which readings shall be taken shall be as agreed with the Engineer but will in general be as detailed in paragraph above.

21.0 OPERATING AND MAINTAINANCE INSTRUCTION

The Supplier/Installer shall demonstrate and explain the plant and the method of starting, running and stopping to such staff as the Engineer shall nominate.
He shall provide three sets of operating and maintenance instructions which shall be enclosed in durable covers. The operating and maintenance instructions shall include;-

- A brief outline of the operation of the plant.

- Instructions on how to start and stop the plant, noting any safety and / or sequencing arrangements.

- Details of required maintenance with suggested frequency of action

- Details of all lubricating oils and greases required and filter replacement

- Details of each item of plant including the name and address of the manufacturer, type and model, serial number, duty and rating.

The operating and maintenance instructions shall be handed to the Engineer not later than at the end of the commissioning period.

22.0 SPARE PARTS

The Installer shall submit a priced list of any extra materials which he recommends should be purchased for the Ventilating and Air Conditioning Plants and all associated equipment and control gear and extras not supplied as standard. He shall be required to give a guarantee that he will hold sufficient running stock of spare parts for the maintenance of the equipment.

PART D

PARTICULAR SPECIFICATIONS FOR MECHANICAL VENTILATION

(Low Pressure Air Systems)

PART D

PARTICULAR SPECIFICATION FOR MECHANICAL VENTILATION

(Low Pressure Air Systems)

PART D

PARTICULAR SPECIFICATION FOR MECHANICAL VENTILATION (Low Pressure Air Systems)

4.01 GENERAL

This section specifies the general requirements for the manufacture and installation of low velocity/medium pressure air systems forming part of the Contract Works. This section shall apply except where specifically stated otherwise in the Particular Specification or on the Contract Drawings.

4.02 SHEET METAL DUCT WORK

A Material

Ductwork within the building shall be fabricated from strip mill cold-reduced mild steel sheet continuously hot-dip galvanised in compliance with B.S. 2989: 1975.

Ductwork external to the building shall be fabricated from cold-rolled, close-annealed or cold reduced black mild steel sheet and galvanised after manufacture in compliance with B.S. 719: 1971.

B Construction

All ductwork shall be manufactured in accordance with the Heating & Ventilating Contractors' Association, (HVCA) U.K., Specification: DW/142: 1982, except where specifically stated otherwise in the particular Specification or on the Contract Drawings.

Ductwork material gauge and stiffening shall be in compliance with the requirements set out in Table A.

TABLE A

Length of Side (mm)	Nominal Sheet Thickness (mm)	Maximum Spacing Between Joints/Stiffeners		Minimum Angle section for Intermediate Stiffeners (mm)
		Without Beading Cross Breaking - (mm)	With or Beading or Cross-Breaking (mm)	
Up to 400	0.6	Unlimited	Unlimited	None
400 to 600	0.6	1,500	Unlimited	25 x 25 x 3
601 to 800	0.8	1,500	Unlimited	25 x 25 x 3
801 to 1,000	0.8	1,200	1,500	25 x 25 x 3
1,001 to 1,500	1.0	800	1,200	40 x 40 x 4
1,501 to 2,250	1.0	800	800	40 x 40 x 4
2,251 to 3,000	1.2	600	600	50 x 50 x 5
For Ducts Galvanized after Manufacture				
Up to 300	1.2	As Equivalent Sizes above		
301 and over	1.6	As Equivalent Sizes above		

C Joints

Cross joints for ducts up to 500 mm narrow side shall be `C' cleat type and sealed with liquid/mastic sealant.

Cross joints for ducts with narrow side in excess of 500 mm shall be reinforced standing seam.

Longitudinal seams shall be of the lock form type of riveted spot/plug welded lap seams.

D Bends

All bends shall have a centre line radius of one and one half times the duct width.

Where radius bends will not fit, square bends shall be provided, with air turns fitted by riveting or welding. The number of vanes shall be none in ducts up to 300mm wide, one in ducts 301mm to 500mm wide and two in ducts above 500mm to 1000mm wide and three in ducts above 1000mm. The vanes shall be positioned in accordance with fig. 1,2,3 and 4 of HVCA Specification DW/142: 1982.

E Transformation

Transformation and taper pieces shall, where the cross-section area is unchanged have a maximum slope of 22.5 degrees on any side. Where the Cross-sectional area is temporarily reduced up to 20 per cent, the maximum slope shall be 15 degrees.

F. Branches

For branch ducts up to 400mm wide the take-off piece shall be tapered at 45^0 in the direction of the air flow in accordance with fig.61 of HVCA Specification DW/142.

For branch ducts over 400mm wide the take-off piece shall be of radius pattern with, where space permits, a minimum inner radius of half the branch duct width.

G. Air Tightness

All ductwork shall be constructed and jointed in such a manner that air-tightness requirements are fulfilled and allowable leakage shall not exceed ten per cent of total air flow at highest fan pressure. The allowable leakage shall not be concentrated at one point of the system.

H Access

Sufficient number of access doors and handholes shall be provided in the ductwork for the purpose of maintenance, inspection, cleaning and entry of test equipment.

Access doors shall be of the hinged type and door openings in ductwork shall be adequately stiffened and made air-tight with purpose-made rubber gaskets around the door perimeter.

I Connections

Brass screwed connections shall be provided on the ductwork for thermostats, humidistats, thermometers, etc, in positions indicated on Contract Drawings. The connections shall be provided with an air-tight rubber seal.

J Test Holes

Test holes shall be provided in all branch ducts and in the main duct on the discharge side of the fan. The holes shall be suitably spaced in accordance with B.S. 848: Part 1, on a straight length of ductwork and, where possible, not less than two metres downstream of any bends or dampers.

After completion of the testing, proprietary metal or plastic plugs shall be fixed to all test holes. The use of rubber or cork bungs shall not be permitted.

K Hangers and Supports

Ductwork hangers and supports shall be manufactured from rolled mild steel angles or channel sections and shall be of the drop rod or cantilever type. The table below sets out construction and spacing details.

Supports for insulated ductwork shall not be connected directly to the duct stiffening or flanges. The insulation and vapour barrier should be abutted to insulator incorporation with the bearing support. The insulator shall be made from rot and vermin-proof hardwood.

Length of Longer Side (mm)	Drop Rod M.S. Rod Diameter (mm)	Hanger M.S. Flat (mm)	Minimum Bearing (mm)	Maximum Spacing (mm)
Up to 501	10	25 x 3	25 x 3 Flat or 25 x 25 x 3 Angle	3.0
501 to 800	10	25 x 3	40 x 40 x 5 Angle	3.0
801 to 1000	10	25 x 3	40 x 40 x 5 Angle	2.5
1001 to 2500	10	25 x 3	50 x 50 x 6 Angle	2.5
2,251 and Over	to suit loading			

L. Ductwork through Building Fabric

Where duct work passes through building fabric, the connections shall be by built-in galvanised sheet metal sleeves of the same thickness as the duct.

The sleeve ends shall be finished with mating flanges. Joints between mating flanges shall be fitted with sealing gasket or mastic sealant.

M. Protective Finishes

Within the building, ductwork flanges, stiffeners, hangers, supports, etc. shall be painted with two coats of red oxide or zinc chromate paint before fixing.

Outside the building, ductwork steel sections shall be painted with one coat of red oxide followed by two coats of bituminous paint.

All paints shall be used in accordance with the paint manufacturer's recommendations.

4.03 FLEXIBLE CONNECTIONS

Where fans or similar equipment are connected to the ductwork system, the connection shall be made with heavy-duty rot and vermin-proof neoprene or rubberised canvas.

Flexible connections shall be secured by a pre-drilled mating flange. When exposed to outside weather the flexible connection shall suitably be protected from rain.

4.04 AIR VOLUME DAMPERS

These shall be provided where indicated on the Contract Drawings.

Damper blades shall be of rigid construction without sharp edges and shall be substantially air-tight.

Butterfly dampers shall be used only where the longer side of the rectangular duct does not exceed 300mm. The damper spindle shall extend to the outside of the duct and shall be provided with locking device on the outside of the duct.

For rectangular ductwork having longer side in excess of 300mm, multi-leaf dampers shall be used. All multi-leaf dampers shall be constructed in demountable ductwork sections, which shall extend beyond the swing of the blades. Provisions shall be made for linkages to connect the multiple extended spindles.

The `OPEN' and `CLOSED' damper positions shall be clearly marked on all dampers.

4.05 FIRE DAMPERS

Automatic fire dampers shall be provided where indicated on the Contract Drawings.

These shall be of stainless steel multi-blade construction to provide positive closure and stainless steel spring operated through a fusible link rated at 72^0C.

The damper casing shall be of galvanised 16 gauge steel, with continuously welded corners and spigot connections.

The fire dampers supplied must accompany certification from a recognised fire authority.

4.06 DUCT THERMAL INSULATION

A. General

All supply air ductwork shall be insulated.

Recirculated and exhaust air ductwork within conditioned space shall not be insulated.

Outside the conditioned space both the supply and the recirculated air ductwork shall be insulated.

B. Ductwork within Conditioned Space

Insulation shall be 25 mm thick expanded polystyrene sheet or spray applied polyurethane foam to a uniform thickness of 25mm.

Polystyrene shall be fixed so that the edges butt without gap and the insulation shall overlap at corners by the thickness of the insulation. The Polystyrene sheet shall be fixed by means of a suitable adhesive and plastic impingement pins attached to the ductwork.

The insulation shall be effectively vapour-sealed by application of two coats of anti-condensation paint.

C. Ductwork in Plant Rooms

The insulation shall be identical in all respects to the requirements laid down in Clause 4.06 B with the exception that the insulation shall be finished with 15mm thick layer of hard setting plastic compound trowelled to a smooth finish.

All corners shall be protected by setting in a 1mm thick aluminium angle strip into the hard setting finish.

Insulation of all connecting flanges, access hatches and all other places where operation or maintenance is likely to cause the breaking of insulation shall be levelled at an angle of 45^0.

D. Ductwork External to Plant Room

The insulation shall be identical in all respects to the requirements laid down in Clause 4.06 B with the exception that the insulation shall be finished with two coats of bitumastic paint and clad with 0.80mm thick polished aluminium sheeting.

The cladding shall be fixed in lengths of not less than 1.8 metres and the longitudinal seam shall have an overlap of 25mm and be screwed by self tapping screws as described above. Joints between lengths of cladding shall be made with a 25mm overlap and sealing with bitumastic and self-tapping screws as described above. At bends the cladding shall be mitred and each section of mitre shall contain an overlap to permit sealing with bitumastic and securing with self-tapping screws as described above.

Joints between lengths of cladding shall be made with a 25mm overlap and sealing with bitumastic and self-tapping screws.

E. Duct Acoustic/Thermal Insulation

Where shown on the Contract Drawings, ductwork shall be internally insulated and insulation shall serve as both thermal insulation and sound attenuator.

Insulation shall be 25mm thick, 24 kg/m^3 density, flame-attenuated glass fibre bonded with thermal setting resin as manufactured by Newalls Insulation Co. Ltd. U.K.

The insulation shall in particular comply with Fire Classification Class 1 surface spread of flame, B.S. 476: Part 7, be hundred per cent non-hygroscopic, shall not be subject to any fibre migration for air velocities up to 25 m/s, and be suitable for temperature range of + 5^0C to + 50^0C.

The insulation shall be fixed in strict compliance with the manufacturer's installation recommendations.

4.07 VIBRATION ISOLATION

The Contractor shall be responsible for ensuring that sufficient provision is made to prevent the transmission of vibration from all equipment to the supporting structure and interconnected items of the complete system. It is deemed that the tenderer has included for this requirement in his pricing.

4.08 **DUCTWORK INSPECTION AND TESTING**

A General

No ductwork shall be insulated or covered in any manner prior to inspection and testing.

The Contractor shall give adequate notice to the Engineer of his intention to carry out tests in order that such tests can be witnessed by the Engineer.

B. Ductwork - Testing for Air Tightness

The Contractor shall provide a suitable variable speed portable fan and effective sealing caps for this purpose.

Air leakages shall not exceed the figures stated in the table below:

Working Pressure of Fan N/m^2	Leakage $M^3/m^2.hr$	Test Pressure N/m^2
0 – 390	4	196
390 – 980	8	685

C. Ductwork - Testing of Flow Rates

All fans installed under this Contract shall be charged with suitable lubricant and shall be tested upon completion of the ancillary system erection to ascertain that the performance of each fan complies with the requirements of the Specification. The complete system shall be balanced by means of dampers and other special controls so as to give the required air flows.

Test flow rates must be obtained within +/- 5% of the design figures.

Flow rates delivered at air terminals may be measured by the use of a vane anemometer. Flow rates in main and branch ducts shall be measured by the use of a pilot-static tube, through holes of suitable size and spaced in accordance with B.S. 848.

PART E

BILLS OF QUANTITIES

SCHEDULE OF PRICES

GENERAL NOTE

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

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

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

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

   b) Insurance

   c) Clearing and forwarding

   d) Delivery and storage at site

   e) Packing for storage

   f) Replace any defective or damaged item

   g) Installation

   h) Testing

   i) Painting

   j) Commissioning

   k) Maintenance during the defects liability period

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

Item ref	Description	Qty	Unit	Rate Kshs.	Total Kshs
	SPLIT SYSTEM AIR CONDITIONING				
	Supply,deliver, Install, set to work, test and commission the following items. Tenderers are requested to indicate the make of the units on offer in their tender bid, and also submit technical brochures for the same.				
1.10	**BOARD ROOM 01 SPLIT UNIT AIR CONDITIONERS**				
a	Supply, deliver and install 4 way Ceiling cassettes air conditioner units (cooling type) complete with a wireless remote controller, indoor and outdoor units. **Cooling capacity: 7.1kW (24000 BTU/hr)**	2	no.		
b	Supply, deliver and install 30 Amps Automatic Voltage Stabilisers as **'Sollatek"**	2	no.		
c	Allow for Aluminium coated wall mounting brackets for outdoor units c/w mounting rubbers, rawl bolts and other accessories.	2	lot		
d	Allow for 3/8 and 5/8 refrigerant gas pipes complete with amarflex insulation	30	lm		
e	Allow for 2.5mm2 x 3 core flexible cable by "East Africa Cables" or equal and approved.	30	lm		
f	Allow for all Electrical Connection from local DB switch to the equipment including all controls	2	Item		
1.11	**CONDENSATE DRAINAGE PIPES**				
a	Supply, deliver and install the condensate uPVC drainage piping complete with armaflex insulation, bends, fittings etc. Ø25mm ditto	30	lm		
1.20	**CEOs OFFICE SPLIT UNIT AIR CONDITIONERS**				
a	Supply, deliver and install 4 way Ceiling cassettes air conditioner units (cooling type) complete with a wireless remote controller, indoor and outdoor units. **Cooling capacity: 5.6kW (18000 BTU/hr)**	2	no.		
b	Supply, deliver and install 30 Amps Automatic Voltage Stabilisers as **'Sollatek"**	2	no.		
c	Allow for Aluminium coated wall mounting brackets for outdoor units c/w mounting rubbers, rawl bolts and other accessories.	2	lot		
d	Allow for 3/8 and 5/8 refrigerant gas pipes complete with amarflex insulation	30	lm		
e	Allow for 2.5mm2 x 3 core flexible cable by "East Africa Cables" or equal and approved.	30	lm		
f	Allow for all Electrical Connection from local DB switch to the equipment including all controls	2	Item		
1.21	**CONDENSATE DRAINAGE PIPES**				
a	Supply, deliver and install the condensate uPVC drainage piping complete with armaflex insulation, bends, fittings etc. Ø25mm ditto	30	lm		
	Sub Total for Boardroom, CEO Air conditioning units to Summary page				

PROPOSED PARTITIONING WORKS ON SEVENTH FLOOR TSC HEADQUARTERS FOR TSC
MECHANICAL INSTALLATIONS
SECTION VII: BILLS OF QUANTITIES FOR AIR CONDITIONING INSTALLATIONS

Item ref	Description	Qty	Unit	Rate Kshs.	Total Kshs
1.30	**DEPUTY CEO OFFICES & BOARDROOM 02 SPLIT UNIT AIR CONDITIONERS**				
a	Supply, deliver and install 4 way Ceiling cassettes air conditioner units (cooling type) complete with a wireless remote controller, indoor and outdoor units. **Cooling capacity: 5.6kW (18000 BTU/hr)**	2	no.		
b	Supply, deliver and install 30 Amps Automatic Voltage Stabilisers as **'Sollatek"**	2	no.		
c	Allow for Aluminium coated wall mounting brackets for outdoor units c/w mounting rubbers, rawl bolts and other accessories.	2	lot		
d	Allow for 3/8 and 5/8 refrigerant gas pipes complete with amarflex insulation	30	lm		
e	Allow for 2.5mm2 x 3 core flexible cable by "East Africa Cables" or equal and approved.	30	lm		
f	Allow for all Electrical Connection from local DB switch to the equipment including all controls	2	Item		
1.31	**CONDENSATE DRAINAGE PIPES**				
a	Supply, deliver and install the condensate uPVC drainage piping complete with armaflex insulation, bends, fittings etc. Ø25mm ditto	30	lm		
	Sub Total for Deputy CEO Air conditioning units to summary page				

PROPOSED PARTITIONING WORKS ON SEVENTH FLOOR TSC HEADQUARTERS FOR TSC
MECHANICAL INSTALLATIONS
SECTION VII: AIR CONDITIONING AND MECHANICAL VENTILATION

Item ref.	Description	Amount (Kshs)
	SUMMARY PAGE	
A	TOTAL FOR BOARD ROOM AND CEOs OFFICE AIR CONDITIONING INSTALLATIONS	
B	TOTAL FOR DEPUTY CEO OFFICE & BOARDROOM 2 AIR CONDITIONING INSTALLATIONS	
C	Allow for setting to work, testing and commissioning the entire system	
D	Allow for 3 No. Sets of Working and As Installed Drawings, Operating and maintenance manuals plus Soft Copies	

Total for HVAC Installation Services C/F To Grand Summary Page

Grand total amount in words .

Kshs----------

Tenderers

Name:----------

Official Stamp:----------

V.A.T. No.:---------- **P.I.N**----------

Witness:----------

Signature:----------

Date:----------

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 8 – PROVISIONAL SUM – CONTIGENCY.

Item	Description	Qty	Unit	Rate	Shs.	Cts.
	SECTION NO.8 - PROVISIONAL SUM: -					
	CONTIGENCIES:					
A.	Allow the Provisional sum of **Kenya Shillings: One Million (Kshs1,000,000:00)** to be spent in part or whole as directed by the Client or the consultants on his behalf. (for unforeseen).	Item				
	SECTION NO.8 - PROVISIONAL SUM. TOTAL CARRIED TO GRAND SUMMARY PAGE (GSP/1) ——			SHS.		

RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 9 – GRAND SUMMARY.

BEEQUE CONSULTANTS LTD.

TEACHERS SERVICE COMMISSION

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE - PARTITIONING WORKS AT 7TH FLOOR:

GRAND SUMMARY PAGE:

ITEM	DESCRIPTION			SHS.	CTS.
	SECTION NO. —	TITLE: —	FROM PAGE NO.—		
1.0	3 -	PRELIMINARIES AND CONDITIONS OF CONTRACT. (INCLUDING VAT)	(3.39)		
2.0	4 -	MEASURED BUILDER'S WORKS. (INCLUDING VAT)	(MS/1)		
3.0	5 -	ELECTRICAL INSTALLATIONS.	(5/49)		
4.0	6 -	INTERNAL PLUMBING AND DRAINAGE INSTALLATIONS.	(6/50)		
5.0	7 -	AIR CONDITIONING AND MECHANICAL VENTILATION.	(7/33)		
6.0	8 -	PROVISIONAL SUM. (CONTIGENCY)	(8.1)		
	TOTAL CARRIED TO FORM OF TENDER PAGE 3.7 AND 3.8 OF SECTION NO. 3 - PRELIMINARIES AND CONDITIONS OF CONTRACT: -		KSHS.		

Amount in words:

Kenya Shillings:- .....

.....

.....

Name of Tenderer: .....

.....

.....

Teachers Service Commission.

Main Summary

(GSP/1)

THE PROPOSED TSC HOUSE RENOVATION OF THE ROOF AND RE – PARTITIONING WORKS AT 7TH FLOOR.

SECTION NO. 10 – CONTRACT DRAWINGS.

SECTION NO.10- DRAWINGS:

Drawings used in preparation of these Bills of Quantities are listed below and may be inspected at the offices of Project Architect or Service Engineers.

	Drawing Number	Drawing Title
1.0	ARCHITECTURAL DRAWINGS:	**Revisions (01 - 07 & 02 - 07) - JULY 2019.**
	1. SK 1802/143 01 - 03	Roof and 7th Floor Plan Layout.
	2. SK 1802/143 02 - 03	Section, Elevation & Partition details.
	3. SK 1802/143 03 - 03	7th Floor Toilets & Lifts Lobby Layout and Sections.
	4. SK 1802/143 01 - 05	Outline presentation drawings for 7th floor plan layout.
	5. SK 1803/143 02 - 05	Roof Plan and Section (A - A)
	6. SK 1803/143 03 - 05	CEO's Ceiling Plan, partitions "A & B" sections.
	7. SK 1803/143 04 - 05	Lift Lobby layout plan, washroom layout plan, Lift Lobby Ceiling Plan and Section.
	8. SK 1803/143 05 - 05	Board Room Ceiling Plan, Board Room Layout Plan and Sections.
	9. SK 1802/143	Doors Schedule. Revised to 07 - 07.
	10. SK 1802/143	Doors Schedule Layout Plan. Revised to 06 - 07.
2.0	SERVICE ENGINEERS DRAWINGS:	
	2.1 MECHANICAL DRAWINGS:	
	1. MC/219/01/M01	Seventh Floor Plumbing Layout.
	2. MC/219/01/M02	Seventh Floor Drainage Layout.
	3. MC/219/01/M03	Seventh Floor Air Conditioning & Mechanical Ventilation Layout.
	2.2 ELECTRICAL DRAWINGS:	
	4. MC/219/01/E01	Seventh Floor Lighting Layout.
	5. MC/219/01/E02	Seventh Floor Power Layout.
	6. MC/219/01/E03	Electrical Symbols.

AUGUST 2019.

TEACHERS SERVICE COMMISSION

SITE VISIT FORM:

Name of the
Bidder…….

AREA	DETAILS	PLEASE TICK (√) IF VISITED

This is to certify that the named bidder visited the station and has been shown all the areas as required in the tender document.

TSC Rep. Name……...Signature……. Date……

Official Stamp

Contractors Rep: Name…… Signature……. Date……

Official Stamp

SITE VISIT CERTIFICATE

This is to certify that (IN BLOCK LETTERS)
Name:
Cell Phone No:
Email:
Being the authorized representative of (IN BLOCK LETTERS)

M/S [Firm/Company]

Official Tel No
Official Email:
Participated in the organized inspection visit of the site of the works for:
TSC/T/07/2019/2020: TENDER FOR COMPLETION OF THE PROPOSED DOUBLE OFFICE BLOCK AT BOMET
FOT TEACHERS SERVICE COMMISSION
Held on Day of Month 2019
Signed: (Employer's Representative)
(Name of Employer's Representative)

(Designation)

NOTE: 1. This form is to be completed at the time of the organized site visit.
2. Bidder to bring along with him duly filled site visit certificate during the site visit
TSC/T/07/2019/20120: TENDER FOR COMPLETION OF THE PROPOSED DOUBLE STOREY OFFICE BLOCK AT BOMET FOR TEACHERS SERVICE COMMISSION
FORM OF DECLARATION OF TENDERER'S KNOWLEDGE OF SITE

1. This is to certify that

*Name/s ……..
Being the authorized representative/Agent of [Name of Bidder] …….
Has undertaken the inspection of site in accordance with the instruction to Bidders, for purposes of bidding for
TSC/T/07/2019/2020: TENDER FOR COMPLETION OF THE PROPOSED DOUBLE STOREY OFFICE BLOCK AT
BOMET FOT TEACHERS SERVICE COMMISSION
…….

Held on…….. Day of…….20……

2. Having studied the tender document, I carefully examined the site to make myself familiar with the local conditions likely to influence the works and cost thereof.

3. I further certify that I am satisfied with the description of the works and I understand perfectly the scope of the works as specified and implied in the performance of the contract

SIGNED AND STAMPED…….

(Bidder's Representative)

**Bidder to bring along with him duly filled site visit certificate during the site visit

INTEGRITY DECLARATION

UNDERTAKING BY TENDERER ON ANTI – BRIBERY POLICY / CODE OF CONDUCT AND COMPLIANCE PROGRAMME

1. Each Tenderer must submit a statement, as part of the Tender documents, in either of the two given formats which must be signed personally by the Chief Executive Officer or other appropriate senior corporate officer of the Tendering company and, where relevant, of its subsidiary in the Kenya. If a Tender is submitted by a subsidiary, a statement to this effect will also be required of the parent company, signed by its Chief Executive Officer or other appropriate senior corporate officer.

2. Tenderers will also be required to submit similar No-bribery commitments from their subcontractors and consortium partners; the Tenderer may cover the subcontractors and consortium partners in its own statement, provided the Tenderer assumes full responsibility.

3. a) Payment to agents and other third parties shall be limited to appropriate compensation for legitimate services.

b) Each Tenderer will make full disclosure in the Tender documentation of the beneficiaries and amounts of all payments made, or intended to be made, to agents or other third parties (including political parties or electoral candidates) relating to the Tender and, if successful, the implementation of the contract.

c) The successful Tenderer will also make full disclosure [quarterly or semi- annually] of all payments to agents and other third parties during the execution of the contract.

d) Within six months of the completion of the performance of the contract, the successful Tenderer will formally certify that no bribes or other illicit commissions have been paid. The final accounting shall include brief details of the goods and services provided that they are sufficient to establish the legitimacy of the payments made.

e) Statements required according to subparagraphs (b) and (d) of this paragraph will have to be certified by the company's Chief Executive Officer, or other appropriate senior corporate officer.

4. Tenders which do not conform to these requirements shall not be considered.

5. If the successful Tenderer fails to comply with its No-bribery commitment, significant sanctions will apply. The sanctions may include all or any of the following:

a) Cancellation of the contract;

b) Liability for damages to the public authority and/or the unsuccessful competitors in the Tendering possibly in the form of a lump sum representing a pre-set percentage of the contract value (liquidated).

6. Tenderers shall make available, as part of their Tender, copies of their anti-Bribery Policy/Code of Conduct, if any, and of their-general or project - specific - Compliance Program.

7. The Government of Kenya has made special arrangements for adequate oversight of the procurement process and the execution of the contract, and has invited civil society and other competent Government Departments to participate in the oversight. Those charged with the oversight responsibility will have full access to all documentation submitted by Tenderers for this contract, and to which in turn all Tenderers and other parties involved or affected by the project shall have full access (provided, however, that no proprietary information concerning a Tenderer may be disclosed to another Tenderer or to the public).

ANTI-CORRUPTION DECLARATION PLEDGE

(Sections39, 40,41,42,43 & of the PPD Act, 2005)

I/We/Messrs……..

of Street, Building, P O Box……..
……....

Contact/Phone/E mail…….

declare that Public Procurement is based on a free and fair competitive Tendering process which should not be open to abuse.

I/We ……...

declare that I/We will not offer or facilitate, directly or indirectly, any inducement or reward to any public officer, their relations or business associates, in connection with

Tender/Tender No ……

for or in the subsequent performance of the contract if I/We am/are successful.

Authorized Signature.....

Name and Title of Signatory…….

NON-DEBARMENT STATEMENT

I/We/Messrs……..

of .....Street/avenue, ... Building,

P. O. Box <<<<<Code ...<<, of ..... (town), ... (Nationality),

Phone ..... E-mail .....<<<<<<<<<<<<<<<.

declare that I/We /Messrs ..... are not debarred from participating in public procurement by the Public Procurement Oversight Authority pursuant to pursuant to Section 62 of the Public Procurement & Asset Disposal Act, 2015

Dated this ..... day of ..... 20.....

Authorized Signature..... Official Stamp .....

Name and Title of Signatory…….....