

# PROPOSED MODERN ASSEMBLY CHAMBERS

FOR

COUNTY ASSEMBLY OF NAKURU

MAIN WORKS

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## BILLS OF QUANTITIES

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TENDER NAME: PROPOSED MODERN ASSEMBLY CHAMBERS

TENDER NUMBER: CAN/T/02/2019/2020- MAIN WORKS

**PROJECT MANAGERS/ARCHITECTS**

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**SERVICES ENGINEERS**

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**CLIENT**

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P.O. BOX 907-20100,  
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Website: [www.assembly.nakuru.go.ke](http://www.assembly.nakuru.go.ke)

**QUANTITY SURVEYORS**

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**CIVIL/STRUCTURAL ENGINEERS**

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**SEPTEMBER 2019**

**PART NO. 5**

**PARTICULAR PRELIMINARIES**

**PARTICULAR PRELIMINARIES**

ITEM	DESCRIPTION	
<p><b>A</b></p> <p><b>B</b></p>	<p><b>PRICING ITEMS FOR PRELIMINARIES</b></p> <p>Prices <b>shall be inserted</b> against items of 'preliminaries' in the tenderer's priced Bill of Quantities. The Contractor is advised to read and understand all preliminaries. Preliminary items not priced shall be deemed to have been included in the rates of items in the Bill of Quantities.</p> <p><b>DESCRIPTION OF THE WORKS</b></p> <p>The works to be carried out under this contract comprise construction of a 4 – storey Modern Assembly Chambers with all associated specialized services installations and external works. The total approximate built-up area is as follows: -</p> <ul style="list-style-type: none"> <li>01. Basement – 370 S.M.</li> <li>02. Ground Floor – 721 S.M</li> <li>03. First Floor – 531 S.M</li> <li>04. Second Floor – <u>747 S.M.</u></li> </ul> <p align="center"><b>TOTAL 2,369 S.M</b></p> <p>The building structure is in reinforced concrete foundation with both a flat slab roof as well as a pitched roof with steel truss members.</p> <p>Windows are generally aluminium framed infilled with clear and/or obscure glass. Doors are Aluminium glass doors &amp; hardwood panel doors externally, semi-solid and solid core flush doors internally.</p> <p>Wall finishes are generally plastered and painted in common areas and laminated mdf paneling in debating chambers. Granito wall tiles to internal wet areas.</p> <p>Ceiling finishes are plastered and painted slab soffits, Acoustic ceiling and Gypsum to office spaces.</p> <p>The external works include paving to parking, planting, grassing and other landscaping works.</p> <p>The Services Installations include General Electrical Works, Generator Works, Structured Cabling, Plumbing, Fire Fighting Installations, Air Conditioning &amp; Mechanical Ventilation Systems and Lift Installation Works</p>	
	<p><b>Carried to Collection</b></p>	<p align="right"><b>KSHS</b></p>

ITEM	DESCRIPTION	
A	<p><b>MEASUREMENTS</b> In the event of discrepancy between the Bill of Quantities and the actual works, the site measurements shall generally take precedence. However, such discrepancies between any Contract documents shall immediately be reported to the Project Manager in accordance with Clause 22 of the Conditions of Contract. The discrepancies shall then be treated as a variation and be dealt with in accordance with Clause 22 of the said Conditions.</p>	
B	<p><b>LOCATION OF THE SITE</b> The site is located within Nakuru Town.</p>	
C	<p><b>CLEARING AWAY</b> The Contractor shall remove all temporary works, rubbish, debris and surplus materials from the site as they accumulate, upon completion of the works, remove, clear away all plants, equipment, rubbish, unused materials, stains and leave in a clean tidy state to the satisfaction of the Project Manager. The whole of the works shall be delivered up clean, complete, and perfect condition in every respect to the satisfaction of the Project Manager.</p>	
D	<p><b>CLAIMS</b> It shall be a condition of this Contract that upon it becoming reasonably apparent to the Contractor that he has incurred losses and/or expenses due to any of the Contract Conditions, or by any other reason whatsoever, he shall present such claim or intent to claim notice to the Project Manager within the Contract period. No claim shall be entertained upon the expiry of the said Contract period.</p>	
E	<p><b>PAYMENTS</b> Payment will be done on monthly basis by the Project Manager on application by the Contractor. All payments shall be made by Client Department upon certification by the Project Manager. Subcontractors shall be paid through the Main Contractor. The Main Contractor must confirm that they have paid sub-contractors to be eligible for subsequent certificates.</p>	
F	<p><b>PREVENTION OF ACCIDENTS, DAMAGE OR LOSS</b> The Contractor is notified that the works are to be carried out on a fairly busy, high security conscious site where the Client is going on with other normal activities. He/she is therefore instructed to take reasonable care in the execution of the works so as to prevent accidents, damage or loss and disruption of normal activities being carried out by the Client. The Contractor shall allow in his rates any expenses he deems necessary by taking such care within the site.</p>	
	Carried to Collection	KSHS.

ITEM	DESCRIPTION
A	<p><b>WORKING CONDITIONS</b> The Contractor shall allow in his rates for any interference that he may encounter in the course of execution of the works.</p>
B	<p><b>SIGN BOARD.</b> Allow for providing, erecting, maintaining throughout the Contract period and clearing afterwards a sign board as designed and approved by the Project Manager.</p>
C	<p><b>LABOUR CAMPS</b> The Contractor shall <b>NOT</b> be allowed to house his labourers on site. Allow also for transporting workers to and from site during the Contract Period as may be necessary.</p>
D	<p><b>PROJECT MANAGER'S SITE OFFICE</b> Allow for maintaining throughout the project period temporary site office size 8x10m long comprising 50x100mm cypress timber structure, flat roof covered with 30gauge corrugated iron sheets, 32gauge corrugated iron sheet clad walls, 100mm thick set floor well compacted and finished smooth with cement and sand (1:3) screed, timber doors, windows and all necessary office furniture (15no. arm chairs, table, calendar, visitors and site instruction books). The Contractor shall also allow for the Project Manager use desktop computer complete with email connecting devices as well as provision for scratch cards and payment for email or internet connectivity expenses, stationery for the duration of the contract.</p>
E	<p><b>PRICING NOTES</b> The tenderer shall include for all cost in executing the whole of the works, including transport, replacing damaged items, fixing, all to comply with the said Conditions of Contract.</p>
	<p><b>Carried to Collection</b> <span style="float: right;"><b>KSHS</b></span></p>

ITEM	DESCRIPTION	
<p><b>A</b></p> <p><b>B</b></p> <p><b>C</b></p> <p><b>D</b></p> <p><b>E</b></p>	<p><b>SECURITY OF THE WORKS</b> The Contractor shall allow for providing adequate security for the works and workers during the Contract. No claim will be entertained for lack of enough security in this respect.</p> <p><b>URGENCY OF THE WORKS</b> The Contractor should note that these works are very urgent and must be completed within the agreed contract period.</p> <p><b>PAYMENT FOR MATERIALS ON SITE</b> All materials for incorporation in the works must be in the site stores before they are considered for payment, unless specifically exempted by the Project Manager. This is to include materials of the Main Contractor, Nominated Sub-Contractors and Nominated Suppliers.</p> <p><b>EXISTING SERVICES</b> Prior to the commencement of any work, the Contractor is to ascertain from the relevant authority the exact position, depth and level of all existing services in the and he/she shall make whatever provisions that may be required by the authority for support, maintenance and protection of such services.</p> <p><b>PHASED IMPLEMENTATION AND SECTIONAL COMPLETION</b> The Client based on various factors may consider sectional completion or phased implementation of the works. The Contractor will be instructed by the Project Manager to abide by such directions to suit the requirements of the Employer.  Tenderers are also notified that no contractual claims or increase in prices will be allowed due to any Phased implementation of the works  The last of the contract works are however to be completed within the overall Contract Completion Period.</p>	
	<p><b>Carried to Collection</b></p>	<p><b>KSHS</b></p>

ITEM	DESCRIPTION	
<p><b>A</b></p>	<p><b>PERFORMANCE BOND</b></p> <p>A performance bond in the form of unconditional bank guarantee required is 10% of the bid price. On award of contract, no payment on account for the works executed will be made to the Contractor until he has submitted the Performance Bond to the Project Manager duly signed, sealed and stamped from an approved bank.</p>	
<p><b>B</b></p>	<p><b>TENDER DOCUMENT</b></p> <p>Tender documents are listed in the Instruction to Tenderers and all documents in connection therewith, as specified above must be delivered in the addressed envelope which should be properly sealed and deposited at the offices as specified in the letter accompanying these documents.</p> <p>Tenders will be opened at the time specified in the letter accompanying these documents. Tenders delivered or received later than the above time will not be opened.</p>	
<p><b>C</b></p>	<p><b>VALUE ADDED TAX</b></p> <p>The Contractor's attention is drawn to the Legal Notice in the Finance Act part 3 Section 21(b) operative from 1<sup>st</sup> September, 1993 which requires payment of VAT on all contracts. The Contractor <b>must</b> therefore include V.A.T in their rates.</p>	
<p><b>D</b></p>	<p><b>FORM OF CONTRACT</b></p> <p>The form of Contract shall be as stipulated in the Republic of Kenya's Standard Tender Document for Procurement of Building Works (2006 Edition) included under this Proposal. The Conditions of Contract are also included herein (<b>Conditions of Contract</b>) Particulars of insertion to be made in the Appendix to the Contract Agreement will be found in Part No.4 Section II.</p>	
	<p><b>Carried to Collection</b></p>	<p><b>KSHS</b></p>

ITEM	DESCRIPTION	
	<p><b>COLLECTION</b></p> <p>Brought Forward from Page 5/1</p> <p>Brought Forward from Page 5/2</p> <p>Brought Forward from Page 5/3</p> <p>Brought Forward from Page 5/4</p> <p>Brought Forward from Page 5/5</p>	
	<p><b>TOTAL FOR PART NO. 5 CARRIED TO MAIN SUMMARY</b></p>	<p><b>KSHS</b></p>



**PART NO. 6**

**GENERAL PRELIMINARIES**

ITEM	DESCRIPTION	KSHS	CTS
	<b>GENERAL PRELIMINARIES</b>		
<b>A</b>	<p><b>PRICING OF ITEMS OF PRELIMINARIES AND PREAMBLES</b>  Prices shall be inserted against items of preliminaries in the Contractor's priced Bills of Quantities and Specifications.</p> <p>The Contractor shall be deemed to have included in his prices or rates for various items in the Bills of Quantities of Specifications for all costs involved in complying with all the requirements for the proper execution of the whole of the works in the Contract.</p>		
<b>B</b>	<p>Throughout these bills, units of measurement and terms are abbreviated and shall be interpreted as follows</p> <p><b>CM</b>                      Shall mean cubic metre</p> <p><b>SM</b>                      Shall mean square metre</p> <p><b>LM</b>                      Shall mean linear metre</p> <p><b>MM</b>                      Shall mean millimeter</p> <p><b>KG</b>                      Shall mean kilogram</p> <p><b>NO</b>                      Shall mean numbers</p> <p><b>PRS</b>                      Shall mean pairs</p> <p><b>BS</b>                      Shall mean the British Specification published by the British Standard Institution , 2 Park Street, London W.1 England</p> <p><b>DITTO</b>                      Shall mean the whole of the preceding description except as qualified in the description in which it occurs.</p> <p><b>M.S</b>                      Shall mean measured separately</p> <p><b>a.b.d</b>                      Shall mean as above described.</p>		
	<b>Carried to Collection</b>	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>EXCEPTION TO THE STANDARD METHOD OF MEASUREMENT</b></p> <p><b>Attendance;</b>  Clause B19(a) of the Standard Method of Measurement is deleted and the following Clause is substituted:-</p> <p>Attendance on nominated Sub-Contractors shall be given as an item in each case and shall be deemed to include: allowing use of standing scaffolding, mesh rooms, sanitary accommodation and welfare facilities; provision of special scaffolding where necessary, providing space for office accommodation, and for storage of plant and materials; providing light and water for the works; clearing away rubbish; unloading checking providing electric power and removing and replacing duct covers, pipe chasings and the like necessary for the execution and testing of Sub-Contractor's work and being responsible for the accuracy of the same.</p> <p><b>Fix Only;</b>  "Fix Only" Shall mean take delivery on site where necessary, distribute to position, hoist and fix only.</p>		
B	<p><b>THE EMPLOYER</b></p> <p>The term "Employer" and "Client" wherever used in the Contract Document shall be synonymous.</p>		
C	<p><b>PROJECT MANAGER</b></p> <p>The term "PM" wherever used in this Bills of Quantities shall be deemed to imply the Project Manager as defined in Conditions of Contract or such person or persons as may be duly authorized to represent him on behalf of the Employer. The Project Manager shall be deemed to mean Messrs. Dama Services Ltd. of P.O. Box 9656-00100, NAIROBI,  Tel. Nos. +254 020-2628155 or +254-722 299466  Email: <a href="mailto:damaservices@gmail.com">damaservices@gmail.com</a></p>		
D	<p><b>ARCHITECT</b></p> <p>The term Architect shall be deemed to mean Messrs. Dama Services Ltd. of P.O. Box 9656-00100, NAIROBI,  Tel. Nos. +254 020-2628155 or +254-722 299466  Email: <a href="mailto:damaservices@gmail.com">damaservices@gmail.com</a></p>		
E	<p><b>QUANTITY SURVEYOR</b></p> <p>The term "Quantity Surveyor" shall be deemed to mean the firm of Messrs Integra Consulting Limited of address P.O. Box 27974-00100 Nairobi.  Tel: 020-2713061.  Email: <a href="mailto:integra.consultingqs@gmail.com">integra.consultingqs@gmail.com</a>  <a href="mailto:info@integraconsulting.co.ke">info@integraconsulting.co.ke</a></p>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<b>SERVICES ENGINEER</b> The term "Electrical Engineer" shall be deemed to mean Messrs. Fluid Systems Engineers Ltd P.O Box. 41309 - 00100, Nairobi. Tel. No. +254 724507969 Email: <a href="mailto:fluidsystemengineers@gmail.com">fluidsystemengineers@gmail.com</a>		
B	<b>STRUCTURAL &amp; CIVIL ENGINEER</b> The term "Structural & Civil Engineer" shall be deemed to mean the Firm of Messrs. Inticom Consulting Ltd, P.O Box 14105 -00100, NAIROBI, Tel. No. +245 722343406 Email: <a href="mailto:inticomltd@gmail.com">inticomltd@gmail.com</a>		
C	<b>INTERIOR DESIGNERS</b> The term "Interior Designers" shall be deemed to mean the Firm of Messrs. Chege Designers, P.O Box 39228-00623 NAIROBI, Tel. No. 3741603/3743286 Email: <a href="mailto:info@chegedesigners.co.ke">info@chegedesigners.co.ke</a>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>PLANT, TOOLS AND VEHICLES</b></p> <p>Allow for providing all scaffolding, plants, tools and vehicles required for the works except in so far as may be stated otherwise herein and except for such items specifically and only required for use of nominated Sub-Contractors as described herein. No timber used for scaffolding, formwork, or temporary works of any kind should be afterwards in the permanent works.</p>		
B	<p><b>TRANSPORT</b></p> <p>Allow for transport of workmen, materials, etc. to and from the site at such hours and by such routes as may be permitted by competent Authorities in liaison with the PROJECT MANAGER.</p>		
C	<p><b>MATERIALS AND WORKMANSHIP</b></p> <p>All materials and workmanship used in the execution of the works shall be of the best quality and description unless otherwise stated. The Contractor shall order all materials to be obtained from overseas immediately after the contract is signed and shall also order for materials to be obtained from local sources as early as necessary to ensure that they are onsite when required for use in the works. The Bills of Quantities shall not be used for the purposes of ordering materials.</p>		
D	<p><b>SIGN FOR MATERIALS SUPPLIED</b></p> <p>The Contractor shall be required to sign receipts for all articles and materials supplied by the Project Manager at the time of taking delivery thereof, as having received them in good order and condition, and will thereafter be responsible for any such loss or damage and for replacement of such any loss with articles and/or materials which shall be supplied by the Project Manager at the current market prices including Customs Duty and VAT, all at the Contractors own cost and expenses, to the satisfaction of the PROJECT MANAGER.</p>		
E	<p><b>STORAGE OF MATERIALS</b></p> <p>The Contractor shall provide at his own risk and cost where directed on the site weather proof lock-up sheds and make good damaged or disturbed surfaces upon completion to the satisfaction of the PROJECT MANAGER. NOMINATED SUB-CONTRACTORS are to be made liable for the cost of any storage accommodation provided specifically for their use.</p>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>SAMPLES</b></p> <p>The Contractor shall furnish at his own cost any samples of materials or workmanship including concrete test cubes required for the works that may be called for by the PROJECT MANAGER for his approval. The PROJECT MANAGER may reject any materials or workmanship in his opinion not to the approved sample. The PROJECT MANAGER shall arrange for testing of such materials as he/she may at his/her discretion deem desirable, but the testing shall be made at the expense of the Contractor and not at the expense of the PROJECT MANAGER. The Contractor shall pay for the testing in accordance with the current scale of testing charges laid down by Ministry of Public Works</p> <p>The procedure for submitting samples of materials for testing and the method of marking for identification shall be laid down by the PROJECT MANAGER. The Contractor shall allow in his tender for such samples and tests except for those in connection with nominated subcontractor's work.</p>		
B	<p><b>GOVERNMENT ACT REGARDING WORK PEOPLE ETC.</b></p> <p>Allow for complying with Government Acts, order and Regulations in connection with the employment of Labor and other matters related to the execution of the works. In particular, the Contractor's attention is drawn to the provisions of the Factory Act of 1950 and the tenderer must include for all costs arising or resulting from compliance with any Act Order or Regulation relating to insurance, pensions, and holidays for work people or so the safety and welfare of the work people. The Contractor must make himself fully acquainted with current Acts and Regulations including police regulations regarding movements, housing, security and control of labor, labor camps, passes for transport etc. It is important that the Contractor before tendering obtain information regarding all such regulations and/or restrictions which may affect the organization of the works, supply and control of labor etc: and allow accordingly in his tender. No claim shall be entertained for lack of knowledge in this respect.</p>		
C	<p><b>SECURITY OF WORKS, ETC.</b></p> <p>The Contractor shall be entirely responsible for the security of the works, materials, plant, personnel etc, both his own and subcontractor's and must provide all necessary watching, lighting and precautions necessary to ensure security against theft, loss or damage and the protection of the public.</p>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>PUBLIC AND PRIVATE ROADS</b></p> <p>Maintain as required throughout the execution of the works and make good any damage to Public or Private roads arising from or subsequent upon the execution of the works to the satisfaction of the local and other competent authority and the Project Manager.</p>		
B	<p><b>EXISTING PROPERTY</b></p> <p>The Contractor shall take every precaution to avoid damage to existing property including roads, cables, drains and other services and he will be held responsible for and shall make good all such damages arising from the execution of this Contract at his own expense at his own cost to the satisfaction of the Project Manager.</p>		
C	<p><b>VISIT THE SITE AND EXAMINE DRAWINGS</b></p> <p>The Contractor is advised to examine the drawings and visit the site location of which is described in the Particular Preliminaries hereof in liaison with PROJECT MANAGER. He shall be deemed to have acquainted him/ herself therewith as to its nature, position, means of access or any other matter which may affect his tender. No claim arising from his failure to comply with this advice shall be entertained.</p>		
D	<p><b>ACCESS TO SITE AND TEMPORARY ROADS</b></p> <p>Means of accessing the site shall be agreed with the PROJECT MANAGER prior to commencement of the works and the Contractor must allow for building any necessary temporary access road for the transport of materials, plant and workmen as may be required for the complete execution of the works including the provision of temporary culverts, crossings or any other means of accessing the site. Upon completing the works, the Contractor shall remove temporary access roads, temporary culverts etc; and make good, reinstate all works and surfaces disturbed to the satisfaction of the PROJECT MANAGER.</p>		
E	<p><b>AREA TO BE OCCUPIED BY THE CONTRACTOR</b></p> <p>The area of the site which may be occupied by the Contractor for site office, storage and for the purpose of erecting workshops etc; shall be defined on site by the PROJECT MANAGER.</p>		
	<p>Carried to Collection</p> <p style="text-align: right;">KSHS</p>		

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>OFFICE FOR THE PROJECT MANAGER</b></p> <p>The Contractor shall erect and maintain where directed on site and afterwards dismantle the site office of the type noted in Particular Preliminaries, complete with furniture. He shall also provide strong metal trunk complete with strong hasp and staple fastening and two keys. He shall provide and maintain a lock-up type water or bucket closet for the sole use of the PROJECT MANAGER including connections to the drain where applicable in conformity with Public Health Authorities and shall provide services of a cleaner and pay all conservancy charges and keep both office and closet in a clean and sanitary condition from commencement to completion of the works and thereafter dismantle and make good disturbed surfaces. The office and the closet shall be erected before the contractor is permitted to commence the works. The Contractor shall make available on site as and when required by the PROJECT MANAGER a modern and accurate level together with leveling staff, ranging rods and 50 metre metallic or linen tape measure.</p>		
B	<p><b>WATER AND ELECTRICITY SUPPLY</b></p> <p>The Contractor shall provide at his own risk all necessary water, electric light and power required for use in the works. The Contractor must make his own arrangement for connection to the nearest suitable water mains available and for metering the water used. He must also provide temporary water tank and meters as required at his own cost and clear away when no longer required and make good on completion to the entire satisfaction of the PROJECT MANAGER. The Contractor shall pay all charges in connection herewith. No guarantee is given or implied that sufficient water will be available from mains and the Contractor must make his own arrangement for augmenting this supply at his own cost.</p>		
C	<p><b>SANITATION</b></p> <p>The sanitation of the works shall be arranged and maintained by the Contractor to the satisfaction of the PROJECT MANAGER.</p>		
	Carried to Collection	KSHS	



ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>PRIME COST OR PC SUMS</b></p> <p>The term "Prime Cost or PC Sum" whenever used in these Bills of Quantities shall be expended upon the authority of the Project Manager.</p>		
B	<p><b>PROGRESS CHART</b></p> <p>The Contractor shall provide within two weeks of Possession of Site and in Agreement with the PROJECT MANAGER a Progress Chart for the whole of the works including the works of Nominated Subcontractors; one copy to be handed to the PROJECT MANAGER and a further copy to be retained on site. Progress to be recorded and chart to be amended as necessary as the work proceeds.</p>		
C	<p><b>ADJUSTMENT OF PC SUMS</b></p> <p>In the final account, all P.C Sums shall be deducted and the amount properly expended upon the PROJECT MANAGER'S order in respect of each of them added to the Contract Sum. The Contractor shall produce to the PROJECT MANAGER such quotations, invoices or bills, properly receipted as may be necessary to show the actual details of the sums paid by the Contractor. Items of profit upon P.C Sums shall be adjusted in the final account pro-rata to the amount paid. Items of attendance (as previously described) following P.C Sums shall be adjusted to the physical extent of the work executed (not pro-rata to the amount paid) and shall apply even though the Contractors Priced Bills shows a percentage in the rate column in respect of them.</p> <p>Should the Contractor be permitted to tender and his tender be accepted of any work for which a P.C Sum is included in the Bills of Quantities, profit and attendance will be allowed as it would be if the work were executed by a Nominated Sub-contractor.</p>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>ADJUSTMENT OF PROVISIONAL SUMS</b></p> <p>In the final account all Provisional Sums shall be deducted and the amount properly executed in respect of them upon the PROJECT MANAGER's order added to the Contract Sum. Such works shall be valued as described for Variations in Condition No.22 of the Conditions of Contract, but the value of such work or articles for the work to be supplied by a Nominated Subcontractor, the value of such work or article to be supplied by a Nominated Supplier, the value of such work or article shall be treated as a P.C Sum and profit and attendance comparable to that contained in the priced Bills of Quantities for similar items added.</p>		
B	<p><b>NOMINATED SUB-CONTRACTORS</b></p> <p>When any work is ordered by the PROJECT MANAGER to be executed by nominated Sub-contractors, the Main Contractor shall enter into a Sub-contract as described in Condition No.7 of the Conditions of Contract and shall thereafter be responsible for such sub-contractors in every respect. Unless otherwise described, the Contractor is to provide for such Sub-contractors any or all the facilities in these Preliminaries. They should price for these with the nominated Subcontract Contractor's work concerned in the P.C Sums under the description "Add for Attendance".</p>		
C	<p><b>DIRECT CONTRACTS</b></p> <p>Notwithstanding the foregoing conditions, the Employer reserves the right to place a "Direct Contract" for any goods or services required in the works which are covered by a P.C Sum in the Bills of Quantities and to pay for the same direct. In any such instances, profit relative to the P.C Sum the priced Bills of Quantities will be adjusted as described for P.C Sums and allowed.</p>		
D	<p><b>ATTENDANCE UPON OTHER TRADESMEN ETC.</b></p> <p>The Contractor shall allow for the attendance of trade upon trade and shall afford any tradesmen or any other persons employed for the execution of any work not included in this Contract every facility for carrying out the work and for use in his ordinary scaffolding. The Contractor, however, shall perform such carting away for and making good after the work of such tradesmen or persons as may be ordered by the PROJECT MANAGER and the work will be measured and paid for to the extent executed at rates provided in these bills.</p>		
	Carried to Collection	KSHS	

ITEM	DESCRIPTION	KSHS	CTS
A	<p><b>INSURANCE</b></p> <p>The Contractor shall insure as required and as outlined in the Appendix to the Conditions of Contract. No payment on account in respect of the works shall be made to the Contractor unless he/she has satisfied the PROJECT MANAGER either by production of an Insurance Policy certificate that the foregoing Insurance Clauses have been complied within all respects. Thereafter the PROJECT MANAGER shall from time to time ascertain that premiums are duly paid up by the Contractor who shall if called upon to do so, produce receipted premium renewals for the PROJECT MANAGER's inspection.</p>		
B	<p><b>PROVISIONAL WORK</b></p> <p>All work described as "Provisional" in these Bills of Quantities is subject to re-measurement in order to ascertain the actual quantity executed for which payment will be made. All "Provisional" and other work liable to adjustment under this Contract be left uncovered for a reasonable period of time to enable all measurements needed to be taken by the PROJECT MANAGER. Immediately the work is ready for measuring, the Contractor shall give notice to the PROJECT MANAGER. If the Contractor makes default in these respects he/she shall if the PROJECT MANAGER so directs uncover the work to enable all measurements to be taken afterwards reinstate at his own expense.</p>		
C	<p><b>ALTERATION TO BILLS, PRICING ETC.</b></p> <p>Any unauthorized alteration or qualification made to the text of the Bills of Quantities may cause the Tender to be disqualified and in any case be ignored. The Contractor shall be deemed to have made allowance in his/her prices generally to cover any items against which no price has been inserted in the Priced Bills of Quantities. All items of measured work shall be priced in detail and the Tenders containing Lump Sums to cover trades or groups of work must be broken down to show the prices of each item before they will be accepted.</p>		
D	<p><b>BLASTING OPERATIONS</b></p> <p>Blasting shall only be allowed with the express permission of the PROJECT MANAGER in writing. All blasting operations shall be carried out at the Contractor's sole risk and cost in accordance with any Government regulations in force for the time being and any special regulations laid down by the PROJECT MANAGER governing the use and storage of explosives.</p>		
	<p><b>Carried to Collection</b></p>	<p><b>KSHS</b></p>	

ITEM	DESCRIPTION	KSHS	CTS
<b>A</b>	<p><b>MATERIALS ARISING FROM EXCAVATIONS</b></p> <p>Materials of any kind obtained from excavations shall be the property of the Client. Unless the PROJECT MANAGER directs otherwise such materials shall be dealt with as provided in the Contract. Such materials shall only be used in the works, in substitution for materials which the Contractor will otherwise have had to supply with the written permission of the PROJECT MANAGER. Should such permission be given, the Contractor shall make due allowance for materials so used at a price to be agreed.</p>		
<b>B</b>	<p><b>PROTECTION OF THE WORKS</b></p> <p>Provide protection of the whole of the works contained in the Bills of Quantities, including casing, casing up, covering or such other means as may be necessary to avoid damage to the satisfaction of the PROJECT MANAGER and remove such protection when no longer required and make good any damage which nevertheless have been done at completion free of cost to the to Government.</p>		
<b>C</b>	<p><b>REMOVAL OF RUBBISH ETC.</b></p> <p>Removal of rubbish and debris from the buildings and site as it accumulates and at the completion of the works and remove all plant, scaffolding and unused materials at completion.</p>		
<b>D</b>	<p><b>WORKS TO BE DELIVERED UP CLEAN</b></p> <p>Clean and flush all gutters, rainwater and waste pipes, manholes and drains, wash (except where such treatment might cause damage) and clean all floors, sanitary fittings, glass inside and outside and any other parts of the works and remove all marks, blemishes, stains and defects from joinery, fittings and decorated surfaces generally, polish door furniture and bright parts of metal work and leave the whole of the buildings water tight, clean, perfect and fit for occupation to the approval of the PROJECT MANAGER.</p>		
	<p><b>Carried to Collection</b></p>	<b>KSHS</b>	

ITEM	DESCRIPTION	KSHS	CTS
<b>A</b>	<p><b>GENERAL SPECIFICATION.</b></p> <p>For the full description of materials and workmanship, method of execution of the works and notes for pricing, the Contractor is referred to Ministry of Public Works and Housing General Specification dated 1976 or any subsequent revision thereof, and which shall be allowed for in all respects unless it conflicts with the General Preliminaries, Trade Preambles or other items in these Bills of Quantities.</p>		
<b>B</b>	<p><b>TRAINING LEVY</b></p> <p>The Contractor's attention is drawn to legal notice No. 237 of October, 1971 which requires payment by Contractor of a Training levy at the rate of 1/4% of the Contract Sum on all Contracts of more than Kshs. 500,000.00 in value.</p>		
<b>C</b>	<p><b>MATERIALS ON SITE</b></p> <p>All materials for incorporation into the works must be stored on or adjacent to the site before payment is effected unless specifically exempted by the PROJECT MANAGER. This includes the materials of the Main Contractor, Nominated Subcontractors and Nominated Suppliers.</p>		
<b>D</b>	<p><b>HOARDING</b></p> <p>The Contractor shall enclose the site of the works under construction with a hoarding 2400mm high consisting of iron sheets on 100x50mm timber posts firmly secured at 1800mm centres with two 75x50mm timber rails. The Contractor is in addition required to take precautions necessary for the safe custody of the works, materials, plant, public and Employer's property on the site.</p>		
<b>E</b>	<p><b>CONTRACTOR'S SUPERINTENDENCE/ SITE AGENT</b></p> <p>The Contractor shall constantly keep on the works a literate English and Kiswahili speaking Agent Representative, competent and experienced in the kind of work involved who shall give his whole experience in the kind of work involved and shall give his whole time to the superintendence of the works. Such Agent or Representative shall receive on behalf of the Contractor all directions and instructions from the PROJECT MANAGER and such directions shall be deemed to have been given to the Contractor in accordance with the Conditions of Contract.</p>		
	<b>Carried to Collection</b>	<b>KSHS</b>	

ITEM	DESCRIPTION	
	<p><b>COLLECTION</b></p> <p>Brought Forward from Page 6/1</p> <p>Brought Forward from Page 6/2</p> <p>Brought Forward from Page 6/3</p> <p>Brought Forward from Page 6/4</p> <p>Brought Forward from Page 6/5</p> <p>Brought Forward from Page 6/6</p> <p>Brought Forward from Page 6/7</p> <p>Brought Forward from Page 6/8</p> <p>Brought Forward from Page 6/9</p> <p>Brought Forward from Page 6/10</p> <p>Brought Forward from Page 6/11</p> <p>Brought Forward from Page 6/12</p>	
	<p><b>TOTAL FOR PART NO. 6 CARRIED TO MAIN SUMMARY</b></p>	<p><b>KSHS</b></p>

**PART NO. 7**  
**BUILDER'S WORK**

		Qty	Unit	Rate	KSHS CTS
a	<p><b>DEMOLITIONS &amp; REMOVALS (ALL PROVISIONAL)</b></p> <p><b>(NOTE: Site vist is highly recomended since there will be no acceptance of review of cost due to lack of knowledge of any information while quoting in this section; Contractors to allow for providing support of existing structures not to be demolished; maintaining for the duration of the construction period; Adapting to allow progress of new works to the satisfaction of the Structural Engineers and Architect; All salvaged material to remain as property of the client.)</b></p> <p><b>OLD OFFICES</b></p> <p>Single storey Office block; overall dimensions 25 x 15 x 3 m high to eaves; comprising natural stone or block walling, galvanised corrugated iron sheet roof on timber trusses; demolition down to ground floor level; grub up all foundations; Hand over redeemed material to the employer and cart away resulting debri from site; (Approximately 310 sqm)</p>				
To Collection KSHS					



PROPOSED MODERN ASSEMBLY CHAMBERS					
		Qty	Unit	Rate	KSHS CTS
<b>Summary</b>					
DEMOLITION Page 1					
				To Summary KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<b>D20 EXCAVATING AND FILLING;</b>					
	<b>SITE PREPARATION;</b>					
	Clearing site vegetation, grubbing up roots and filling up voids left with selected excavated material;					
a	Bushes, shrubs, undergrowth or the like and cart away from site;	944	m2			
	<b>EXCAVATING</b>					
	Topsoil for preservation;					
b	200 mm average depth starting from existing ground level;	944	m2			
	Basement excavation and the like;					
c	Not exceeding 1.5 m deep starting from stripped level;	1278	m3			
d	Over 1.5 m but not exceeding 3.0 m deep;	1278	m3			
e	Over 3.0 m but not exceeding 4.5 m deep;	426	m3			
	Excavations for column bases;					
f	Not exceeding 1.5 m deep starting from stripped level;	12	m3			
g	Over 1.5 m but not exceeding 3.0 m deep;	12	m3			
h	Over 3.0 m but not exceeding 4.5 m deep;	4	m3			
	Excavation for strip foundation footing;					
i	Not exceeding 1.5 m deep starting from stripped level;	180	m3			
	Excavation for lift pits and ducts;					
j	Not exceeding 1.5 m deep starting from reduced level;	42	m3			
k	Over 1.5 m but not exceeding 3.0 m deep;	14	m3			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
	<b>D20 EXCAVATING AND FILLING; continued ...</b>					
	Extra over excavation irrespective of depth for breaking out;					
a	Soft rock;	65	m3			
b	Hard rock;	97	m3			
	<b>DISPOSAL</b>					
	Excavated material;					
c	Off site to contractor's tip;	2013	m3			
	<b>FILLING TO EXCAVATIONS</b>					
	Selected excavated material to make up levels compacted in layers not exceeding 225mm to approval of the Structural Engineer;	462	m3			
	<b>HARDCORE</b>					
e	Well compacted in layers of 150mm maximum thickness to approval of the Structural Engineer;	1233	m3			
f	300 mm thick; well compacted in layers of 150mm maximum thickness to approval of the Structural Engineer;	219	m2			
	<b>QUARRY DUST BLINDING</b>					
	Blinding on surfaces of hardcore fill;					
g	50 mm thick;	219	m2			
	<b>HERBICIDES / INSECTICIDES</b>					
	Applying to surfaces					
h	Apply anti-termite treatment; "Termidor" or equal and approved in accordance with manufacturers' printed specifications and ten years guarantee;	939	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
<b>SURFACE TREATMENTS</b>						
	Trimming bottoms of excavations to achieve uniformity					
a	Bottoms of basement	720	m2			
	Planking and Strutting					
b	Labour and materials; to uphold the sides of excavations; generally		item			
	Disposal of Water					
c	Labour and materials; Keeping excavations free from general water		item			
<b>E05 IN SITU CONCRETE CONSTRUCTION GENERALLY</b>						
<b>50 mm thick mass concrete 1:4:8 foundation blinding;</b>						
	To column bases;					
d	Generally;	8	m2			
	To strip foundation footings;					
e	Generally;	120	m2			
	To raft foundation;					
f	Generally;	720	m2			
	To lift base;					
g	Generally;	28	m2			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
	<b>Vibrated Reinforced Concrete; Class 25(20mm agg); mix 1:1.5:3;</b>					
a	Floor bed; 150 mm thick;	145	m2			
b	Suspended slab; 250 mm thick;	430	m2			
c	Column Bases; Generally;	4	m3			
d	Strip foundation footings; Generally;	36	m3			
e	Columns; Generally;	111	m3			
f	Beams; Generally;	97	m3			
g	Raft foundation; Generally;	594	m3			
h	Retaining wall; 200 mm thick;	462	m2			
i	Lift base; Generally;	14	m3			
j	Lift shaft and duct walls; 200 mm thick;	104	m2			
k	Ramp; 200 mm thick;	45	m2			
To Collection KSHS						

		Qty	Unit	Rate	KSHS	CTS
<b>E20 FORMWORK FOR IN SITU CONCRETE</b>						
<b>SAWN FORMWORK</b>						
	Sides of Strip Foundation Footings;					
a	Over 300 mm wide;	72	m2			
	Sides of Column bases;					
b	Over 300 mm wide;	8	m2			
	Sides of Raft Foundation;					
c	Over 300 mm wide;	73	m2			
	Sides of Retaining wall;					
d	Over 300 mm wide;	924	m2			
	Sides of Columns;					
e	Over 300 mm wide;	578	m2			
	Sides of Beams;					
f	Over 300 mm wide;	780	m2			
	Sides of Lift Base;					
g	Over 300 mm wide;	15	m2			
	Sides of Lift shaft and duct walls;					
h	Over 300 mm wide;	268	m2			
	Extra over for boxing formwork;					
i	Size 1000 x 2200 mm high;	2	No.			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
<b>E20 FORMWORK FOR IN SITU CONCRETE; continued...</b>						
<b>SAWN FORMWORK; continued...</b>						
	Horizontal soffits of Suspended Slab;					
a	Over 300 mm wide;	430	m2			
	Edges of Suspended Slab;					
b	Over 225 mm but not exceeding 300 mm girth;	128	m			
	Edges of Floor Bed;					
c	Over 150 mm but not exceeding 225 mm girth;	68	m			
	Edges of Ramp;					
d	Over 150 mm but not exceeding 225 mm girth;	29	m			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
<b>E30 REINFORCEMENT FOR IN SITU CONCRETE</b>						
<b>REINFORCEMENT</b>						
Fabric reinforcement to BS 4483; reference A 142 mesh 200 x 200 mm weight 2.22kgs per square metre (measured net - no allowance made for laps); including bends, tying wire, distance blocks and spacers;						
a	Generally;	145	m2			
<b>Bars; high yield steel; cold worked; b.s. 4449 - 2005, including bends, hooks tying wire, distance blocks and spacers all in position as necessary;</b>						
Deformed Bars						
b	8 mm Diameter;	13843	Kg			
c	10 mm Diameter;	41529	Kg			
d	12 mm Diameter;	55371	Kg			
e	16 mm Diameter;	41529	Kg			
f	20 mm Diameter;	55371	Kg			
g	25 mm Diameter;	27686	Kg			
h	32 mm Diameter;	41529	Kg			
<b>F20 NATURAL STONE WALLING</b>						
<b>Natural quarry stone work rough chissel dressed; jointed in cement sand mortar (1:3)</b>						
Walls						
i	200 mm thick	690	m2			
					To Collection KSHS	



		Qty	Unit	Rate	KSHS	CTS
<b>F30 ACCESSORIES AND SUNDRY ITEMS FOR BRICK, BLOCK AND STONE WALLING</b>						
<b>Waterproofing;</b>						
Crystalline based waterproofing material as "VENDEX", "SIKA", "MASTERSEAL" or equivalent and approved; laid in accordance with the suppliers printed specifications and to the approval of the Engineer; on and including 10 years guarantee;						
a	50 mm thick to bed of basement;	720	m2			
b	Ditto to retaining walls;	462	m2			
	50 x 50 mm angle fillet dressing at joints;	132	m			
<b>Water bars</b>						
PVC bulb-edge strip as "SIKA" or other equal and approved water bar, in concrete laid to manufacturers specifications;						
c	150 mm wide;	132	m			
<b>DAMP PROOF COURSES</b>						
On surfaces						
d	200 mm wide;	230	m			
<b>Polythene based damp proof Membrane 1000 gauge in two layers;</b>						
On surfaces						
e	Over 300 mm wide	219	m2			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
	<b>M10 SAND CEMENT /RENDERING</b>					
	<b>20 mm thick Cement and sand (1:3) rendering; finishing trowelled smooth</b>					
	Walls					
a	Over 300 wide	80	m2			
	<b>M12 TROWELLED BITUMEN</b>					
	<b>Lightweight bituminous insulating paint;</b>					
	Walls					
b	Over 300 wide; external	80	m2			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		SUBSTRUCTURE (ALL PROVISIONAL)				
		Qty	Unit	Rate	KSHS	CTS
<b>Collection</b>						
Total from Page 3						
Total from Page 4						
Total from Page 5						
Total from Page 6						
Total from Page 7						
Total from Page 8						
Total from Page 9						
Total from Page 10						
Total from Page 11						
				To Summary KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS					FRAME	
		Qty	Unit	Rate	KSHS	CTS
<b>E05 IN SITU CONCRETE CONSTRUCTION</b>						
<b>GENERALLY</b>						
<b>Vibrated Reinforced Concrete; Class 25(20mm agg); mix 1:1.5:3;</b>						
Suspended slabs;						
a	200 mm thick;	758	m2			
b	250 mm thick;	923	m2			
Steps, staircases or strings;						
c	Generally;	162	m3			
Columns;						
d	Generally;	209	m3			
e	Ditto but grooved to architect's details	4	m3			
Beams;						
f	Generally;	264	m3			
Lift shaft and duct walls;						
g	200 mm thick;	350	m2			
Gutters						
h	Generally;	56	m3			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS					FRAME	
		Qty	Unit	Rate	KSHS	CTS
<b>E20 FORMWORK FOR IN SITU CONCRETE</b>						
<b>SAWN FORMWORK</b>						
	Edges of suspended slabs;					
a	Over 150mm but not exceeding 225 mm wide;	263	m			
b	Over 225 mm but not exceeding 300 mm wide;	206	m			
	Edges of Risers;					
c	Over 75 mm but not exceeding 150 mm wide;	15	m			
d	Over 225 mm but not exceeding 300 mm wide;	64	m			
e	Over 300 mm wide;	80	m2			
	Sides to columns;					
f	Over 300 mm wide;	1525	m2			
g	Ditto but curved on plan to any radius;	35	m2			
	Sides and soffits of beams;					
h	Over 300 mm wide;	1829	m2			
	Soffits of suspended slabs;					
i	Over 300 mm wide;	1681	m2			
	Sides and soffits of gutters;					
j	Over 300 mm wide;	717	m2			
	Sloping soffits of steps, stairs or strings;					
k	Over 300 mm wide;	380	m2			
	Sides of steps, stairs or strings;					
l	Over 300 mm wide;	60	m2			
	Sides of Lift shaft and duct walls;					
m	Over 300 mm wide;	700	m2			
	Extra over for boxing formwork;					
n	Size 1000 x 2200 mm high;	6	No.			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS					FRAME	
		Qty	Unit	Rate	KSHS	CTS
<b>E30 REINFORCEMENT FOR IN SITU CONCRETE</b>						
<b>REINFORCEMENT</b>						
<b>Bars; high yield steel; cold worked; b.s. 4449 - 2005, including bends, hooks tying wire, distance blocks and spacers all in position as necessary;</b>						
Deformed Bars;						
a	8 mm Diameter;	10291	Kg			
b	10 mm Diameter;	30871	Kg			
c	12 mm Diameter;	41161	Kg			
d	16 mm Diameter;	30871	Kg			
e	20 mm Diameter;	41161	Kg			
f	25 mm Diameter;	20581	Kg			
g	32 mm Diameter;	30871	Kg			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<p><b>Collection</b></p> <p>Total from Page 13</p> <p>Total from Page 14</p> <p>Total from Page 15</p>					
To Summary KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS					ROOF	
		Qty	Unit	Rate	KSHS	CTS
	<p><b>F21 NATURAL STONE MASONRY WALLING/DRESSINGS</b></p> <p>Approved local stone; machine cut or fine chisel dressed; bedded and jointed in cement sand mortar (1:4);</p> <p>Parapet Walls</p> <p>a      200 mm thick walls;</p>	243	m2			
	<p><b>F31 PRECAST CONCRETE SILLS/LINTELS/COPINGS/FEATURES</b></p> <p><b>PRECAST CONCRETE</b></p> <p>Copings</p> <p>b      275 x 75 mm thick precast concrete class 20/20 coping, splayed top; weathered and twice throated; finished fair on exposed surfaces bedded straight on masonry parapet walls;</p>	270	m			
					To Collection KSHS	



		Qty	Unit	Rate	KSHS	CTS
<b>G10 STRUCTURAL STEEL FRAMING (PROVISIONAL)</b>						
<b>Truss frame fabrication (Hoisted and fixed to a height not exceeding 11,000 mm above ground floor level); Prepare and apply two coats zinc chromate primer on surfaces of structural steelwork; one before and one after erection;</b>						
The following in 8 No. Trusses Type T1						
a	100 x 50 x 3.0 mm thick RHS: Top members (6.78 kgs/m)	1188	kg			
b	100 x 50 x 3.0 mm thick RHS: Bottom members (6.78 kgs/m)	1140	kg			
c	50 x 50 x 3.0 mm thick SHS: Internal members (4.43 kgs/m)	761	kg			
The following in 3 No. Trusses Type T2						
d	100 x 50 x 3.0 mm thick RHS: Top members (6.78 kgs/m)	440	kg			
e	100 x 50 x 3.0 mm thick RHS: Bottom members (6.78 kgs/m)	272	kg			
f	50 x 50 x 3.0 mm thick SHS: Internal members (4.43 kgs/m)	233	kg			
The following in 4 No. Trusses Type T3						
g	100 x 50 x 3.0 mm thick RHS: Top members (6.78 kgs/m)	220	kg			
h	100 x 50 x 3.0 mm thick RHS: Bottom members (6.78 kgs/m)	204	kg			
i	50 x 50 x 3.0 mm thick SHS: Internal members (4.43 kgs/m)	139	kg			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
<b>G10 STRUCTURAL STEEL FRAMING (PROVISIONAL) continued...</b>						
<b>Truss frame fabrication (Hoisted and fixed to a height not exceeding 11,000 mm above ground floor level); Prepare and apply two coats zinc chromate primer on surfaces of structural steelwork; one before and one after erection; continued..</b>						
The following in 4 No. Trusses Type T4						
a	100 x 50 x 3.0 mm thick RHS: Top members (6.78 kgs/m)	562	kg			
b	100 x 50 x 3.0 mm thick RHS: Bottom members (6.78 kgs/m)	273	kg			
c	50 x 50 x 3.0 mm thick SHS: Internal members (4.43 kgs/m)	273	kg			
d	50 x 50 x 3.0 mm thick SHS: common rafter (4.43 kgs/m)	6412	kg			
e	100 x 50 x 20 x 2 mm thick ZS1 Purlins spaced at 1100mm centers (5.40 kg/m)	3105	kg			
f	Plates, Cleats, Bolts and the like; Allow for plates, cleats, bolts, anti-sag rods etc.	3045	kg			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS					ROOF	
		Qty	Unit	Rate	KSHS	CTS
	<p><b>H31 METAL PROFILED/FLAT SHEET CLADDING/COVERING /SIDING</b></p> <p><b>FULBORA OUTLETS</b></p> <p>Gutters and linings</p> <p>150 mm diameter galvanized mild steel fulbora rainwater outlet at 5000 mm centres complete with dome type grating, flange, raising ring, pvc adapter, mesh trap and other accessories including connecting to down pipe;</p>	58	No			
a						
	<p>Fascia / Barge Board;</p> <p>18 gauge galvanised iron sheet 400 mm wide fascia board; welded to end of ms steel sections(m.s)</p>	196	m			
b						
	<p>Metal Gutters;</p> <p>200 mm wide x 200 mm high, 800 mm girth galvanised iron sheet 16 gauge gutter, welded to GI fascia board (m.s);</p>	196	m			
c						
	<p>Flashings;</p> <p>26 gauge preformed galvanized metal sheet flashing; fixed with galvanized screws to ends Zed Purlins and other side dressed over masonry wall to Structural Engineer's detail drawings;</p>					
d	<p>570 mm girth;</p>	134	m			
	<p><b>PLASTIC PROFILES</b></p> <p>Supply and fix approved uPVC rainwater system with solvent welded seal ring or dry joints to manufacturer's printed instructions;</p>					
e	<p>Heavy gauge; 150mm diameter grey down pipe;</p>	630	m			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<p><b>H70 MALLEABLE METAL SHEET PREBONDED COVERINGS</b></p> <p><b>Supply and fix Decra roofing sheet covering; from approved manufacturer and of approved colour and size, including edging trim, firmly secured with galvanised steel screws or nails with end and side laps; fixed onto and including 50 x 50 mm timber battens at 600 mm c/c; with all necessary curvatures, hoisting, placing and connections;</b></p> <p>Coverings; fixing every tile on every fourth course with two 38 mm galvanised nails; to 75 mm laps;</p>					
a	Sloping not exceeding 30 degrees from horizontal;	775	m2			
b	350 mm Ridge cap to match	72	m			
c	350 mm Valleys to match ; (GI plain sheet)	85	m			
d	150 mm Hip cap to match;	112	m			
				To Collection KSHS		

		Qty	Unit	Rate	KSHS	CTS
	<p><b>J21 MASTIC ASPHALT ROOFING/INSULATION/FINISHES</b></p> <p><b>APP waterproofing or equal and approved water proofing agent laid in accordance with the manufactures printed specifications; with and including a ten years guarantee</b></p> <p>Roofing to falls and cross falls not exceeding 15 degrees from horizontal;</p>					
a	To flat roof; over 300 mm wide;	430	m2			
b	Ditto to gutters;	352	m2			
c	Ditto to parapet walls;	243	m2			
d	50 x 50 mm angle fillet dressing at joints;	281	m			
e	200 mm wide skirtings and dressings around fulbora pipe outlets;	37	m			
	<p><b>M60 PAINTING/CLEAR FINISHING</b></p> <p><b>Touch up primer; prepare and apply three coats gloss oil paint on metal surfaces as described in :-</b></p> <p>General surfaces of fascia / barge board;</p>					
f	Over 300 wide; externally;	212	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS					ROOF	
		Qty	Unit	Rate	KSHS	CTS
<b>Collection</b>						
	Total from Page 17					
	Total from Page 18					
	Total from Page 19					
	Total from Page 20					
	Total from Page 21					
	Total from Page 22					
					To Summary KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				STAIRS		
		Qty	Unit	Rate	KSHS	CTS
<b>E05 IN SITU CONCRETE CONSTRUCTION</b>						
<b>GENERALLY</b>						
<b>Reinforced concrete; class 25/20; mix 1:1.5:3;</b>						
Staircases						
a	Generally	19	m3			
Landings;						
b	150 mm Thick landing;	15	m2			
<b>E20 FORMWORK FOR IN SITU CONCRETE</b>						
<b>SAWN FORMWORK</b>						
Soffits of landings						
c	Over 300 mm wide;	15	m2			
Sloping soffits of stairs;						
d	Over 300 mm wide;	43	m2			
Edges of landing;						
e	Over 75 mm wide but not exceeding 150 mm high	28	m			
Edges of risers;						
f	Over 75 mm wide but not exceeding 150 mm high	116	m			
Open edge of strings;						
g	300 mm extreme width; including cutting to profile;	28	m			
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS		STAIRS				
		Qty	Unit	Rate	KSHS	CTS
<b>E30 REINFORCEMENT FOR IN SITU CONCRETE</b>						
<b>Bars; high yield steel; cold worked; b.s. 4449 - 2005, including bends, hooks tying wire, distance blocks and spacers all in position as necessary;</b>						
Deformed Bars;						
a	8 mm Diameter;	765	Kg			
b	10 mm Diameter;	1339	Kg			
c	12 mm Diameter;	1722	Kg			
<b>L30 STAIRS /WALKWAYS /BALUSTRADES</b>						
<b>Stainless steel balustrading; comprising of 50 mm diameter x 3 mm thick stainless steel handrail; 40 mm diameter x 3 mm thick hollow section baluster at 1000 mm centres; 900 x 800 mm high in 12 mm thick laminated glass panels firmly secured to balusters; including 3 mm thick x 50 mm diameter bottom plate around baluster; all welded, grounded smooth and fixed on floors with lugs and steel plate; all to architect's detailed drawings;</b>						
Staircases;						
d	900 mm high;	34	m			
Ramps;						
e	900 mm high;	30	m			
Corridor;						
f	900 mm high;	13	m			
					To Collection KSHS	



PROPOSED MODERN ASSEMBLY CHAMBERS				STAIRS		
		Qty	Unit	Rate	KSHS	CTS
<b>M10 SAND CEMENT /CONCRETE SCREEDS /FLOORING</b>						
<b>30 mm thick cement and sand (1:4) flooring; wood floated receive Granito floor tiles (m.s)</b>						
	Landing Floors;					
a	Over 300 mm wide;	15	m2			
	Ramp Floors;					
b	Over 300 mm wide;	45	m2			
	Treads					
c	300 mm wide	107	m			
	Risers					
d	150 mm high	116	m			
	Skirtings					
e	100 mm high	19	m			
<b>M20 PLASTERED /RENDERED</b>						
<b>Plaster cement and sand 1:3; work to blockwork;</b>						
12 mm thick in two coats;						
f	Over 300 mm; sloping soffits of staircase;	43	m2			
g	Over 300 mm; soffits of landings;	15	m2			
h	Over 300 mm; sides of staircase;	28	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		STAIRS				
		Qty	Unit	Rate	KSHS	CTS
<b>M40 TILING</b>						
<b>NOTE:</b>						
<b>Tenderer to Add for taking delivery and fixing on the P.C. Rate provided for fixing of tiles;</b>						
Approved size non-slip granito tiles - P.C. Rate of Kshs. 3,500 per square metre including fixing on cement sand screed backing (m.s);						
a	Landings; over 300 mm wide	15	m2			
b	Ramps; over 300 mm wide	45	m2			
c	100 mm high; skirtings;	49	m			
d	300 mm wide; treads, grooved and bull-nosed	107	m			
e	150 mm high; Risers;	113	m			
f	300 mm wide; extreme to open strings	34	m			
<b>M60 PAINTING/CLEAR FINISHING</b>						
<b>PAINTING</b>						
Prepare by skimming plastered surface; apply one undercoat; two coats Premium Quality Silk Vinly paint to Crown paints or equal and approved;						
g	Over 300 girth; to smooth plastered surfaces; internally; soffits of staircase	43	m2			
h	Over 300 girth; to smooth plastered surfaces; internally; soffits of landing	15	m2			
i	Over 300 mm wide; smooth plastered surfaces; sides of staircase	28	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS				STAIRS	
		Qty	Unit	Rate	KSHS CTS
<b>Collection</b>					
	Total from Page 24				
	Total from Page 25				
	Total from Page 26				
	Total from Page 27				
				To Summary KSHS	0.00

PROPOSED MODERN ASSEMBLY CHAMBERS					WALLS	
		Qty	Unit	Rate	KSHS	CTS
<b>F21 NATURAL STONE / MASONRY WALLING</b>						
<b>Approved local stone; squared; machine cut or fine chisel dressed; bedding and jointed in cement sand mortar (1:4);</b>						
	External walling;					
a	200 mm thick;	1998	m2			
b	100 mm thick;	125	m2			
Internal walling;						
c	200 mm thick;	1602	m2			
d	150 mm thick;	19	m2			
e	100 mm thick;	289	m2			
<b>Approved Precast concrete louver blocks; squared; bedding and jointed in cement sand mortar (1:4) and recessed pointing one side in cement sand mortar (1:4) as work proceeds (m.s); louver blocks</b>						
f	200mm thick	48	m2			
<b>F21 ALUMINIUM PARTITIONING</b>						
<b>Supply and fix powder coated Aluminium partition not exceeding 3500mm high; standard hollow or angle sections; 75 x 50mm horizontal and vertical frame members mitred at corners including reinforcing cleats and all necessary ironmongery; fixing with steel screws; plugging or fixing to concrete, block work or stone work; complete with 6 mm thick clear glass panel with 400mm high aluminium louvers to top section; sealing with mastic: oiling and adjusting on completion;</b>						
g	Over 300 mm wide	51	m2			
<b>WINDOW FILM</b>						
<b>Supply and fix approved obscure window film; to Aluminium partitions; all to Architect's drawings;</b>						
h	Over 300 mm wide;	51	m2			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<b>Collection</b>  Total from Page 29					
				To Summary KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS				WINDOWS		
		Qty	Unit	Rate	KSHS	CTS
	<b>F31 PRECAST CONCRETE CILLS</b>					
	<b>Approved pre-cast concrete cill: bedded and jointed in cement (sand (1:3) mortar: pointed in matching coloured cement;</b>					
	Cills;					
a	265 x 50 mm thick cill; once weathered and throated;	190	m			
	<b>G20 CARPENTRY/TIMBER FRAMING</b>					
	<b>WROT HARDWOOD: PRIME GRADE;</b>					
	Pelmet/curtain boxes;					
b	250 x 25 mm Pelmet fascia	190	m			
c	150 x 25 mm Pelmet front	190	m			
d	250 x 150 x 25 mm Pelmet box ends	160	No			
e	150 x 25 mm Window board; plugged	190	m			
f	25 mm Quadrant beading	190	m			
g	50 x 25 mm Bearers, plugged	190	m			
	<b>H75 STRIP STEEL</b>					
	<b>Medium duty steel curtain rail/track to specification;</b>					
	Medium duty steel curtain rail or other equal and approved I-section complete with fixing brackets, rollers 150 mm laps, runners at 100 mm centres and end stops;	190	m			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				WINDOWS		
		Qty	Unit	Rate	KSHS	CTS
<b>L10 WINDOWS</b>						
<b>ALUMINIUM WINDOWS;</b>						
<b>Supply and fix powder coated Aluminum Window; standard hollow or angle sections; frames mitred at corners including reinforcing cleats and all necessary ironmongery;</b>						
Complete with 4 mm thick clear glass; fixing with aluminium screws; plugging or fixing to concrete, blockwork or stone work; sealing with mastic; oiling and adjusting on completion; all to referenced Architect's drawings;						
a	Window overall size 1800 x 1600 mm high; Sliding window to architects' drawing Ref. W01	8	No			
b	Window overall size 900 x 1600 mm high; Sliding window to architects' drawing Ref. W02	13	No			
c	Window overall size 1200 x 800 mm high; Top hung openable window to architects' drawings Ref. W03	13	No			
d	Window overall size 2100 x 800 mm high; Top hung openable window to architects' drawings Ref. W04	6	No			
e	Window overall size 1200 x 1600 mm high; Sliding window to architects' drawing Ref. W05	4	No			
f	Window overall size 600 x 1100 mm high; double glazed fixed window to architects' drawing Ref. W06	7	No			
g	Window overall size 600 x 2100 mm high; double glazed fixed window to architects' drawing Ref. W07	8	No			
h	Window overall size 1800 x 1600 mm high; Sliding window to architects' drawing Ref. W08	7	No			
i	Window overall size 2700 x 1600 mm high; Sliding window to architects' drawing Ref. W09	9	No			
j	Window overall size 2400 x 1600 mm high; Sliding window to architects' drawing Ref. W10	3	No			
k	Window overall size 3900 x 1200 mm high; double glazed fixed window to architects' drawing Ref. W11	1	No			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		WINDOWS				
		Qty	Unit	Rate	KSHS	CTS
	<p><b>L10 WINDOWS continued...</b></p> <p><b>STEEL CASEMENT WINDOWS;</b></p> <p>Supply and fix heavy duty steel casement windows; standard hollow or angle sections; frames mitred at corners including reinforcing cleats and approved patterned solid steel buglar bars and all necessary ironmongery; fixing with steel screws; plugging or fixing to concrete, blockwork or stone work; sealing with mastic; oiling and adjusting on completion; all in accordance with referenced Architect drawings</p>					
a	<p>Window overall size 2300 x 300 mm high; louvred windows to architects' drawings Ref W12</p>	8	No			
	<p><b>L10 SCREENS / FAÇADE / CURTAIN WALL</b></p> <p>Supply and fix Anodised Aluminium or Equal and approved; 50mm thick curtain walls with a 6mm toughened glass; 100 x 50 x 5mm thick Anodised Aluminium RHS horizontal and vertical frame members mitred at corners including reinforcing cleats, endcaps, silicone, supporting brackets, coner cleats with press, vertical, central and horizontal Mullion gaskets, adjustment parts and all necessary ironmongery; window openings including fly screen planes and accesories; fixing with (DIN ISO 7049 -A2) 4.8 x 25 stainless steel screws and M10 x 75 stud anchor cast in concrete with 100x50x4mm steel plates and fastened with nuts and washers; plugging or fixing to concrete, block work, steel/aluminium members or stone work; with all necessary steel accesories and structures including galvanizing and painting of all elements, supports and brackets; and exposed concrete and steel elements to match anodised aluminium sections; to the approval of the Project Manager.</p>					
b	<p>Over 300 mm wide</p>	111	m2			
To Collection KSHS						



PROPOSED MODERN ASSEMBLY CHAMBERS				WINDOWS		
		Qty	Unit	Rate	KSHS	CTS
<b>M60 PAINTING/CLEAR FINISHING</b>						
<b>PAINTING WOOD</b>						
<b>Prepare and apply one coat of aluminium wood primer on timber surfaces in contact with concrete or masonry surfaces;</b>						
Painting Wood;						
a	Surfaces not exceeding 100 mm girth: bearers and returned ends;	190	m			
b	Ditto over 100 mm but not exceeding 200 mm girth: window board	190	m			
<b>Prepare surfaces: apply three coats polyurethane varnish on wood: to surfaces;</b>						
Varnishing wood;						
c	Surfaces over 100 but not exceeding 200 mm girth: window board;	190	m			
d	General surfaces over 300 mm girth; pelmet boxes	59	m2			
<b>PAINTING METAL</b>						
<b>Prepare and apply one under coat; two coats oil paint full gloss finish; to cown paint or equal and approved;</b>						
e	Window surfaces; generally over 300 mm wide; both sides measured;	11	m2			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS CTS
	<p><b>Collection</b></p> <p>Total from Page 31</p> <p>Total from Page 32</p> <p>Total from Page 33</p> <p>Total from Page 34</p>				
To Summary KSHS					

PROPOSED MODERN ASSEMBLY CHAMBERS				DOORS	
		Qty	Unit	Rate	KSHS CTS
	<p><b>L20 DOORS /SHUTTERS /HATCHES</b></p> <p><b>AUTOMATIC SLIDING DOORS</b></p> <p>Supply and fix an automatic sliding glass door with motion sensors to manufactures specifications; including 4 mm thick toughened glass, complete with frames, approved fixing accessories; top and bottom rail tracks ; including reinforcing cleats and all necessary ironmongery; fixing with steel screws; plugging or fixing to concrete, block work or stone work; sealing with mastic; oiling and adjusting on completion; to referenced Architect's drawings</p> <p>Double leaf door overall size 2400 x 2100mm high; ref D01</p>	1	No		
a					
	<p><b>ALUMINIUM DOORS</b></p> <p>Supply and fix 75 x 50 mm powder coated aluminium frame door complete with 4 mm thick toughened glass ; including reinforcing cleats and all necessary ironmongery including Heavy duty door closer; fixing with steel screws; plugging or fixing to concrete, block work or stone work; sealing with mastic; oiling and adjusting on completion; to referenced Architect's drawings</p> <p>Double leaf door overall size 2400 x 2100 mm high; ref D10</p> <p>Single leaf door overall size 900 x 2100 mm high;</p>	2	No		
b					
c					
				To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<b>PANELLED / WROT MAHOGANY;</b>					
	Paneled doors; comprising of 75 x 50 mm top rail and stiles; 100 x 50 mm bottom rail with two labors each; infilled with 10 mm thick solid hardwood protective panel edges beveled, tongued and grooved into frame; molding all round to approval;					
a	Double leaf, single swing door overall size 1400 x 2100 mm high; to Architects' drawings; Ref. D02	3	No			
b	Double leaf, single swing door overall size 1400 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D03	1	No			
c	Single leaf, single swing door overall size 800 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D04	26	No			
	<b>FLUSH DOORS;</b>					
	Supply and fix 50 mm Thick flush door: Solid core; hardwood veneer facing to both sides: hardwood lipped edges to BS 459; to referenced Architect's drawings;					
d	Single leaf, single swing door overall size 800 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D05	16	No			
e	Single leaf, single swing door overall size 900 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D06	20	No			
f	Single leaf, single swing door overall size 1000 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D08	6	No			
	Supply and fix 50 mm Thick flush door: Semi-Solid core; hardwood veneer facing to both sides: hardwood lipped edges to BS 459; to referenced Architect's drawings;					
g	Single leaf, single swing door overall size 800 x 2000 mm high; to Architects' drawings; Ref. D07	24	No			
h	Single leaf door overall size 600 x 2100 mm high; timber louvered door; to Architects' drawings; Ref. D09	18	No			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS				DOORS		
		Qty	Unit	Rate	KSHS	CTS
	<b>PRIME GRADE STAINED; HARD WOOD</b>					
	Door frames / transomes					
a	200 x 50 mm thick; including 50 x 25 mm linings;	480	m			
b	150 x 50 mm thick; including 50 x 25 mm linings;	206	m			
	<b>M60 PAINTING/CLEAR FINISHING</b>					
	<b>Prepare and apply one coat of aluminium wood primer on timber surfaces in contact with concrete or masonry;</b>					
	General surfaces					
c	Over 100 but not exceeding 200 mm girth;	686	m			
	<b>Prepare surfaces: apply three coats polyurethane clear lacquer or other equal approved: on timber surfaces: to</b>					
	General surfaces					
d	Frames; over 100 mm but not exceeding 200 mm girth;	686	m			
e	Over 300 mm girth;	390	m2			
				To Collection KSHS		

		Qty	Unit	Rate	KSHS	CTS
<b>P21 IRONMONGERY</b>						
<b>NOTE: This section caters for <u>FLUSH DOORS &amp; PANEL DOORS ONLY</u>. Therefore all bidders <u>MUST</u> factor in their cost of all ironmongery and any other accessories as may be required in their rates of all other doors</b>						
<b>Supply and Fix the following as per Union Catalogue or other equal and approved; to soft wood, hardwood or the like; fixing with screws;</b>						
Hinges;						
a	100 mm brass, heavy duty 2 ball bearing hinges;	180	Pair			
Mortice Locks;						
b	Three lever mortice lock No. 2295 with one pair of lever handles with escutcheon No. 680-06-2	30	No			
c	Two lever mortice lock No. 2237 with one pair of lever handles with escutcheon No. 680-06-2	82	No			
d	Door stops No. 8400; oval / brass 38 mm	112	No			
e	Aluminium sex indicator plates	18	No			
f	Heavy duty overhead door closer	6	No			
g	Indicator bolts	30	No			
h	Aluminium coat and hat hooks with rubber buffer	30	No			
i	1000mm x 500mm high kick plate	6	No			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				DOORS	
		Qty	Unit	Rate	KSHS CTS
<b>Collection</b>					
	Total from Page 36				
	Total from Page 37				
	Total from Page 38				
	Total from Page 39				
To Summary KSHS					

		Qty	Unit	Rate	KSHS	CTS
	<b>M10 SAND CEMENT /CONCRETE SCREEDS /FLOORING</b>					
	<b>CEMENT AND SAND</b>					
	15 mm thick backing screed; wood floated to receive Ceramic wall tiles; (m/s) to concrete or blockwork base generally;					
a	Over 300 mm wide;	685	m2			
b	Ceramic border tile; not exceeding 100 mm girth;	326	m			
	<b>M20 PLASTERED /RENDERED</b>					
	<b>Render; 9 mm first coat of cement and sand 1:6; 3 mm second coat of cement sand and lime putty (1:10); steel trowelled smooth;</b>					
	External surfaces;					
c	Walls; over 300 mm wide;	2816	m2			
d	Columns; over 300 mm wide;	763	m2			
e	Beams; Over 300 mm wide;	915	m2			
To Collection KSHS						



PROPOSED MODERN ASSEMBLY CHAMBERS		WALL FINISHES			
		Qty	Unit	Rate	KSHS CTS
	<b>M20 PLASTERED /RENDERED continued ...</b>				
	<b>Plaster; 9 mm first coat of cement and sand 1:6; 3 mm second coat of cement sand and lime putty (1:10); steel trowelled smooth;</b>				
	12 mm thick in 2 No coats work; to concrete or blockwork base (m/s); generally to internal surfaces;				
a	Walls; over 300 mm wide;	5258	m2		
b	Columns; over 300 mm wide;	763	m2		
c	Beams; Over 300 mm wide;	915	m2		
	<b>M40 STONE /CONCRETE /QUARRY /CERAMIC TILING/MOSAIC</b>				
	<b>NOTE:</b>				
	<b>Tenderer to Add for taking delivery and fixing on the P.C. Rate provided for fixing of tiles;</b>				
	Approved size granito wall tiles - P.C. Rate of Kshs. 3,500 per square metre including fixing on cement sand screed backing (m.s);				
d	Approved size; butt joints straight both ways; to cement and sand base (m/s); Over 300 mm wide;;	685	m2		
e	100 x 6 mm thick; Ceramic Border;	326	m		
				To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
<b>M60 PAINTING/CLEAR FINISHING</b>						
<b>PAINTING PLASTER</b>						
<b>Prepare by skimming plastered surface; apply one undercoat; two coats Premium Quality Silk Vinly paint to Crown paints or equal and approved;</b>						
Steel trowelled plastered surfaces;						
a	Walls; over 300 mm wide;	2816	m2			
b	Columns; over 300 mm wide;	763	m2			
c	Beams; Over 300 mm wide;	915	m2			
<b>Prepare and apply one undercoat; finishing coat of special application paint to classic mouldings range or equal and approved;</b>						
Steel trowelled plastered surfaces;						
d	Walls; over 300 mm wide;	25	m2			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		WALL FINISHES			
		Qty	Unit	Rate	KSHS CTS
	<p><b>PAINTING RENDER</b></p> <p>Prepare and apply one undercoat; finishing coat of textured special effect paint to crown paints or equal and approved;</p> <p>Steel trowelled plastered surfaces;</p>				
a	Walls; over 300 mm wide;	5258	m2		
b	Columns; over 300 mm wide;	763	m2		
c	Beams; Over 300 mm wide;	915	m2		
	<p><b>PUDDLED WALL</b></p> <p>Supply and fix wall padding of approved colour and material fixed onto timber/ aluminium framing support system mounted to walls and curved trim and wall angles as necessary; all in accordance with Interior Designer's drawings;</p>				
d	Over 300 wide;	93	m2		
	<p><b>GROOVED MDF PANELS</b></p> <p>Supply and fix 25mm laminated MDF panels grooved with 6mm spaced at 150 mm c/c fixed with angle brackets; all in accordance with Interior Designer's drawings;</p>				
e	Over 300 wide;	279	m2		
	<p><b>MDF PANELS</b></p> <p>Supply and fix 25mm laminated MDF panels fixed with angle brackets onto wall; all in accordance with Interior Designer's drawings;</p>				
f	Over 300 wide;	39	m2		
	<p><b>MURAL</b></p> <p>Supply and fix wall mural fixed with angle brackets onto wall; all in accordance with Interior Designer's drawings;</p>				
g	Over 300 wide;	25	m2		
To Collection KSHS					

PROPOSED MODERN ASSEMBLY CHAMBERS				WALL FINISHES	
		Qty	Unit	Rate	KSHS CTS
<b>Collection</b>					
Total from Page 41					
Total from Page 42					
Total from Page 43					
Total from Page 44					
				To Summary KSHS	

		Qty	Unit	Rate	KSHS	CTS
<b>M10 SAND CEMENT /CONCRETE SCREEDS</b>						
<b>CEMENT AND SAND</b>						
	20 mm thick mix (1:4) flooring; wood floated in 2 No coats work to concrete, blockwork or brickwork base (m.s); generally to receive APP Waterproofing agent;					
a	Over 300 mm wide; to roof terrace;	430	m2			
	32 mm thick backing; wood floated to receive Non-slip Granito tiles; (m/s) to concrete or block work base generally;					
b	Over 300 mm wide;	560	m2			
c	100 mm high skirting;	299	m			
	32 mm thick backing; wood floated to receive Granito tiles; (m/s) to concrete or block work base generally;					
d	Over 300 mm wide;	2550	m2			
e	100 mm high skirting;	532	m			
	32 mm thick backing; wood floated to receive Anti-acid tiles; (m/s) to concrete or block work base generally;					
f	Over 300 mm wide;	80	m2			
g	100 mm high skirting;	87	m			
	32 mm thick backing; wood floated to receive carpets rolls; (m/s) to concrete or block work base generally;					
h	Over 300 mm wide;	570	m2			
i	100 mm high skirting;	252	m			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
<p><b>M40 STONE /CONCRETE /QUARRY /CERAMIC TILING/MOSAIC</b></p> <p><b>Tenderer to Add for taking delivery and fixing on the P.C. Rate provided for fixing of tiles;</b></p> <p>Approved size non-slip granito tiles - P.C. Rate of Kshs.3,500 per square metre including fixing on cement sand screed backing (m.s);</p>						
a	300 x 600 x 9 mm thick; butt joints straight both ways; to cement and sand base (m/s); over 300 mm wide;	560	m2			
b	100 mm high Skirting	299	m			
<p>Approved size Granito tiles - P.C. Rate of Kshs.3,500 per square metre including fixing on cement sand screed backing (m.s);</p>						
c	600 x 600 x 9 mm thick; butt joints straight both ways; to cement and sand base (m/s); over 300 mm wide;	2550	m2			
d	100 mm high Skirting;	532	m			
<p>Approved size Anti - acid tiles - P.C. Rate of Kshs.3,500 per square metre including fixing on cement sand screed backing (m.s);</p>						
e	300 x 300 x 15 mm thick; butt joints straight both ways; to cement and sand base (m/s); over 300 mm wide;	80	m2			
f	100 mm high Skirting;	87	m			
<p>Supply and install 12 mm thick carpet roll consisting of woollen/polyester carpet pile, with backing, fitted with underlay to manufacturer's details including naplocks and all fitting accessories;</p>						
g	Over 300 mm wide;	570	m2			
h	100 mm high Mahogany Skirting;	252	m			
					To Collection KSHS	

		Qty	Unit	Rate	KSHS	CTS
	<p><b>Collection</b></p> <p>Total from Page 46</p> <p>Total from Page 47</p>					
				To Summary KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS		CEILING FINISHES			
		Qty	Unit	Rate	KSHS CTS
	<b>K10 CEILINGS</b>				
	Supply and fix 600 x 600 mm suspended semi-recessed L.I.G. acoustic ceiling panels as Armstrong Fine Fissured Tegular 95% RH SecondLook on white 24 mm wide lay-in grid as Trulok F24 (Armstrong) with and including fixing to suspended white powder coated aluminium 'T-grid' brandering support system complete with white perimeter and curved trim and wall angles as necessary; all in accordance with Interior Designer's drawings;				
a	Ceilings; Over 300 wide;	900	m2		
	12 mm thick Gypsum profiled Ceilings or equal and approved ceiling cover; tapered edge wallboard; joints taped and filled; firmly secured with and including fixing to steel or aluminium studwork brandering support system with rounded, smooth compound sanded edges, edge trims, plastered, joints taped and filled finished to receive direct decoration; allow for provision of resseded mouldings / bulk heads on gypsum ceiling to allow for indirect lighting to detail; all in accordance with Architect's drawings;				
b	Gypsum board profiled Ceilings; Over 300 wide;	743	m2		
c	100 mm wide moulded cornice;	218	m		
	18mm x 400mm mahogany veneered particle board with 25 x 50 mm mahogany timber beading; firmly secured with and including fixing to steel or aluminium studwork brandering support system with rounded, smooth compound sanded edges, edge trims, plastered, joints taped and filled finished to receive direct decoration; to Interior Designers detail and Approval;				
d	Over 300 wide;	97	m2		
	<b>M20 PLASTERED /RENDERED</b>				
	Render; 9 mm first coat of cement and sand 1:6; 3 mm second coat of cement sand and lime putty (1:10); steel trowelled smooth;				
	12mm thick 2 No. coats work; to concrete or blockwork base (m/s) generally to internal surfaces				
e	Ceilings; over 300 mm wide;	75	m2		
	<b>M60 PAINTING/CLEAR FINISHING</b>				
	<b>PAINTING PLASTER</b> textured special effect paint to crown paints or equal and approved;				
f	Plastered Ceiling Surfaces; over 300 mm wide;	75	m2		
To Collection KSHS					



PROPOSED MODERN ASSEMBLY CHAMBERS				CEILING FINISHES	
		Qty	Unit	Rate	KSHS CTS
<b>Collection</b>					
Total from Page 49					
				To Summary KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
<b><u>SUBSTRUCTURE (ALL PROCVISIONAL)</u></b>						
<b>D20 EXCAVATING AND FILLING;</b>						
<b>SITE PREPARATION;</b>						
Clearing site vegetation, grubbing up roots and filling up voids left with selected excavated material;						
a	Bushes, shrubs, undergrowth or the like and cart away from site;	45	m2			
<b>EXCAVATING</b>						
Topsoil for preservation;						
b	200 mm average depth starting from existing ground level;	45	m2			
Excavations for column bases;						
c	Not exceeding 1.5 m deep starting from stripped level;	27	m3			
Excavation for strip foundation footing;						
d	Not exceeding 1.5 m deep starting from stripped level;	16	m3			
Extra over excavation irrespective of depth for breaking out;						
e	Rock; irrespective of class;	1	m3			
<b>DISPOSAL</b>						
Excavated material;						
f	Off site to contractor's tip;	21	m3			
<b>FILLING TO EXCAVATIONS</b>						
Selected excavated material to make up levels compacted in layers not exceeding 225mm to approval of the Structural Engineer;						
g		27	m3			
<b>HARDCORE</b>						
300 mm thick; well compacted in layers of 150mm maximum thickness to approval of the Structural Engineer;						
h		15	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	<b>QUARRY DUST BLINDING</b>					
a	Blinding on surfaces of hardcore fill; 50 mm thick;	15	m2			
	<b>HERBICIDES / INSECTICIDES</b>					
b	Applying to surfaces  Apply anti-termite treatment; "Termidor" or equal and approved in accordance with manufacturers' printed specifications and ten years guarantee;	15	m2			
c	Planking and Strutting  Labour and materials; to uphold the sides of excavations; generally		item			
d	Disposal of Water  Labour and materials; Keeping excavations free from general water		item			
	<b>E05 IN SITU CONCRETE CONSTRUCTION GENERALLY</b>					
	<b>50 mm thick mass concrete 1:4:8 foundation blinding;</b>					
e	To column bases;  Generally;	18	m2			
f	To strip foundation footings;  Generally;	11	m2			
g	<b>Vibrated Reinforced Concrete; Class 25(20mm agg); mix 1:1.5:3;</b>  Floor bed;  150 mm thick;	15	m2			
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
<b>E05 IN SITU CONCRETE CONSTRUCTION</b>						
<b>GENERALLY Continued</b>						
<b>Vibrated Reinforced Concrete; Class 25(20mm agg); mix 1:1.5:3;</b>						
	Column Bases;					
a	Generally;	7	m3			
	Strip foundation footings;					
b	Generally;	2	m3			
	Columns;					
c	Generally;	2	m3			
<b>E20 FORMWORK FOR IN SITU CONCRETE</b>						
<b>SAWN FORMWORK</b>						
	Sides of Strip Foundation Footings;					
d	Over 300 mm wide;	7	m2			
	Sides of Column bases;					
e	Over 300 mm wide;	17	m2			
	Sides of Columns;					
f	Over 300 mm wide;	22	m2			
	Edges of Floor Bed;					
g	Over 150 mm but not exceeding 225 mm girth;	17	m			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
<b>E30 REINFORCEMENT FOR IN SITU CONCRETE</b>						
<b>REINFORCEMENT</b>						
Fabric reinforcement to BS 4483; reference A 142 mesh 200 x 200 mm weight 2.22kgs per square metre (measured net - no allowance made for laps); including bends, tying wire, distance blocks and spacers;						
a	Generally;	15	m2			
<b>Bars; high yield steel; cold worked; b.s. 4449 - 2005, including bends, hooks tying wire, distance blocks and spacers all in position as necessary;</b>						
Deformed Bars						
b	8 mm Diameter;	271	Kg			
c	10 mm Diameter;	271	Kg			
d	12 mm Diameter;	271	Kg			
e	16 mm Diameter;	271	Kg			
f	20 mm Diameter;	271	Kg			
g	25 mm Diameter;	271	Kg			
<b>F20 NATURAL STONE WALLING</b>						
<b>Natural quarry stone work rough chissel dressed; jointed in cement sand mortar (1:3)</b>						
Walls						
h	200 mm thick	28	m2			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE			
		Qty	Unit	Rate	KSHS CTS
	<b>DAMP PROOF COURSES</b>				
a	On surfaces 200 mm wide;	18	m		
	<b>Polythene based damp proof Membrane 1000 gauge in one layer;</b>				
b	On surfaces Over 300 mm wide	15	m <sup>2</sup>		
	<b>M10 SAND CEMENT /RENDERING</b>				
	<b>20 mm thick Cement and sand (1:3) rendering; finishing trowelled smooth</b>				
c	Walls Over 300 wide	5	m <sup>2</sup>		
	<b>M12 TROWELLED BITUMEN</b>				
	<b>Lightweight bituminous insulating paint;</b>				
d	Walls Over 300 wide; external	5	m <sup>2</sup>		
	<b><u>REINFORCED CONCRETE SUPERSTRUCTURE</u></b>				
	<b>E05 IN SITU CONCRETE CONSTRUCTION GENERALLY</b>				
	<b>Vibrated Reinforced Concrete; Class 25(20mm agg); mix 1:1.5:3;</b>				
e	Columns; Generally;	5	m <sup>3</sup>		
f	Beams; Generally;	3	m <sup>3</sup>		
				To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
<b>E20 FORMWORK FOR IN SITU CONCRETE</b>						
<b>SAWN FORMWORK</b>						
	Sides to columns;					
a	Over 300 mm wide;	66	m2			
	Sides and soffits of beams;					
b	Over 300 mm wide;	45	m2			
<b>E30 REINFORCEMENT FOR IN SITU CONCRETE</b>						
<b>REINFORCEMENT</b>						
<b>Bars; high yield steel; cold worked; b.s. 4449 - 2005, including bends, hooks tying wire, distance blocks and spacers all in position as necessary;</b>						
	Deformed Bars;					
c	8 mm Diameter;	211	Kg			
d	10 mm Diameter;	211	Kg			
e	12 mm Diameter;	211	Kg			
f	16 mm Diameter;	211	Kg			
g	20 mm Diameter;	211	Kg			
h	25 mm Diameter;	211	Kg			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
	<p><b>F21 NATURAL STONE MASONRY WALLING/DRESSINGS</b></p> <p>Approved local stone; machine cut or fine chisel dressed; bedded and jointed in cement sand mortar (1:4);</p> <p>Parapet Walls</p>					
a	200 mm thick walls;	35	m2			
	<p><b>F31 PRECAST CONCRETE SILLS/LINTELS/COPINGS/FEATURES</b></p> <p><b>PRECAST CONCRETE</b></p> <p>Copings</p> <p>275 x 75 mm thick precast concrete class 20/20 coping, splayed top; weathered and twice throated; finished fair on exposed surfaces bedded straight on masonry parapet walls;</p>					
b		39	m			
	<p><b>G10 STRUCTURAL TIMBER FRAMING</b></p> <p>The following in seasoned pressure impregnated cypress second grade or equal and approved softwood timber members; erected to height not exceeding 10,000 mm above ground; painted to approval</p> <p>Pitched roof members;</p>					
c	100 x 50 mm; Rafters;	20	m			
d	100 x 50 mm; Tie Beam	12	m			
e	100 x 50 mm; King post;	2	m			
f	75 x 50 mm; Purlins and battens;	153	m			
g	100 x 50 mm Wall Plate secured with and including 12mm diameter mild steel j-bolts including mortise in concrete grouted in cement and sand (1:3) mortar	34	m			
h	200 x 50 mm Ridge Board	14	m			
				To Collection KSHS		



PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	Joints;					
a	Allow for plates, cleats, stiffeners, raw bolts, etc		Item			
b	Extra over 150 x 50 mm members for scarfed joints strapped in 16 gauge and 25 mm wide hoop iron ties	28	No			
<b>H70 MALLEABLE METAL SHEET PREBONDED COVERINGS</b>						
<b>Supply and fix Decra roofing sheet covering; from approved manufacturer and of approved colour and size, including edging trim, firmly secured with galvanised steel screws or nails with end and side laps; fixed onto and including 50 x 50 mm timber battens at 600 mm c/c; with all necessary curvatures, hoisting, placing and connections;</b>						
	Coverings; fixing on purlin with two 38 mm galvanised nails; to 75 mm laps;					
c	Sloping not exceeding 30 degrees from horizontal;	50	m2			
d	Half round Ridge cap to match	20	m2			
<b>Chamfered wrought cypress in fascia/berge board with splayed heading joints;</b>						
e	Size 200 x 25 mm fixed to ends of rafters and purlins;	34	m			
<b>M60 PAINTING/CLEAR FINISHING</b>						
<b>Primer, one undercoat and one coat of matte finish paint; over 200-300 mm girth;</b>						
	General surfaces fascia board;					
f	Over 200 mm but not exceeding 300 mm girth;	34	m			
					To Collection KSHS	

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	<b>J21 MASTIC ASPHALT ROOFING/INSULATION/FINISHES</b>					
	<b>APP waterproofing or equal and approved water proofing agent laid in accordance with the manufactures printed specifications; with and including a ten years guarantee</b>					
a	To parapet walls;	35	m2			
b	50 x 50 mm angle fillet dressing at joints;	34	m			
	<b>F21 NATURAL STONE / MASONRY WALLING</b>					
	<b>Approved local stone; squared; machine cut or fine chisel dressed; bedding and jointed in cement sand mortar (1:4);</b>					
	External walling;					
c	200 mm thick;	62	m2			
	Internal walling;					
d	200 mm thick;	11	m2			
	<b>WINDOWS</b>					
	<b>F31 PRECAST CONCRETE CILLS</b>					
	<b>Approved pre-cast concrete cill: bedded and jointed in cement (sand (1:3) mortar: pointed in matching coloured cement;</b>					
	Cills;					
e	265 x 50 mm thick cill; once weathered and throated;	4	m			
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
	<b>G20 CARPENTRY/TIMBER FRAMING</b>					
	<b>WROT HARDWOOD: PRIME GRADE;</b>					
	Pelmet/curtain boxes;					
a	250 x 25 mm Pelmet fascia	4	m			
b	150 x 25 mm Pelmet front	4	m			
c	250 x 150 x 25 mm Pelmet box ends	4	No			
d	150 x 25 mm Window board; plugged	4	m			
e	25 mm Quadrant beading	4	m			
f	50 x 25 mm Bearers, plugged	4	m			
	<b>H75 STRIP STEEL</b>					
	<b>Medium duty steel curtain rail/track to specification;</b>					
	Medium duty steel curtain rail or other equal and approved I-section complete with fixing brackets, rollers 150 mm laps, runners at 100 mm centres and end stops;	4	m			
	<b>ALUMINIUM WINDOWS;</b>					
	<b>Supply and fix powder coated Aluminum Window; standard hollow or angle sections; frames mitred at corners including reinforcing cleats and all necessary ironmongery;</b>					
	Complete with 4 mm thick clear glass; fixing with aluminium screws; plugging or fixing to concrete, blockwork or stone work; sealing with mastic; oiling and adjusting on completion; all to referenced Architect's drawings;					
h	Window overall size 900 x 1600 mm high; Sliding window to architects' drawing Ref. W02	2	No			
i	Window overall size 1200 x 800 mm high; Top hung openable window to architects' drawings Ref. W03	1	No			
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
	<b>M60 PAINTING/CLEAR FINISHING</b>					
	<b>PAINTING WOOD</b>					
	<b>Prepare and apply one coat of aluminium wood primer on timber surfaces in contact with concrete or masonry surfaces;</b>					
	Painting Wood;					
a	Surfaces not exceeding 100 mm girth: bearers and returned ends;	4	m			
b	Ditto over 100 mm but not exceeding 200 mm girth: window board	4	m			
	<b>Prepare surfaces: apply three coats polyurethane varnish on wood: to surfaces;</b>					
	Varnishing wood;					
c	Surfaces over 100 but not exceeding 200 mm girth: window board;	4	m			
d	General surfaces over 300 mm girth; pelmet boxes	2	m <sup>2</sup>			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	<p><b>L20 DOORS /SHUTTERS /HATCHES</b></p> <p><b>PANELLED / WROT MAHOGANY;</b></p> <p>Paneled doors; comprising of 75 x 50 mm top rail and stiles; 100 x 50 mm bottom rail with two labors each; infilled with 10 mm thick solid hardwood protective panel edges beveled, tongued and grooved into frame; molding all round to approval;</p> <p>Single leaf, single swing door overall size 800 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D04</p>	1	No			
a						
	<p><b>FLUSH DOORS;</b></p> <p>Supply and fix 50 mm Thick flush door: Solid core; hardwood veneer facing to both sides: hardwood lipped edges to BS 459; to referenced Architect's drawings;</p> <p>Single leaf, single swing door overall size 800 x 2100 mm high; complete with 300mm fanlight in 4 mm thick clear glass to Architects' drawings; Ref. D05</p>	1	No			
b						
	<p><b>PRIME GRADE STAINED; HARD WOOD</b></p> <p>Door frames / transomes</p> <p>200 x 50 mm thick; including 50 x 25 mm linings;</p>	10	m			
c						
	<p><b>M60 PAINTING/CLEAR FINISHING</b></p> <p><b>Prepare and apply one coat of aluminium wood primer on timber surfaces in contact with concrete or masonry;</b></p> <p>General surfaces</p> <p>Over 100 but not exceeding 200 mm girth;</p>	10	m			
d						
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	<p><b>Prepare surfaces: apply three coats polyurethane clear lacquer or other equal approved: on timber surfaces: to</b></p> <p>General surfaces</p> <p>a Frames; over 100 mm but not exceeding 200 mm girth;</p> <p>b Over 300 mm girth;</p> <p><b>P21 IRONMONGERY</b></p> <p><b>NOTE: This section caters for <u>FLUSH DOORS &amp; PANEL DOORS ONLY</u>. Therefore all bidders <u>MUST</u> factor in their cost of all ironmongery and any other accessories as may be required in their rates of all other doors</b></p> <p><b>Supply and Fix the following as per Union Catalogue or other equal and approved; to soft wood, hardwood or the like; fixing with screws;</b></p> <p>Hinges;</p> <p>c 100 mm brass, heavy duty 2 ball bearing hinges;</p> <p>Mortice Locks;</p> <p>d Three lever mortice lock No. 2295 with one pair of lever handles with escutcheon No. 680-06-2</p>	10	m			
		7	m2			
		6	Pair			
		2	No			
				To Collection KSHS		

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE				
		Qty	Unit	Rate	KSHS	CTS
	<b>M10 SAND CEMENT /CONCRETE SCREEDS /FLOORING</b>					
	<b>CEMENT AND SAND</b>					
	15 mm thick backing screed; wood floated to receive Granitoc wall tiles; (m/s) to concrete or blockwork base generally;					
a	Over 300 mm wide;	23	m2			
b	Ceramic border tile; not exceeding 100 mm girth;	8	m			
	<b>M20 PLASTERED /RENDERED</b>					
	<b>Render; 9 mm first coat of cement and sand 1:6; 3 mm second coat of cement sand and lime putty (1:10); steel trowelled smooth;</b>					
	External surfaces;					
c	Walls; over 300 mm wide;	62	m2			
d	Columns; over 300 mm wide;	46	m2			
e	Beams; Over 300 mm wide;	31	m2			
	<b>M20 PLASTERED /RENDERED continued ...</b>					
	<b>Plaster; 9 mm first coat of cement and sand 1:6; 3 mm second coat of cement sand and lime putty (1:10); steel trowelled smooth;</b>					
	12 mm thick in 2 No coats work; to concrete or blockwork base (m/s); generally to internal surfaces;					
f	Walls; over 300 mm wide;	84	m2			
g	Columns; over 300 mm wide;	20	m2			
h	Beams; Over 300 mm wide;	14	m2			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS		GATE HOUSE			
		Qty	Unit	Rate	KSHS CTS
	<p><b>M40 STONE /CONCRETE /QUARRY /CERAMIC TILING/MOSAIC</b></p> <p><b>NOTE:</b></p> <p><b>Tenderer to Add for taking delivery and fixing on the P.C. Rate provided for fixing of tiles;</b></p> <p>Approved size granito wall tiles - P.C. Rate of Kshs. 3,500 per square metre including fixing on cement sand screed backing (m.s);</p> <p>Approved size; butt joints straight both ways; to cement and sand base (m/s); Over 300 mm wide;;</p>				
a	100 x 6 mm thick; Ceramic Border;	23	m2		
b		8	m		
	<p><b>M60 PAINTING/CLEAR FINISHING</b></p> <p><b>PAINTING PLASTER</b></p> <p><b>Prepare by skimming plastered surface; apply one undercoat; two coats Premium Quality Silk Vinly paint to Crown paints or equal and approved;</b></p> <p>Steel trowelled plastered surfaces;</p>				
c	Walls; over 300 mm wide;	84	m2		
d	Columns; over 300 mm wide;	20	m2		
e	Beams; Over 300 mm wide;	14	m2		
				To Collection KSHS	



PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
	<b>PAINTING RENDER</b>					
	<b>Prepare and apply one undercoat; finishing coat of textured special effect paint to crown paints or equal and approved;</b>					
	Steel trowelled plastered surfaces;					
a	Walls; over 300 mm wide;	62	m2			
b	Columns; over 300 mm wide;	46	m2			
c	Beams; Over 300 mm wide;	31	m2			
	<b>M10 SAND CEMENT /CONCRETE SCREEDS</b>					
	<b>CEMENT AND SAND</b>					
	32 mm thick backing; wood floated to receive Non-slip Granito tiles; (m/s) to concrete or block work base generally;					
d	Over 300 mm wide;	3	m2			
e	100 mm high skirting;	8	m			
	32 mm thick backing; wood floated to receive Granito tiles; (m/s) to concrete or block work base generally;					
f	Over 300 mm wide;	8	m2			
g	100 mm high skirting;	11	m			
To Collection KSHS						

		Qty	Unit	Rate	KSHS	CTS
	<p><b>M40 STONE /CONCRETE /QUARRY /CERAMIC TILING/MOSAIC</b></p> <p><b>Tenderer to Add for taking delivery and fixing on the P.C. Rate provided for fixing of tiles;</b></p> <p>Approved size non-slip granito tiles - P.C. Rate of Kshs.3,500 per square metre including fixing on cement sand screed backing (m.s);</p>					
a	300 x 600 x 9 mm thick; butt joints straight both ways; to cement and sand base (m/s); over 300 mm wide;	8	m2			
b	100 mm high Skirting	11	m			
	<p><b>K10 CEILINGS</b></p> <p><b>12 mm thick Gypsum profiled Ceilings or equal and approved ceiling cover; tapered edge wallboard; joints taped and filled; firmly secured with and including fixing to steel or aluminium studwork branderer support system with rounded, smooth compound sanded edges, edge trims, plastered, joints taped and filled finished to receive direct decoration; allow for provision of resseded mouldings / bulk heads on gypsum ceiling to allow for indirect lighting to detail; all in accordance with Architect's drawings;</b></p> <p>Gypsum board profiled Ceilings;</p>					
c	Over 300 wide;	14	m2			
d	100 mm wide moulded cornice;	15	m			
	<p><b>Sawn celcured cypress;</b></p> <p>Framed supports</p>					
d	100 x 50mm thick branderer plugged	68	m			
To Collection KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE		
		Qty	Unit	Rate	KSHS	CTS
	<b><u>GATE</u></b>					
	<b>Pedestrian Gate</b>					
	Consisting of 100 x 50 x 4mm rectangular hollow section frame and intermediate rail filled in with 25 x 25 x 2mm rectangular hollow section verticals spaced at 150mm with and including 3No. Purpose made hinges cut and pinned to masonry stonework, eye for padlock and 300mm drop complete with socket cast into concrete.					
a	900 x 2500mm high	1	No.			
	<b>Main Gate</b>					
	Consisting of 100 x 50 x 4mm rectangular hollow section frame and intermediate rail filled in with 25 x 25 x 2mm rectangular hollow section verticals spaced at 150mm; Mild steel shaped grilles including applying red oxide primer to surfaces ;approved steel spikes welded onto, 25mm solid square bars; welded to approved patterns and welded to gate: to; (Architects Drawings and Specifications); 3No. Purpose made hinges cut and pinned to masonry stonework, eye for padlock and 300mm drop complete with socket cast into concrete.					
b	Overall size 3900 x 2100mm high in two no equal leafs	1	No.			
			To Collection KSHS			

PROPOSED MODERN ASSEMBLY CHAMBERS				GATE HOUSE	
		Qty	Unit	Rate	KSHS CTS
<b>Collection</b>					
	Total from Page 51				
	Total from Page 52				
	Total from Page 53				
	Total from Page 54				
	Total from Page 55				
	Total from Page 56				
	Total from Page 57				
	Total from Page 58				
	Total from Page 59				
	Total from Page 60				
	Total from Page 61				
	Total from Page 62				
	Total from Page 63				
	Total from Page 64				
	Total from Page 65				
	Total from Page 66				
	Total from Page 67				
	Total from Page 68				
	<b>Sub-Total</b>				
	<b>Multiply by 2 no. Gate House</b>		x2		
To Summary KSHS					

PROPOSED MODERN ASSEMBLY CHAMBERS		EXTERNAL WORKS				
		Qty	Unit	Rate	KSHS	CTS
<b><u>Storm Water Drainage</u></b>						
<b>D20 EXCAVATING AND FILLING;</b>						
<b>EXCAVATING TRENCHES TO RECEIVE PIPES</b>						
a	Excavations for invert block drain 700 mm wide; depth not exceeding 1.5m deep; Return fill and ram soft soil around pipe and cart away surplus spoil	101	m			
<b>PRECAST CONCRETE WATER CHANNELS AND PIPES</b>						
b	Half round invert block drain; jointed and bedded in cement/sand (1:3) mortar and laid on and including 100mm thick compacted gravel base 300mm internal diameter with precast concrete side slabs, complete length on either side	101	m			
c	Plain Concrete 1:3:6 (25mm aggregate) bed and surround to 100mm diameter pipe;	101	m			
d	Precast Concrete Kerbs and Channels Class 25 to B.S 340 bedded, jointed and pointed in cement mortar 125 x 250 with one chamfered edge	161	m			
e	100 x 200 channels	161	m			
			To Summary KSHS			

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
GROUND FLOOR						
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
<b>A</b>	<b>CIRCULATION/LOBBIES</b>					
	<u>Accessories</u>					
1.0	Lift Lobby dust bins in stainless steel with screwed fitting lid.	Nos.	4			
1.1	Standard potted plant in clay pots with tray. Size of pot 600mm high.	Nos.	4			
<b>B</b>	<b>RECEPTION COUNTER</b>					
	Information Desk/ Reception Counter. Supply and install "L" shape Executive two leveled Reception counter in high quality mahogany veneers with a base of mahogany laminated particle board & 1 inch blockboard framework and heat sealed melamine edges. Install aluminium molding for wire management system and veneered MDF mahogany side & front panel with stainless steel and glass counter top on the upper level and natural granite on the lower level to design specifications. (see annex document).					
2.0	U shape Size 2500L x 2000D x 1100Hmm	Nos.	1			
2.1	Straight counter Size 2500L x 900D x 900Hmm	Nos.	1			
	<u>Lounge Chairs</u>					
	Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal. Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength. Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.  Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
2.2	Size 1800L x 900D x 900H mm	Nos.	2			
2.3	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u>					
	Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
2.4	Size 1500L x 900 x 450H mm.	Nos.	2			
	<u>Accessories</u>					
2.5	PRESIDENTIAL PORTRIAT in non-reflective glass. Artistic wall painting.	Nos.	1			
2.6	Size 1000 x 600mm.	Nos.	1			
2.7	Standard potted plant in clay pots with tray. Size of pot 900mm high.	Nos.	1			
<b>C</b>	<b>WINDOW FINISH</b>					
2.8	Window finish – Vertical Blinds on the external windows including all closing & opening accessories.	m2	500			
2.9	Window finish – Stained glass panels for the windows at the Restaurant space. Size 1200W x 2400H mm	Nos.	8			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS				FURNITURE		
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
D	<u>Speaker's Office &amp; Secretary's Area.</u> Furniture for the Secretary in the Speaker's Office. Install furniture that is durable with 10 years guarantee. Administration tables with cable management system.					
3.0	'L' shape tables 1600L x 1200D x 720Hmm (right side)	Nos.	1			
3.1	Mobile pedestal with lockable 3 drawers.	Nos.	2			
	<u>Administration/ Staff Chairs.</u> Supply and install Reception & Secretary's Office chair with synchronized seat/ back tilting mechanism, medium back swivel chairs with arms & appropriate plywood timber frame to leatherette finish and chrome castor legs/wheels. Chair feature has a locking mechanism that locks the seat and back angle in any position & returns to it.					
3.2	Size 750L x 750D x 1100H mm	Nos.	2			
3.3	Ditto, Admin. Visitors Chairs	Nos.	1			
	<u>Lockable cabinets</u> Supply portable low level lockable cabinet with 1" MDF framework to high quality veneers with melamine edges finish to design specification.					
3.4	Size 900L x 500D x 900H mm	Nos.	2			
	Supply portable high level lockable cabinet with 1" MDF framework to high quality veneers with melamine edges finish on the lower side and glass doors on the upper level to design specification.					
3.5	Size 900L x 500D x 1800H mm	Nos.	1			
	<u>Speaker's Office</u> Table. Supply and install straight table with a separate side extension in high quality mahogany veneers with a base of MDF and heat sealed melamine edges. Install aluminium molding for wire management system and veneered MDF mahogany side & modesty front panel to design specifications.					
3.6	Table – Size 2200L x 1100D x 750H mm	Nos.	1			
3.7	Side extension – Size 1200L x 600D x 750H mm.	Nos.	1			
	Supply lockable mobile pedestal on castors.					
3.8	Size 450L x 550D x 500Hmm	Nos.	2			
	<u>Executive Chair</u> Supply and install Executive Chair with synchronized seat/ back tilting mechanism, high back swivel chairs with arms & appropriate timber framework to genuine leather finish and chrome castor legs/wheels. Chair feature has a locking mechanism that locks the seat and back angle in any position & returns to it.					
3.9	Size 750L x 750D x 1100H mm	Nos.	1			
	Ditto for the Visitors chairs.					
3.10	Size 750L x 750D x 900H mm	Nos.	2			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS				FURNITURE		
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
	<u>Cabinets.</u>					
	<u>Lockable cabinets</u>					
	Supply portable high level lockable cabinet with 1” MDF framework to high quality veneers with melamine edges finish on the lower side and glass doors on the upper level to design specification.					
3.11	Size 900L x 500D x 1800H mm	Nos.	1			
3.12	Ditto Blazer cabinet. Size 900L x 500D x 1800H mm	Nos.	1			
	<u>Lounge Chairs</u>					
	Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal.					
	Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength.					
	Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.					
	Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
3.13	Size 1800L x 900D x 900H mm	Nos.	1			
3.14	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u>					
	Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
3.15	Size 1500L x 900 x 450H mm.	Nos.	1			
	<u>Accessories</u>					
	Artistic wall painting.					
3.16	Size 1000 x 600mm.	Nos.	1			
	<u>Sargent At Arms Office</u>					
	<u>Auxuriallary Room</u>					
	Rectangular writing tables with metal legs (cable management system) in high quality mahogany veneers with a base of mahogany laminated particle board framework and heat sealed melamine edges.					
3.17	Size 1500L x 900D x 720Hmm	Nos.	2			
	<u>Lockable cabinets</u>					
	Supply portable low level lockable cabinet with 1” MDF framework to high quality veneers with melamine edges finish to design specification.					
3.18	Size 900L x 500D x 900H mm	Nos.	2			
	<b>To Collection</b>					



PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
3.19	<p><u>Administration/ Staff Chairs.</u> Supply and install standard Office chair with tilting seat mechanism, medium back swivel chairs with arms &amp; appropriate plywood timber frame to fabric finish and castor legs/wheels.</p> <p>Size 750L x 750D x 1100H mm</p>	Nos.	3			
E	<p><b><u>DEBATING CHAMBERS</u></b> To design specification, install County Assembly member seat fabricated in natural mahogany panels on either sides and a fixed back and a flip seat with stainless steel 150mm kickplate. Connected to a writing table with retractable writing surface panel running on oft close rail. The seat will be finished to red leatherette with Court of Arms LOGO at the headrest and low mahogany armrest.</p>					
4.0	Size – seat & table 1200 depth x 800 wide mm per unit.	Nos.	102			
4.1	Speakers table to mahogany veneer finish with mahogany timber motif. Size 3000L x 1000D x 750H mm	Nos.	1			
4.2	Sargent of Arms & Clerks table to mahogany veneer finish with minimal mahogany motif. Size 3000L x 1000D x 750H mm	Nos.	2			
4.3	<p><u>Speakers Chair, Clerks &amp; Sargent of Arms Chairs.</u> Supply and install finished chairs in red leatherette with Court of Arms LOGO at the headrest and low mahogany armrest. The frame of the chairs will be in solid mahogany with legs. Plywood – The plywood for the chair skeleton contains little moisture and formaldehyde emissions are minimal. Webbing – The webbing in the chair to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength. Foam – Highly rubbery polyurethane foam, than the finished leatherette to be installed.</p> <p>Size 900L x 800D x 1100H mm</p>	Nos.	1			
4.4	Size 900L x 800D x 900H mm	Nos.	8			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS					FURNITURE	
	Total brought forward – Page 71					
	Total brought forward – Page 72					
	Total brought forward – Page 73					
	Total brought forward – Page 74					
	<b>TOTAL FOR GROUND FLOOR</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
FIRST FLOOR						
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
<b>A</b>	<b>CIRCULATION/LOBBIES</b>					
	<u>Accessories</u>					
1.0	Lift Lobby dust bins in stainless steel with screwed fitting lid.	Nos.	4			
1.1	Standard potted plant in clay pots with tray. Size of pot 600mm high.	Nos.	4			
<b>B</b>	<b>RECEPTION AREA</b>					
	<u>Lounge Chairs</u>					
	Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal.					
	Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength.					
	Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.					
	Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
2.0	Size 1800L x 900D x 900H mm	Nos.	2			
2.1	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u>					
	Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
2.2	Size 1500L x 900 x 450H mm.	Nos.	1			
	<u>Accessories</u>					
	Artistic wall painting.					
2.3	Size 1000 x 600mm.	Nos.	1			
2.4	Standard potted plant in clay pots with tray. Size of pot 900mm high.	Nos.	1			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS				FURNITURE		
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
<b>C</b>	<u>Clerk's Office &amp; Secretary's Area.</u> Furniture for the Secretary in the Speaker's Office. Install furniture that is durable with 10 years guarantee. Administration tables with cable management system.					
3.0	'L' shape tables 1600L x 1200D x 720Hmm (right side)	Nos.	1			
3.1	Mobile pedestal with lockable 3 drawers.	Nos.	1			
	<u>Administration/ Staff Chairs.</u> Supply and install Reception & Secretary's Office chair with synchronized seat/ back tilting mechanism, medium back swivel chairs with arms & appropriate plywood timber frame to leatherette finish and chrome castor legs/wheels. Chair feature has a locking mechanism that locks the seat and back angle in any position & returns to it.					
3.2	Size 750L x 750D x 1100H mm	Nos.	1			
3.3	Ditto, Admin. Visitors Chairs	Nos.	1			
	<u>Lockable cabinets</u> Supply portable low level lockable cabinet with 1" MDF framework to high quality veneers with melamine edges finish to design specification.					
3.4	Size 900L x 500D x 900H mm	Nos.	2			
	Supply portable high level lockable cabinet with 1" MDF framework to high quality veneers with melamine edges finish on the lower side and glass doors on the upper level to design specification.					
3.5	Size 900L x 500D x 1800H mm	Nos.	1			
	<u>Clerk's Office</u> Table. Supply and install straight table with a separate side extension in high quality mahogany veneers with a base of MDF and heat sealed melamine edges. Install aluminium molding for wire management system and veneered MDF mahogany side & modesty front panel to design specifications.					
3.6	Table – Size 1800L x 1100D x 750H mm	Nos.	1			
3.7	Side extension – Size 900L x 600D x 750H mm.	Nos.	1			
	Supply lockable mobile pedestal on castors.					
3.8	Size 450L x 550D x 500Hmm	Nos.	1			
	<u>Executive Chair</u> Supply and install Executive Chair with synchronized seat/ back tilting mechanism, medium back swivel chairs with arms & appropriate timber framework to genuine leather finish and chrome castor legs/wheels. Chair feature has a locking mechanism that locks the seat and back angle in any position & returns to it.					
3.9	Size 750L x 750D x 1100H mm	Nos.	1			
3.10	Ditto for the Visitors chairs. Size 750L x 750D x 900H mm	Nos.	2			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
	<u>Cabinets.</u>					
	<u>Lockable cabinets</u>					
	Supply portable high level lockable cabinet with 1" MDF framework to high quality veneers with melamine edges finish on the lower side and glass doors on the upper level to design specification.					
3.11	Size 900L x 500D x 1800H mm	Nos.	1			
3.12	Ditto Blazer cabinet. Size 900L x 500D x 1800H mm	Nos.	1			
	<u>Lounge Chairs</u>					
	Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal.					
	Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength.					
	Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.					
	Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
3.13	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u>					
	Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
3.14	Size 1500L x 900 x 450H mm.	Nos.	1			
	<u>Accessories</u>					
	Artistic wall painting.					
3.15	Size 1000 x 600mm.	Nos.	1			
<b>D</b>	<u>Boardroom</u>					
	Rectangular oval Boardroom table with metal legs & modesty panel (cable management system) in high quality mahogany veneers and heat sealed melamine edges.					
4.0	Size 3800L x 1200D x 750Hmm	Nos.	1			
	<u>Credenza cabinet</u>					
	Supply portable low level lockable cabinet with laminated MDF framework to high quality veneers with melamine edges finish to design specification.					
4.1	Size 1800L x 500D x 900H mm	Nos.	1			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS				FURNITURE		
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
4.2	<u>Boardroom Chairs.</u> Supply and install Boardroom chair with tilting seat mechanism, medium back swivel chairs with arms & appropriate plywood timber frame to fabric finish and cantilever legs.  Size 750L x 750D x 1100H mm	Nos.	14			
E	<u>PUBLIC/ MEDIA/ SPEAKER'S GALLERY</u> To design specification, install County Assembly Gallery seat fabricated in natural mahogany panels on either sides and a fixed back and a flip seat with stainless steel 150mm kickplate. Connected to a writing table with retractable writing surface panel running on oft close rail. The seat will be finished to red leatherette and low mahogany armrest.  Size – seat & table 1200 depth x 700 wide mm per unit.	Nos.	60			
	<b>SUB-TOTAL</b>					
	Total brought forward – Page 76					
	Total brought forward – Page 77					
	Total brought forward – Page 78					
	Total brought forward – Page 79					
	<b>TOTAL FOR FIRST FLOOR</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
SECOND FLOOR						
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
<b>A</b>	<b>CIRCULATION/LOBBIES</b>					
	<u>Accessories</u>					
1.0	Lift Lobby dust bins in stainless steel with screwed fitting lid.	Nos.	4			
1.1	Standard potted plant in clay pots with tray. Size of pot 600mm high.	Nos.	4			
<b>B</b>	<b>RECEPTION AREA</b>					
	<u>Lounge Chairs</u>					
	Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal.					
	Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength.					
	Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.					
	Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
2.0	Size 1800L x 900D x 900H mm	Nos.	2			
2.1	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u>					
	Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
2.2	Size 1500L x 900 x 450H mm.	Nos.	1			
	<u>Accessories</u>					
	Artistic wall painting.					
2.3	Size 1000 x 600mm.	Nos.	1			
2.4	Standard potted plant in clay pots with tray. Size of pot 900mm high.	Nos.	1			
	.					
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
C	<u>Speaker's Panel Members Office &amp; Media Centre Area.</u> Table. Supply and install straight table in high quality mahogany veneers with a base of MDF & fixed single drawer; and heat sealed melamine edges.					
3.0	Tables size 1000L x 600D x 720Hmm	Nos.	10			
	<u>Standard Chairs.</u> Supply and install standard office chair with synchronized seat/ back tilting mechanism, medium back swivel chairs with low arms & appropriate plywood timber frame to fabric finish and castor legs/wheels.					
3.1	Size 750L x 750D x 900H mm	Nos.	10			
	<u>Open Shelves cabinets</u> Supply high level 1800mm high open storage shelves in high quality laminated MDF finish with steel legs and bolts with laminated MDF open shelves to design specifications.					
3.2	Size 900L x 500D x 1800H mm	Nos.	7			
	<u>Deputy Clerk's Office</u> Table. Supply and install straight table with a separate side extension in high quality mahogany veneers with a base of MDF and heat sealed melamine edges. Install aluminium molding for wire management system and veneered MDF mahogany side & modesty front panel to design specifications.					
3.3	Table – Size 1800L x 1100D x 750H mm	Nos.	1			
3.4	Side extension – Size 900L x 600D x 750H mm.	Nos.	1			
	Supply lockable mobile pedestal on castors. Size 450L x 550D x 500Hmm					
3.5	Size 450L x 550D x 500Hmm	Nos.	1			
	<u>Executive Chair</u> Supply and install Executive Chair with synchronized seat/ back tilting mechanism, medium back swivel chairs with arms & appropriate timber framework to genuine leather finish and chrome castor legs/wheels. Chair feature has a locking mechanism that locks the seat and back angle in any position & returns to it.					
3.6	Size 750L x 750D x 1100H mm	Nos.	1			
3.7	Ditto for the Visitors chairs. Size 750L x 750D x 900H mm	Nos.	2			
	<b>To Collection</b>					



PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
	<u>Cabinets.</u> <u>Lockable cabinets</u> Supply portable high level lockable cabinet with 1” MDF framework to high quality veneers with melamine edges finish on the lower side and glass doors on the upper level to design specification.					
3.11	Size 900L x 500D x 1800H mm	Nos.	1			
3.12	Ditto Blazer cabinet. Size 900L x 500D x 1800H mm	Nos.	1			
	<u>Lounge Chairs</u> Plywood – The plywood for the sofa skeleton contains little moisture and formaldehyde emissions are minimal. Webbing – The webbing in the sofa to be used should be of high-strength elastic. The seat pan and back rest are made by tightly interlacing bands with a tensile strength. Foam – Highly rubbery polyurethane foam, than the genuine leather to be installed.  Supply and install Executive Lounge Sofa settee chairs with arms & appropriate timber frame to genuine leather finish and mahogany polished timber legs.					
3.13	Size 800L x 900D x 900H mm	Nos.	2			
	<u>Coffee Table</u> Supply and install Executive Coffee table with magazine rack & solid mahogany timber panel legs to design specification.					
3.14	Size 1500L x 900 x 450H mm.	Nos.	1			
	<u>Accessories</u> Artistic wall painting. Size 1000 x 600mm.					
3.15		Nos.	1			
	<b>To Collection</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS				FURNITURE		
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
	Total brought forward – Page 80					
	Total brought forward – Page 81					
	Total brought forward – Page 82					
	<b>TOTAL FOR SECOND FLOOR</b>					

PROPOSED MODERN ASSEMBLY CHAMBERS			FURNITURE			
BASEMENT/ ARCHIVE						
Item	Description	Unit	Quantity	Rate	Kshs.	Cts.
A	<b>ARCHIVE/ REGISTRY/ STORAGE</b> <u>Open Shelves cabinets</u> Supply high level 1800mm high open storage shelves in high quality laminated MDF finish with steel legs and bolts with laminated MDF open shelves to design specifications.					
1.0	Size 900L x 500D x 1800H mm	Nos.	80			
<b>TOTAL FOR BASEMENT</b>						

Item	Description		Kshs.	Cts.
	GROUND FLOOR Total carried forward, Page 75			
	FIRST FLOOR Total carried forward, Page 79			
	SECOND FLOOR Total carried forward, Page 83			
	BASEMENT Total carried forward, Page 84			
	<b>GRAND TOTAL</b>			
	<b>Total to Summary</b>			

PROPOSED MODERN ASSEMBLY CHAMBERS				SIGNAGE		
S.No.	Name of the sign	Size in mm wxh	Specifications	Total Qty	Rate in Kshs	Total in Kshs
<b>A</b>	<b>EXTERNAL SIGNS</b>		<b><u>SUPPLY AND INSTALLATIONS:</u></b>			
A1	NAKURU COUNTY ASSEMBLY ( ILLUMINATED )	800 x 14500	External Facade Sign: Fabrication & Supply of External Facade Sign Logo made of 1.8 mm thick Aluminium for side returns by Laser cutting and welding. Gold colour powder coating for letters side returns. The Facia to be sealed using Let - R-edge Jewelite trim cap to avoid dust and water from seeping into sign. Sign facia made of polycarbonate sheet day time gold and night time white effect upon illumination. Illumination using Samsung GOQ LED Modules frosted with 1.08 W power output. LED Drivers of Union Korea make with IP 68 rating ROHC & CE Certified. LED Warranty for 3 Years.	1		
A2	NATIONAL ASSEMBLY ( ILLUMINATED )	150mm H	Sign made of SS 304 grade 18 mm thick and back made of 15 mm thick Acrylic,for Illumination using Samsung GOQ LED Modules frosted with 1.08 W power output. LED Drivers of Union Korea make with IP 68	1		
A3	COURTS OF ARMS	800 x 800	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.back made of 4 mm thick Acrylic	1		
<b>B</b>	<b>INTERNAL SIGNS</b>					
B1	Washroom Sign M	250 H	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.back made of 4 mm thick Acrylic	6		
B2	Washroom Sign F	250 H	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.back made of 4 mm thick Acrylic	6		
B3	Washroom Sign D	250 H	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.back made of 4 mm thick Acrylic	6		
B4	All Floor Directory	1000 X 800	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	1		
G1	Speakers Office	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	1		
G2	Gown Room	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on	1		
G3	Speakers Entrance	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	1		
To Collection						

PROPOSED MODERN ASSEMBLY CHAMBERS				SIGNAGE		
S.No.	Name of the sign	Size in mm wxh	Specifications	Total Qty	Rate in Kshs	Total in Kshs
G4	Secretary	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
G5	Reception	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
G6	Speakers Lobby	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
FF1	Clerk	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
FF2	Members Boardroom	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
FF3	Public Gallery & Media	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
FF4	Clerk office	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
FF5	Visitors Lounge	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF1	Private Speaker Dinning	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF2	Spekar Panel Members	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF3	Members restaurant	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
To Collection						

PROPOSED MODERN ASSEMBLY CHAMBERS				SIGNAGE		
S.N o.	Name of the sign	Size in mm wxh	Specifications	Total Qty	Rate in Kshs	Total in Kshs
SF4	Media Corner	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF5	Store Room	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF6	Deputy Speaker Office	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
SF7	Kitchen	400 x 125	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	1		
B5	In case of fire	200x200	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	4		
B6	No Smoking	200x200	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	6		
B7	Electrical Duct	300x100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	3		
B8	Mechenical Duct	300x100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	3		
B9	ICT Duct	300x100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking screws and SS paste on acrylic with 3M VHB tape.	3		
B11	Security Check Point	250x400	5mm thick perspex with UV reverse graphics direct printing on perspex to avoid the bubbles.	1		
B12	Store Room	300 X 100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.	2		
B13	Generator Room	300 X 100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.	1		
To Collection						

PROPOSED MODERN ASSEMBLY CHAMBERS				SIGNAGE		
S.No.	Name of the sign	Size in mm wxh	Specifications	Total Qty	Rate in Kshs	Total in Kshs
B14	Transformer Room	300 X 100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.	1		
B15	Switch Room	300 X 100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.	1		
B16	Mgt Office	200x200	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	1		
B17	CCTV Room	200x300	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	1		
B18	MDF Room	300 X 100	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text.	1		
B19	Floor ID For main stairs	200x200	Sign made of 1.2 mm thick ss 304 grade hairline finish with chemically etched and colour fill text. Back made of 4mm thick acrylic and fix on wall with suncking srews and SS paste on acrylic with 3M VHB tape.	4		
<b>FIRE AND SAFETY SIGNS</b>						
C1	Floor ID For Fire Exit stairs	250x250	Fabrication of Fire Action Sign made of 4 mm thick cheluka sheet with Photoluminiscent film and 3M plotter cut vinyl. (glow in the dark)	6		
C2	Fire Hose Reel/ Fire Extinguisher	200x200	Fabrication of Fire Action Sign made of 4 mm thick cheluka sheet with Photoluminiscent film and 3M plotter cut vinyl. (glow in the dark)	3		
C3	Fire Action	300 X 400	Fabrication of Fire Action Sign made of 4 mm thick cheluka sheet with Photoluminiscent film and 3M plotter cut vinyl. (glow in the dark)	3		
C4	Fire Assembly Point	1000x1000	Fabrication of Fire Assembly point sign of 4mm ACP CNC Routed and applied on top. Text and Pictos using reflective media	6		
				To Collection		



PROPOSED MODERN ASSEMBLY CHAMBERS			SIGNAGE		
<b><u>Collection PAGE</u></b>					
Collection from Page 86					
Collection from Page 87					
Collection from Page 88					
Collection from Page 89					
		Total to Summary			

		Qty	Unit	Rate	KSHS	CTS
a	<p><b>MACE</b></p> <p>Supply and fix 1680 x 745 x 633 mm deep external dimensions; 1420 x 560 x 455 mm deep internal dimensions; approximately 390 kg; pure brass fabricated mace; coated with 18 carat gold plating; with and including one drawer and three shelves, all of mahogany hardwood with soft velvet inner lining of approved colour; two specific stands upper and lower stands 177.8mm high coated with 18 carat gold with an inner lining of soft velvet of approved colour; two sets of gloves for handling; and a set of cleaning materials for demonstration and use to clean the mace; all including features, details, decorations, and artistic impressions to architect's specifications; all to architects details and approval</p>			Item		
To Summary KSHS						

PROPOSED MODERN ASSEMBLY CHAMBERS					
	Qty	Unit	Rate	KSHS	CTS
<b>Summary</b>					
DEMOLITIONS Page 2					
SUBSTRUCTURES Page 12					
FRAME Page 16					
ROOF Page 23					
STAIRS Page 28					
WALLS Page 30					
WINDOWS Page 35					
DOORS Page 40					
WALL FINISHES Page 45					
FLOOR FINISHES Page 48					
CEILING FINISHES Page 50					
GATE HOUSE Page 69					
EXTERNAL WORKS Page 70					
FURNITURE Page 85					
SIGNAGE Page 90					
MACE Page 91					
Total for Bill KSHS					

**PART NO. 8**

**ELECTRICAL AND GENERATOR  
SET INSTALLATION WORKS**

# TABLE OF CONTENTS

<b><u>TITLE</u></b>	<b><u>PAGE</u></b>
<b>Contents</b> .....	(i)
<b>SECTION A:</b> General Specifications of Materials and Works (ELECTRICAL).....	A/1--A/23
<b>SECTION B:</b> Particular Specifications of Materials and Works. (GENSET)...	B/1-B14
<b>SECTION C:</b> Bills of Quantities.....	.C /1—C35
<b>SECTION D:</b> Schedule of Unit Rates.....	D/1--D/2
<b>SECTION E:</b> Technical Schedule of Items to be Supplied.....	E/1--E/2

**SECTION A**

**GENERAL SPECIFICATION**

**OF**

**MATERIALS AND WORKS**

## **GENERAL SPECIFICATIONS OF MATERIALS AND WORKS**

- 2.1 General
- 2.2 Standard of Materials
- 2.3 Workmanship
- 2.4 Procurement of Materials
- 2.5 Shop Drawings
- 2.6 Record Drawings
- 2.7 Regulations and Standards
- 2.8 Setting out Works
- 2.9 Position of Electrical Plant and Apparatus
- 2.10 M.C.B Distribution Panels and Consumer Units
- 2.11 Fused Switchgear and Isolators
- 2.12 Conduits and Conduit Runs
- 2.13 Conduit Boxes and Accessories
- 2.14 Labels
- 2.15 Earthing
- 2.16 Cables and Flexible Cords
- 2.17 Armoured PVC Insulated and Sheathed Cables
- 2.18 Cable Supports; Markers and Tiles
- 2.19 PVC Insulated Cables
- 2.20 Heat Resisting Cables
- 2.21 Flexible Cords

- 2.22 Cable Ends and phase Colours
- 2.23 Cable Insulation Colours
- 2.24 Sub-circuit Wiring
- 2.25 Space Factor
- 2.26 Insulation
- 2.27 Lighting Switches
- 2.28 Sockets and Switched sockets
- 2.29 Fused Spur Boxes
- 2.30 Cooker Outlets
- 2.31 Connectors
- 2.32 Lampholders
- 2.33 Lamps
- 2.34 lighting Fittings Street lighting Lanterns
- 2.35 Position of Points and Switches
- 2.36 Street/Security Lighting Columns
- 2.37 Timing Control Switch
- 2.38 Wiring System for Street Lighting
- 2.39 Metal control Pillar
- 2.40 Current Operated Earth leakage circuit breaker
- 2.41 MV Switchboard
- 2.42 Steel Conduits and Steel Trunking
- 2.43 Testing on Site



## **2.1 SHOP DRAWINGS**

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

## **2.2 RECORD DRAWINGS**

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

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

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

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

## **2.3 REGULATIONS AND STANDARDS**

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

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

## **2.4 SETTING OUT WORK**

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

## **2.5 POSITIONS OF ELECTRICAL PLANT AND APPARATUS**

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

## **2.6 MCB DISTRIBUTION PANELS AND CONSUMER UNITS**

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

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

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

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

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

Insulated barriers shall be fitted between phases, and neutrals in all boards, and to shroud live parts.

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

## **2.7 FUSED SWITCHGEAR AND ISOLATORS**

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

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

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

Isolators shall be load breaking/fault making isolators.

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

## **2.8 CONDUITS AND CONDUIT RUNS**

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

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

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

The Sub-contractors attention is drawn to the necessity of keeping all conduits entirely separate from other piping services such as water and no circuit connections will be permitted between conduits and such pipes.

All conduits systems shall be arranged wherever possible to be self-draining to switch boxes and conduit outlet points for fittings:

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

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

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

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

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

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

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

## **2.13 CONDUIT BOXES AND ACCESSORIES**

All conduit outlets and junction boxes are to be either malleable iron and of standard circular pattern of the appropriate type to suit saddles being used or super high impact PVC manufactured to KS 04 – 179 : 1983.

Small circular pattern boxes are to be used with conduits up to and including 25mm outside diameter. Rectangular pattern adaptable boxes are to be used for conduits of 32mm outside diameter and larger. For drawing in of cables in exposed runs of conduit, standard pattern through boxes are to be used:

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

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

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

## **2.14 LABELS**

Labels fitted to switches and fuseboards;-

- (i) Shall be Ivorine engraved black on white.
- (ii) Shall be secured by R.H brass screws of same manufacturing throughout.
- (iii) Shall be indicated on switches:-
  - a) Reference number of switch
  - b) Special current rating
  - c) Item of equipment controlled
- (iv) Shall indicate on MCB panels
  - a) Reference number
  - b) Type of board, i.e., lighting, sockets, etc.,
  - c) Size of cable supplying panel
  - d) where to isolate feeder cable
- (v) Shall be generally not less than 75mm x 50mm.

## 2.15 EARTHING

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

- (i) It shall be carried out in accordance with the appropriate sections of the current edition of the Regulations, for the Electrical Equipment of Buildings issued by Institute of Electrical Engineers of Great Britain.
- (ii) At all main distribution panels and main service positions a 25mm x 3mm minimum cross sectional area Copper tape shall be provided and all equipment including the lead sheath and armouring of cables, distribution boards and metal frames shall be bonded thereto.
- (iii) The earth tape in Sub-clause (ii) shall be connected by means of a copper tape or cable of suitable cross sectional area to an earth electrode which shall be a copper earth rod (see later sub-clause).
- (iv) All tapes to be soft high conductivity copper, untinned except where otherwise specified and where run underground on or through walls, floors, etc., it shall be served with corrosion resisting tape or coated with corrosion compound and braided
- (v) Where the earth electrode is located outside the building a removable test link shall be provided inside the building as near as possible to the point of entry to the tape, for isolating the earth electrode for testing purposes.
- (vi) Earthing of sub-main equipment shall be deemed to be satisfactory where the sub-main cables are M.I.C.S. or conduit with separate earth wire, and installation is carried out in accordance with the figures stated in the current edition of the I.E.E Regulations.
- (vii) Where an earth rod is specified (see Sub-clause (iii) it shall be proprietary manufacture, solid hand drawn copper of 15mm diameter driven into the ground to a minimum depth of 3.6m . It shall be made up to 1.2m sections with internal screw and socket joints and fitted with hardened steel tip and driving cap.
- (viii) Earth plates will not be permitted
- (ix) Where an earth rod is used the earth resistance shall be tested in the manner described in the current edition of the IEE Regulations, by the Sub-Contractor in the presence of the Engineer and the Sub-Contractor shall be responsible for the supply of all test equipment.
- (x) Where copper tape is fixed to the building structure it shall be by means of purpose made non-ferrous saddles which space the conductor away from the structure a minimum distance of 20mm. Fixings, shall be made using purpose made plugs; No fixings requiring holes to be drilled through the tape will be accepted.
- (xi) Joints in copper tape shall be tinned before assembly riveted with a minimum of two copper rivets and seated solid.

- (xii) Where holes are drilled in the earth tape for connection to items of equipment the effective cross sectional area must not be less than required to comply with the IEE regulations.
- (xiii) Bolts, nuts and washers for any fixing to the earth tape must be of non-ferrous material.
- (xiv) Attention is drawn to the need for the earthing metal parts of lighting fittings and for bonding ball joint suspension in lighting fittings.

## **2.16 CABLES AND FLEXIBLE CORDS**

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

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

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

P.V.C. insulated cables shall be 500/1000 volt grade. No cables smaller than 1.5mm<sup>2</sup> shall be used unless otherwise specified. The installation and the finish of cables shall be as detailed in later clauses. The colour of cables shall conform with the details stated in the "Cable Braid and insulation Colours" Clause.

## **2.17 ARMoured P.V.C. INSULATED AND SHEATHED CABLES:**

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

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

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

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

## **2.18 CABLE SUPPORTS, MARKERS AND TILES**

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

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

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

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

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

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

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

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

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

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



### **2.19 PVC INSULATED CABLES**

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

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

### **2.20 HEAT RESISTING CABLES**

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

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

### **2.21 FLEXIBLE CORDS**

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

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

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

### **2.22 CABLE ENDS AND PHASE COLOURS**

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

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

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

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

SYSTEMINSULATION COLOURCABLE END  
MARKER**Main and Sub-Main**

a) Phase	Red	Red
b) Neutral	Black	Black

**1) Sub-Circuits  
Single Phase**

a) Phase	Red	Red
b) Neutral	Black	Black

**2.24 SUB-CIRCUIT WIRING**

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

Lighting circuits P. V.C. cable 1.5mm<sup>2</sup> for all lighting circuits indicated on the drawing. Power circuits P.V.C cable (minimum sizes).

- (i) 2.5mm<sup>2</sup> for one, two or three 5Amp sockets wired in parallel.
- (ii) 2.5mm<sup>2</sup> for one 15Amp socket.
- (iii) 2.5mm<sup>2</sup> for maximum of ten switched 13 Amp sockets wired from 30 Amp MCB.

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

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

## **2.25 SPACE FACTOR**

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

## **2.26 INSULATION**

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

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

## **2.27 LIGHTING SWITCHES**

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

## **2.28 SOCKETS AND SWITCHED SOCKETS**

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

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

## **2.29 FUSED SPUR BOXES**

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

## **2.30 COOKER OUTLETS**

These shall be flush mounted with 13-A switched socket outlet and neon indicator Lamps.

The cooker control units shall be as manufactured by “M.K. Electrical Company Ltd”, or other approved equal KS 04 – 247: 1988

## **2.31 CONNECTORS**

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

### **2.32 LAMPHOLDERS**

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

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

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

### **2.33 LAMPS**

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

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

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

### **2.34 LIGHTING FITTINGS AND STREET LIGHTING LANTERNS**

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

All fittings and pendants shall be fixed to the conduit boxes with brass R/H screws. These to be in line with metal finish of fittings. The lighting fittings are detailed for the purpose of establishing a high standard of finish and under no circumstances will substitute fittings be permitted.

In case of rectangular shaped ceiling fittings, the extreme ends of the fittings shall be secured to suitable support in addition to the central conduit box fittings. Supports shall be provided and fixed by the Sub-Contractor.

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

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

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

### **2.35 POSITIONS OF POINTS AND SWITCHES**

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

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

### **2.36 STREET/SECURITY OUTDOOR LIGHTING COLUMNS:**

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

### **2.37 TIMING CONTROL SWITCH**

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

### **2.38 WIRING SYSTEM FOR STREETLIGHTING**

Cables shall be as indicated on the drawings, and shall be laid in a cable trench 450mm deep along the road sides and 600mm deep across the roads and 900mm away from the road kerb or 1500mm away from the edges of the road. 'Loop-in' and 'Loop-out' arrangement shall be used at every pole. Wiring to the lanterns on each pole shall be with 1.5mm<sup>2</sup> PVC twin insulated and sheathed cable with earth wire shall be laid at least 600mm below the finished road level on a compact bed of murrum at least 50mm thick and covered with a concrete surrounded 150mm thick.

### **2.39 METAL CONTROL PILLAR**

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

### **2.40 CURRENT OPERATED EARTH LEAKAGE CIRCUIT BREAKER**

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

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

### **2.41 M.V. SWITCHBOARD AND SWITCHGEAR**

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

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

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

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

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

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

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

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

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

## 2.42 STEEL CONDUITS AND STEEL TRUNKING

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

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

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

All trunking fittings (i.e. Bends, tees, etc) shall leave the main through completely clear of obstructions and continuously open except through walls and floors at which points suitable fire resisting barriers shall be provided as may be necessary. The inner edge of bends and tees shall be chamfered where cables larger than 35mm<sup>2</sup> are employed.

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

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

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

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

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



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

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

Conduit and trunking shall be mechanically and electrically continuous. Conduit shall be tightly screwed between the various lengths so that they butt at the socketed joints. The internal edges of conduit and all fittings shall be smooth, free from burrs and other defects. Oil and any other insulating substance shall be removed from the screw threads; where conduits terminate in fuse-gear, distribution boards, adaptable boxes, non-spouted switchboxes, etc., they shall, unless otherwise stated, be connected thereto by means of smooth bore male brass bushes, compression washers and sockets. All exposed threads and abrasions shall be painted using an oil paint for black enamelled tubing and galvanising paint for galvanised tubing immediately after the conduits are erected. All bends and sets shall be made cold without altering the section of the conduit. The inner radius of the bend shall not be less than four (4) times the outside diameter of the conduit. Not more than two right angle bends will be permitted without the inter-position of a draw-in-box. Where straight runs of conduit are installed, draw-in-boxes shall be provided at distances not exceeding 15m. No tees, elbows, sleeves, either of inspection or solid type, will be permitted.

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

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

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

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

All adaptable boxes and lids of the same size shall be interchangeable. Boxes used on surface work are to be tapped or drilled to line up with the conduit fixed in distance type saddles allowing clearance between the conduit and wall without the need for setting the conduit.

Where used in conjunction with mineral insulated copper sheathed cable, galvanised boxes shall be used and painted after erection.

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

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

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

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

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

#### **2.43 TESTING ON SITE**

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

- (a) Tests shall be carried out to prove that all single pole switches are installed in the 'live' conductor.
- (b) Tests shall be carried out to prove that all socket outlets and switched socket outlets are connected to the 'live' conductor in the terminal marked as such, and that each earth pin is effectively bonded to the earth continuity system. Tests shall be carried out to verify the continuity of all conductors of each 'ring' circuit.
- (c) Phase tests shall be carried out on completion of the installation to ensure that correct phase sequence is maintained throughout the installation. Triplicate copies of the results of the above tests shall be provided within 14 days of the witnessed tests and the Sub-contractor will be required to issue to the service engineer the requisite certificate upon completion as required by the regulations referred to above.

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

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

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

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

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

## **APPENDIX TO GENERAL SPECIFICATIONS OF MATERIALS AND WORKS**

The electrical sub-contractor shall comply with the following:-

1. Government Electrical Specifications No. 1 and No. 2.
2. All requirements of Kenya Power and Lighting Company Limited, and Communications Authority of Kenya (CA).
3. Be duly registered with National Construction Authority for Electrical installation works with a valid annual practicing license.
4. Have a valid license from Energy Regulatory Commission for Electrical installation works.

## **PARTICULAR SPECIFICATIONS**

### **1.0 SITE LOCATION**

The site of the proposed works is as described elsewhere in this tender document.

### **2.0 SCOPE OF WORKS**

The works to be carried out under this sub-contract comprise supply, installation, testing and commissioning of the following:-

#### **Electrical Works**

This shall include: -

**a. Electrical Installation**

This shall include conduiting, cabling, fittings and accessories

**b. Fire Alarm system**

This shall include conduiting, cabling, fittings and accessories

**c. Telephone points Installation**

This shall include conduiting, trunking and telephone outlet plates.

**d. Computer points.**

This shall include conduiting, trunking and Data outlet plates.

### **3.0 MATERIALS FOR THE WORKS**

Materials shall be as specified in Section D and in the Bills of Quantities of this document which shall be read in conjunction with contract drawings. Alternative materials shall be accepted only after approval by the Project Manager.

### **4.0 BROCHURES FOR FIRE ALARM, DSTV AND VHF/UHF RECEIVERS.**

For consideration and qualification tenderers shall, at their own cost, provide coloured manufactures brochures detailing technical literature and specifications.

**SECTION B**  
**PARTICULAR SPECIFICATIONS**  
**OF**  
**DIESEL ENGINE GENERATORS**

# PARTICULAR SPECIFICATIONS FOR THE STANDBY GENERATING SYSTEM

## CONTENTS

1. Location of Site
2. Climatic Condition
3. Operating Conditions
4. Functional objects
5. Scope of the Contract
6. Performance objectives
7. Generating Set Arrangements
8. Diesel Engine
  - General
  - Fuel Oil System
  - Lubricating Oil System
  - Starting of Engine
  - Cooling System
  - Governing System
  - Exhaust System
  - Engine Instruments
  - Pipe work, Valves and Fittings
- 9.0. The Generator (Alternator and Exciter)
  - 9.1 General
  - 9.2 Excitation
  - 9.3 Electrical Control Panel
  - 9.4 Lock-out
  - 9.5 Fault Indication
  - 9.6 Starting Battery and Charger
  - 9.7 Wiring and Earthing
  - 9.8 Contactors
  - 9.9 Relays
  - 9.10 Fuses
  - 9.11 Rectifiers, capacitors and solid state components
  - 9.12 Enclosures for Equipment
- 10.0 Lifting Gear and Handling
- 10.0 Commissioning

## PARTICULAR SPECIFICATION FOR THE STANDBY GENERATING SYSTEM.

### **1**     **Location of site**

The site for the proposed Contract Works is as described elsewhere in this document

### **2**     **Climatic Condition**

The following climatic conditions apply at the site of the contract work and the equipment, materials and the installations shall be suitable for these conditions.

Mean Maximum Temperatures 32°C  
Mean Minimum Temperature 17.4°C  
Range of Relative humidity 39% - 97%  
Salt in the atmosphere 0.02%  
Altitude 1095M above sea level  
Latitude /Longitude 00°21' N/37°35' E  
Solar Radiation, February Mean Max 630 Langleys

Extremely heavy rainfall is experienced at certain periods of the year and the contractor shall be deemed to have taken account of this factor both in his prices and his planning of the execution of the contract works.

### **3**     **Operating Conditions**

The equipment and all components shall be suitable for the operation in ambient conditions of 24°C to 36°C and up to 100% relative humidity

- i)       in an unheated ventilated building
- ii)      In the open air as specified

Unless otherwise stated all ratings of equipment and components shall be interpreted as site rating and NOT sea level or other ratings.

### **4.**     **Functional Objectives**

The set shall be capable of operating continuously and satisfactorily in a medium dust laden atmosphere as defined in BS 1701 and in accordance with BS 649.

The generating set is required for standby duty and will be connected to the switchboard through a circuit. It shall have an automatic mains failure control, appropriately interlocked with the other incoming supply. Provisions shall be made in the control circuit of the generator for automatic and remote push button control, including the terminals and cable glands for all external cables, which will be supplied by others, where specified. It shall also be possible to start, operate and stop the set manually, independent of any automatic features.

Within the operating conditions specified in part 3 above the set shall be capable of starting and accepting full load within the shortest possible time, and in any case, in not more than 10 seconds. Any special features included to achieve this shall be stated in Section F.



## 5. Scope of the Contract Works

The work covered by this Specification includes the design, manufacture, supply, delivery, installation, commissioning and testing to the satisfaction of the Engineer and maintenance for a period of twelve months of a new generating set complete with all necessary ancillary equipment.

The equipment to comprise **250KVA**, 415 volts/3 phase /50Hz continuously rated diesel generator set with all integral accessories, and all necessary equipment for the safe and efficient working of the set. The diesel generator set will be site rated at level of 1660 metres, Kenya Datum.

Diesel generator set to include:

- a) Push button starting, starting battery and mains power supply trickle charger to be included.
- b) 72 hour operational running capacity auxiliary fuel oil storage tank, loose transfer pump and duplex oil strainer.
- c) An integral belly/ base fuel tank for daily service with an operational running capacity of 8 hours
- d) All interconnecting pipe work, valves and fittings between the storage tank, base tank and the diesel engine.
- e) An automatic generator control unit
- f) A diesel generator control cubicle
- g) Acoustic enclosure/ sound attenuated canopy
- h) All local wiring
- i) Maintenance tools and spare parts as specified.

## 6 Performance Objective

The output rating of the set in KVA, the voltage, the number of phases and the frequency shall be as specified in Bill No.2 Schedule 1 of the Bills of Quantities.

Within the operating conditions specified the set, equipped with its standard air intake filters, shall be capable of delivering its rated output continuously at rated voltage and 0.8 lagging power factor and of delivering 10% in excess of the continuous maximum rating for a period of one hour in any 12 hour period.

The steady state voltage shall be maintained within 2 ½ % of the rated voltage under control of the voltage regulator between the cold start ambient conditions and the maximum working temperature, from no load to 10% overload and from unity to 0.8 lagging power factor. After any change of load the voltage shall not vary by more than + 15% of the rated voltage and shall return to within +/- 3% within 3 seconds and to within 2 ½ % of rated voltage within 1 seconds. On starting the voltage overshoot shall not exceed 15% and shall return to within 3% in not more than 3 seconds.

The governing of the set shall be such that the steady load speed band shall not exceed 1% of rated speed. Sudden removal of the full load at rated frequency shall not cause the frequency to rise above 110% of the rated frequency and it shall return to within 105% of the rated frequency within 3 seconds. The resultant steady state frequency shall return to 104% within 15 seconds. If full load is then reimposed the frequency shall not fall below 94% of rated frequency and shall return to 99% within 3 seconds and to the rated frequency within 15 seconds. The cyclic irregularity of the set at full load shall not be worse than 1/150.

The deviated interference shall be suppressed to the limit specified in BS 800 and BS 833.

## 7. Generating Set Arrangement

Unless otherwise indicated the set and its auxiliaries shall be mounted on sufficiently substantial under-base. All items which must be held in correct relative alignment shall be located by means of dowels.

The set shall be designed and supplied for operation bolted to the floor on robust anti-vibration and shock absorbing devices. They shall have adjusting screws for optimum setting and levelling and be so designed and installed that no appreciable engine vibration shall be transmitted to the floor or to any surrounding.

Bearings shall be suitable for operation over long periods without the need for replacement of the lubricant. Oil lubricated bearings shall be fitted with a visible oil level gauge.

## 8. Diesel Engine

### 8.1 General

The engine shall comply in design and performance with BS.649 "Diesel Engines for General purposes" or its approved equivalent. The engine shall be designed for satisfactory operation on fuel oil and lubricating oils complying with BS. 2869.

The engine shall be totally enclosed, with forced lubrication from an integral pump having on the suction side a coarse strainer and on the delivery side a dual 'full flow' fine filter with a changeover cock incorporating pressure by-pass, so that the oil flow to the engine is maintained if the filter should choke. Alternatively a single filter of the self-cleaning type fitted with a by-pass relief valve and having the same filtration performance may be provided. Manual lubrication of any part of the engine will not be accepted. The capacity of the lubricating oil system shall be sufficient to enable the engine to run continuously for 12 hours at any load without replacement.

A filter with a by-pass relief valve shall be inserted in the fuel line immediately before the pump(s). The fuel filter element shall be incapable of passing particles larger than micrometers. The fuel system shall be so arranged that fuel resulting from filter, pump or pipe spillage shall be incapable of entering the engine sump.

Air filters complying with KS 06-294: 1986, Grade 'A' and Grade 'B' suitable for use in a dusty atmosphere shall be fitted on the engine air intake(s)

No significant critical speed of the complete shaft system, including the generator, shall be within 15% of the rated speed.

A manually reset overspeed trip shall be fitted to stop the engine if its speed exceeds the rated speed by 15%. A mechanical trip is preferred but an electrical overspeed trip may be offered. Both types shall be equipped with a pair of contacts which close on operation of the trip. If the device is belt driven, at least two belts shall be provided and the drive shall be capable of carrying full load with one belt removed.

The set shall be arranged such that on shut-down the cooling water temperature shall not rise with residual heat so that the high water temperature lock-out operates. The engine may be naturally aspirated as pressure charged, or as indicated.

The starting shall be by means of electricity supplied from a starter battery. The starter motor shall be of axial type, de-energizing by a device operated from the engine. A means of manual starting shall also be provided.

Suitable means shall be provided for running by hand the engine main shaft and the associated generator to facilitate inspection and overhaul.

If weekly test runs are insufficient to prevent the drying out of the bearings, means shall be provided to ensure that the bearing surfaces are adequately and automatically wetted with lubricating oil either periodically or immediately prior to every start.

The engine shall be capable of being started from any crank position. A thermostatically controlled 240-volt immersion heater may be fitted in the engine lubricating oil sump to facilitate starting. The heating surface loading of any lubricating oil heater(s) shall not exceed 0.015 watt per square millimeter to avoid carbonization of oil.

An efficient exhaust silencer with adequate draining facilities shall be supplied, and shall either be mounted on the set or installed in a generator room constructed as shown on the drawing indicated. The exhaust silencer system shall be so arranged that it may be readily relocated if required. Where any additional piping bends and fittings are specified, the manufacturer shall advise on any problems involved.

## **8.2 Fuel Oil System**

An auxiliary fuel storage tank whose minimum capacity shall be sufficient to run the engine continuously on full load for 72 hours shall be installed in the position indicated in the contract drawing. It shall be supplied complete with supports.

The tank shall be fitted with a hand operated fuel with a flexible suction hose to permit filling from a drum on the floor.

A three way cock shall be fitted in the line from tank to the engine to enable the fuel to be supplied from a source other than the storage tank.

The position of the cock shall be clearly marked 'MANUAL, AUTOMATIC, OFF' as applicable.

A duplex oil filter shall be supplied between the storage tank and the diesel engine. The duplex filter shall be capable of being cleaned without dismantling, or in interruption of the fuel flow, and shall be easily maintainable. The tank shall be equipped with a graduated dipstick, a clearly visible contents' gauge (not of the site glass type) and with drain, vent, overflow and inlet and outlet connection.

The set shall also have an integral belly/base fuel tank for daily services with an operational running capacity of 8 hours.

## **8.3 Lubricating Oil System**

An engine driven integral gear type lubricating oil pump shall be provided. The lubricating oil system shall include an oil cooler and fine mesh filters, together with devices to indicate lubricating oil pressure and to initiate a 240 volt A.C. Lubricating oil Low pressure Alarm, Lubricating Oil High Temperature Alarm and Cooling Water High Temperature Alarm.

As separate 240 volt A.C. Motor driven automatic lubricating oil priming pump shall be provided for intermittent operation when the diesel is lying idle.

## **8.4 Starting of Engine**

The diesel generator set shall have facilities for local and remote push button starting, with a Local/ Remote/ Automatic selector switch at the local panel.

On mains failure the engine shall be capable of being automatically started from battery located near the generator set.

The battery shall be complete with drip tray and trickle charger.

All necessary relays, contacts, switches and miscellaneous items for the starting

sequence shall be supplied and installed in the local control panel.

The system shall be designed to give maximum reliability in starting.

The Contractor shall state in detail his proposals to ensure reliable starting and prevention of deterioration of the diesel engine, generator and exciter during idle periods.

All manually operated valves and controls on whose setting the correct operation of the automatic starting equipment depends shall be provided with locking devices.

## **8.5 Cooling System**

The engine may be air or water cooled unless a preference is indicated.

### **8.5.1 Air Cooling of Engine**

Cooling air for the engine and lubricating oil shall be provided by fan(s) mechanically driven from the engine. The cooling system shall be adequate for the total requirements of the engine when running on continuous full load and on 10% overload for one hour in accordance with BS 649 and under the conditions of Section 3.

The engine shall be so designed that the cooling air discharges into or is drawn through a reasonably airtight ducted assembly enclosing the lubricating oil cooler, the cylinder barrels and the cylinder heads of the engine.

This assembly shall terminate in a flanged outlet to which trunking may be readily attached when necessary, to enable hot air from the cooling system to be discharged outside the building.

Belt driven fans shall have at least two belts and the drive shall be capable of transmitting the full load with one belt removed. The cooling air temperature shall be controlled so as to maintain a safe working temperature of the cylinder head(s) and the engine shall shut down if the maximum is exceeded.

### **8.5.2 Water Cooling of Engine**

A radiator of the air blast type shall be provided. It shall either have separate sections for water and for lubricating oil or be arranged for jacket water cooling only.

The radiator shall be mounted on the set and the fan(s) shall be mechanically driven from the engine. Where indicated the radiators shall be suitable for remote wall or floor mounting, in which case the fan shall be electric motor driven from a supply similar in voltage, phase and frequency to the alternator output and shall be started on line.

Where remotely mounted, the fan shall only operate when generating set is running and shall be controlled by a thermostat mounted in the radiator such that the fan motor will start on rising temperature 50°C and stop on falling temperature.

Belt driven fans shall be provided with at least two belts and the drive shall be capable of transmitting the full load with one belt removed. Circulation of the jacket water and lubricating oil through the respective radiator sections and /or heat exchanger shall be by means of pumps mechanically driven by the engine. Belt driven pumps shall be provided with at least two belts and drive shall be capable of transmitting the full load with one belt removed.

Circulation by thermo-syphon will be accepted provided the engine will operate under the conditions of section 6 and in accordance with BS 649.

An easily visible flow indicator provided with contacts shall be fitted in the water outlet from the engine; the contacts shall close in the 'no flow' condition and shut down the set.

Alternatively in thermo syphon systems and sealed or pressurized radiator systems the flow indicator may be dispensed with providing the engine shuts down by the operation of the high temperature or low oil pressure safety devices in accordance with section 8.3.

A thermostatically controlled diverter valve shall be inserted in the engine water discharge pipe with a return to the circulating pipe section, to maintain the circulating water at the optimum temperature irrespective of the load. Alternatively a thermostatic bypass will be accepted.

A radiator make-up/expansion tank, fitted with float control inlet, shall be provided. If a sealed or pressurized unit is offered the tank may be dispensed with.

Where indicated provision shall be made on the radiator framework to permit the attachment of ducting for the discharge air.

A thermometer shall be mounted near the cylinder head(s) to indicate water temperature. Where a lubricating oil cooler is fitted, thermometers shall be mounted at the oil inlet too and outlet from the engine. Alternatively, thermocouple may be provided at all thermometer positions and taken to an instrument panel.

Adequate drains shall be provided at low points in the water and lubricating oil systems of the radiator and, where applicable, of the heat exchanger.

## **8.6 Governing System**

Governing shall conform to B.S. 640 Class A. The governor shall control the frequency within the limits stated in Section 6 Part. Manual speed adjustment shall be provided over a range of +/-15% of the rated speed at any load. The governor system shall be of the mechanical or hydraulic type. In addition the engine shall be fitted with an approved over speed trip device which shall operate independently of the normal speed governor and shall act directly upon the fuel supply to the engine.

The over speed shall act at a speed of 12% to 15% in excess of normal operating speed.

## **8.7 Exhaust System**

The diesel engine shall be provided with a suitable exhaust system for horizontal discharge outside the diesel generator room.

The silencer shall be of spark arresting type and shall be equipped with cleaning and draining arrangements.

If an exhaust driven turbo-charger is supplied it shall include air intake filters, mani-folds and outlet manifolds.

All necessary ducting, piping, supports and lagging required for the system shall be included.

Weatherproof wall boxes permitting expansion shall be fitted where the exhaust piping passes through the building wall or roof. Pipe work shall be connected at site by butt weld connections or use of flanged joints. The use of screwed connectors shall

be avoided.

Flanges shall conform to the appropriate Table of B.S.10: 1962. Welding of flanges at site shall be carried out in accordance with B.S.806. The faces of flanges shall be machined and the backs shall be machined or spot faced to receive the bolt heads.

Valves and fittings shall be of approved design and manufacture and shall be subject to the same tests as the highest pressure piping or vessel to which they are connected.

### **8.8 Engine Instruments**

Unless otherwise indicated the following instruments shall be provided:

- (a) a lubricating oil pressure gauge
- (b) a running hours meter
- (c) a tachometer
- (d) a water thermometer
- (e) an exhaust gas pyrometer or thermometer mounted near the mani-fold
- (f) lubricating oil thermometers on the inlet to and outlet from the engine, when a lubricating oil cooler is fitted
- (g) Exhaust turbo-blower pressure gauge(s) as applicable

### **8.9 Pipe work, Valves and Fittings**

All piping shall comply with requirements of KS-259:11989 for mild steel pipes. Provision shall be made for ready handling of all parts of the plant during assembly or disassembly of the unit.

Adequate provision shall be made for attaching lifting devices, slings and eyebolts.

## **9. The Generator (Alternator and Exciter)**

### **9.1 General**

The generator shall comply with B.S.2613:197, for service in tropical conditions, and shall withstand being idle for considerable periods without any harmful drop in the insulation resistance.

The generator shall have a prime rated net output of **250KVA** as specified in the schedules of the Bills of Quantities, at 0.8 lagging power factor, 415 volts, 3 phase, 4 wire, 50 Hertz with brushless rotating rectifier excitation system and voltage regulator. It shall be directly coupled to the engine and be sized such that it will accept the maximum output of the engine including overload. The output voltage shall be maintained within plus or minus 2 ½ % from no load to full load conditions. The alternator shall be capable of operating within the range of plus or minus 15% of the nominal voltage according to the automatic voltage regulator.

Three phase machines shall be star connected, and a diagram showing the terminal marking and phase rotation shall be provided in the terminal box. Cables connecting the machine winding and machine terminals shall not have a higher de-rating factor for temperature than the windings.

The insulation shall comply with BS 2757 excluding Classes Y and A. The insulation shall have an oil, moisture and fungus proof finish, with a surface which will not retain dust or condensation. It shall be possible to put the set in service after long periods in unheated storage without necessarily drying out the insulation.

The alternator shall be capable of withstanding a short circuit for three seconds when

under the control of the automatic voltage regulator.

## **9.2 Excitation**

Excitation shall be by means of brushless direct coupled exciter armature.

The alternators shall be designed for an excitation voltage at full load of not less than 50 Volts unless prior approval is given.

## **9.3 ELECTRICAL CONTROL PANEL**

The Automatic Mains Failure control panel shall be provided and fitted with the following:-

- a) Two four pole contactors and two TP & N incoming MCCB's each of suitable rating for controlling the supply from the mains transformer and standby generator.
- b) An automatic voltage regulator for the set.
- c) Control equipments as necessary including phase failure protection relay for both the mains supply and the generator supply (with both under and over voltage protection) and phase sequence protection relay for the mains supply all to fulfill the functional requirements and automatic changeover as detailed in Part 9.3.2
- d) One ammeter and a selector switch to measure each phase current and neutral current
- e) One voltmeter and a selector switch to read line to line and line to neutral voltage
- f) A frequency meter

The meters shall comply with BS 89, table 7.

### **9.3.1 General**

The set is to be used for mains failure duty and an automatic starting panel shall be provided which shall contain all necessary equipment for controlling the automatic starting and stopping of the set, lubricating oil priming (if necessary), all auxiliaries, fault warnings and shut downs. All faults, warning and shut-downs shall be separately indicated. There shall be test facilities for indication lamps, etc, preferably by means of a single test button.

Means shall be provided for isolating all supplies to the starting panel either by an isolating switch or by withdrawable fuses.

When the set is stopped other than under lock-out conditions, it shall be self-resetting ready for the next start.

The set shall be suitable for starting by manual means. e.g. by cranking or direct operation of the starter solenoid.

All switches and push buttons shall be clearly marked to indicate their function.

It shall be possible to operate the 'Start' and 'Stop' buttons and to see the 'Set Failure' indications without opening the panel doors.

### **9.3.2 Automatic Changeover Controls**

The controls shall be installed and wired in the machine control panel.

The control shall be provided such that on failure of the normal electricity supply, it will automatically initiate the starting of and effect the transfer of load to the standby generator. The schematic for the controls shall be approved by the Electrical Engineer before manufacture commences.

Where failure of the normal supply is referred to, it shall be defined as follows:

- a) Complete loss of voltage in one line Or in all the three lines
- b) Falling of voltage below 85% of the normal voltage between two lines or line and neutral
- c) Voltage overshoot to 110% of the normal voltage between two lines or line and neutral
- d) Incorrect phase sequence

On failure of the normal supply, the unit shall operate in the following manner:

- (a) After a delay, adjustable from 0 to 15 seconds (to avoid operation by a transient dip in voltage) a signal shall be given to start the standby generating set.
- (b) On receipt of a signal from the standby generating set that it is ready to take load, and providing that the failure of the normal supply still persists, the normal supply contactor in the control panel shall open and the standby contactor shall close. If the normal supply has been restored before the changeover has taken place, the contactor shall not operate and the starting relay contacts shall open to initiate the shutting down of the standby generating set.

When the standby supply is in operation and the normal supply is restored and remains within 10% of rated voltage on all phases for a pre-set time (adjustable up to 120 second) the standby contactor shall open and the normal supply contactor shall close; the starting relay contacts shall then open to shut down the generating set.

Provision shall be made so that automatic return to normal supply can be prevented if required.

Once a start signal has been sent to standby generating set, the engine starting sequence shall be allowed to continue until the set is ready to take the load before a stopping signal is sent.

A push button labelled 'Test' shall be provided to enable a failure of normal supply to be simulated. If the button is pressed and released the equipment shall complete the starting sequence, and when the set is ready to take load it shall be shut down. If the button is held depressed the equipment shall change over to the standby supply when the set is ready to take load.

Indicating lamps or illuminated panels shall be provided on the front of the panel. They shall be appropriately labelled, easily visible and shall give the following information:

- 'Main Supply Available'
- 'Generator Supply Available'
- 'Mains Supply on load'
- 'Generator Supply on load'

## 9.4 Lock out

### 9.4.1 General

The set shall stop and lock out to prevent further starting when:

- a) It fails to start when the electric starter motor has been in operation for 20 seconds under automatic start condition.
- b) The lubricating oil pressure falls to a value at which it would be unsafe to continue running the engine.



- c) The cooling water does not flow, when the engine is fitted with a visible flow indicator on the cooling water system.
- d) (i) In water cooled engines the cooling water temperature exceeds a predetermined limit.  
  
(ii) In air cooled engines the cylinder head temperature exceeds a safe maximum.
- e) The overspeed trip has operated.

9.4.2 Failure of the circuits concerned in sub-section 9.4.1 (b) to 9.4.1(e) shall cause a set to shut down. Reset of lock out shall be by hand.

### 9.5 **Fault indication**

Each lock-out detailed in section 9.4.1 shall be indicated by a lamp on the panel together with an indication of the fault causing the shut-down. The fault warning lights shall be set to operate before the lock-out.

### 9.6 **Starting Battery and Charger**

The battery shall be 24 volts and capable of with-standing the loads imposed upon it by its specified duties. It may be of lead-acid or alkaline type and shall be of sufficient capacity for four starts in succession once in an eight-hour period. Auxiliary circuits connected to the battery shall be protected by fuses.

The battery shall be used to supply an automatic starting and control equipment, and relay operation shall not be impaired when the battery is supplying current to the starter motor.

A single phase supply for battery charging shall be available from the main M.V SWITCHBOARD.

A charger shall be provided which will recharge the battery after engine starting and maintain it in a charged condition when the set is standing or is in service. It may also supply the load of any automatic starting and control equipments, and an additional load up to 24 watts when the set is running and in service.

An alternative quick charge rate shall be provided. The charger shall be fitted with an ammeter to measure the charge and discharge current excluding the starter motor current.

### 9.7.1 **Wiring and Earthing**

Power cables and small wiring cables interconnecting major components shall be of the heat and oil resistant type and shall be metal sheathed or run in metal ducts or metal conduit, which shall be coded and terminated with lugs or eyes or to be soldered, the terminations shall be clearly marked with the numbers and letters of the terminals to which they are connected. Terminals shall be numbered or lettered, easily accessible and fitted with individual insulating barriers or adequately spaced. Barriers shall be fitted to separate control terminals from power wiring terminals.

All metal work housing electrical equipment shall be bonded to a brass earthing terminal and connected to station Earth and as detailed in the schedule.

## **9.8 Contactors**

Contactors shall have magnetic circuits designed for a.c or d.c operation and shall be rated in accordance with ks 04-182:1982. Four pole- contactors shall be fitted for three phase-equipment and two-pole contactors for single phase equipments. Main and auxiliary contacts shall be silver faced or better.

## **9.9 Relays**

Relays shall preferably be of sealed type mounted in approved plug-in bias with spring loaded retainers but if this is not practicable they shall be mounted on individual sub-bases and wired so that easy access is obtained to soldered connections. Unsealed relays shall be enclosed in individual or common dust protecting cases.

Time delays, if of the pneumatic type, shall operate on filtered air. The thermal type of time delay relay will not be accepted.

## **9.10 Fuses**

Fuses shall comply with KS-183:1978. A spare fuse cartridge for each pole shall be mounted inside each equipment.

## **9.11 Rectifiers, Capacitors and solid State components**

Rectifiers, capacitors and solid state components shall be suitable for any transient voltage and high currents likely to be uncoupled during the operation of the equipment and for the internal operating temperature of the enclosures at the specified maximum external ambient temperature.

## **9.12 Enclosures for Equipment**

Enclosures for electrical and control equipment shall be drip proof and dust protecting, with adequate front and rear access as necessary for maintenance and repair. Special attention shall be given to the method of construction and to the mounting of the components to minimize the effect of vibration. Diagrams of connections in durable form shall be mounted inside the enclosures.

## **10 Lifting Gear and Handling.**

Provision shall be made for ready handling of all parts of the plant during assembly or disassembly of the unit. Adequate provision shall be made for attaching lifting devices, slings and eyebolts.

## **11 Commissioning**

The Contractor shall include for fully commissioning the set and its control equipment and for the purpose of the required tests, shall provide all necessary instruments, tools, fuel and lubricating oil.

The following tests and checks as applicable shall be carried out by the contractor in the presence of the electrical engineer or his representative.

- a) Check that the main frame is level in all directions, engine and generator shafts are in proper alignment and the vibration absorbing devices are properly installed and located.
- b) Check water and sump oil levels and that the water jacket and radiation eaters (if fitted) are in working order.

- c) Check the battery electrolyte levels and the specific gravity.
- d) Examine the containers in which the fuel and lubricating oils were delivered and check that the type and grade of oils are as recommended for the unit.
- e) Ensure that sufficient fuel oil is in the fuel tank for a two hours test run.
- f) Check that all radiator and engine block water drain points are free from sludge and other blockages.
- g) Check engine bolts, main drive coupling, valve clearance, fuel pumps settings, governor settings, pipeline connections, water hose, exhaust couplings, flexible pipe work etc, and where a separate cooling water tank is fitted, that the water levels is satisfactory and the ball valve and overflow work.
- h) Check all outgoing connections on the generator and the control panel. All lugs for principal connections shall have clean and bright contact surfaces. A suitable abrasive shall be used where necessary.
- i) Check access panels and doors for proper opening and closing and for functioning of any interlocks fitted.
- j) With the set isolated from the main supply and the selector switch in the 'manual' position, start the engine by means of the 'start' push button and allow it to run up to normal speed. Check that the main battery charger is automatically switched off to avoid its being overloaded by the reduction in voltage across the battery. Where a battery charging dynamo is fitted, check that the main battery charger is disconnected by the operation of the auxiliary contact during the time the engine is running.
- k) Check instruments and gauges for normal operation and response and that the generator voltage is being maintained within the prescribed limits, making due allowance for no-load conditions. Compare the reading of the frequency meter with that of engine tachometer, where both are fitted
- i) Stop engine by turning selector switch to off position and verify that the generator contactor opens at between 95% and 85% of normal voltage. Re-check water and oil levels.
- m) Turn selector switch to 'Auto' position. Disconnect the sensing circuit supply and check that the set starts, the mains contactor opens, and the generator contactor closes in correct order. Reconnect the sensing circuit to verify that the engine stops on restoration of the mains supply and the contactors operate correctly. Check voltage sensing and time delays on each phase in turn and also the push buttons for mains failure simulation and engine stopping operate correctly.

**NOTE:** Running of the engine for any length of time under no load condition is undesirable and tests calling for such operation should be carried out in as short time as possible consistent with thoroughness.

- n) Operate the necessary isolators and switches to put the set on standby for essential services network with the mains failure simulation push, verify that the set operates correctly with the appropriate time delay for taking up load and that the carrying of the load and its distribution over three phases are satisfactory.

- o) Run the set at various loads for periods totaling at least 30 minutes. Check that the voltage and frequency are being maintained within the required limits with large alterations of load. Note the rate of charge on the dynamo ammeter with the engine running (if a dynamo is fitted), and the rate of charge on the battery charging ammeter with the engine stopped. Check against manufacturers recommendations and adjust charging rates if necessary.
- p) Check that the various engine safeguards operate satisfactorily.
- q) Check the vibration absorbing devices for proper operation and that performance of all flexible connections, both mechanical and electrical, is satisfactory.
- r) When all tests are satisfactory and agreed with the Engineer or his representative, the lubricating oil and water levels shall be finally checked, the fuel oil tank replenished and set left in normal operating order.
- s) An initial supply of all lubricating oils and greases shall be provided by the Contractor.
- t) Additional lubricating oil shall be provided for recharging the engine sump once together with a supply of lubricating oils and greases to cover the normal use and serving of the set during the 12 months maintenance period referred to in Part 14 of Section D.

**INFORMATION TO BE SUPPLIED BY THE TENDERER**

## CONTENTS OF SECTION F

### DESCRIPTION

1. General
2. Information on the set to be supplied
3. Deviations from the specifications

1. **GENERAL**

- a). The tenderer shall complete Part 2 of Section F in full with details of the set he is offering.
- b). Any equipment which he wishes to offer but which does not comply with the specification shall be fully detailed in Part 3 of section F together with details of any other deviation or omissions which he may wish to make.

Any tender which is submitted without filling these sections will be deemed non-responsive.

- c). The tenderers shall be required to submit, together with their tenders, brochures detailing technical specifications of the generator set they intend to supply. Any tender which is submitted without the brochures will be deemed non-responsive

2 – INFORMATION OF THE SET TO BE SUPPLIED

ITEM	EQUIPMENT	DETAILS
1.	<p><b><u>Diesel Engine</u></b>            Make            Type  <b>Net continuous rating (B.S.649)</b>            (a) at sea level            (b) at site</p> <p><b>Speed</b></p> <p><b>Supercharger</b>            Make            Type</p> <p><b>Air cooling</b>            Quantity of air required            Details of ducting</p> <p><b>Water cooling</b>            Details of water cooling circuits</p> <p><b>Radiator:</b>            Make            Type            Length            Breadth            Height</p>	<p>KVA            KVA</p> <p>Rev/min</p> <p>Not Applicable</p> <p>To be Applicable</p> <p>mm            mm            mm</p>



ITEM	EQUIPMENT	DETAILS
2.	Aspiration Method Quantity of air required <u>Auxiliaries</u> Filters Coolers Primary pumps Tachometer and drive Governor Special cold start devices Running hours meter Safety devices High temperature Low pressure (lubricating oil) Cooling water flow trip over speed trip Speed sensing devices Lubricating oil thermometers: Number Position (s) Water thermometer Position Exhaust thermometer Position Starting Battery Battery charger Immersion Heater	
3.	<u>Lubrication</u> Recommended oil (s) Sump Elsewhere (state where)	Grade quantity (litres)
4.	<u>Alternator and Exciter</u> Make and type Bearings Insulation class (BS.2757)	

ITEM	EQUIPMENT	DETAILS	
5.	<p><b><u>Electrical Control Panel</u></b></p> <p>Main circuit breaker</p> <p>Bypass switches</p> <p>Automatic changeover contactor</p> <p>Automatic voltage regulator</p> <p>Ammeter selector switch</p> <p>Voltmeter selector switch</p> <p>Frequency meter</p> <p>Ammeters ----- No.</p> <p>Voltmeters – .....No.</p> <p>Power factor meter</p> <p>Other equipment – give details</p>		
6.	<p><b><u>Performance data</u></b></p> <p>Fuel consumption</p> <p>Maximum output</p>	<p><u>Rated output</u></p> <p>%</p> <p>110</p> <p>100</p> <p>75</p> <p>50</p> <p><u>Ambient temp.</u></p> <p>°C</p> <p>40</p> <p>30</p> <p>20</p> <p>10</p>	<p><u>Consumption</u></p> <p>Litres/hour</p> <p><u>Out-put KVA</u></p>

ITEM	EQUIPMENT	DETAILS
6.	Performance Data (cont'd) Voltage regulation Frequency regulation Time to accept 75% full load from 5°C Time to accept 100% full load from 5°C Time to accept 100% full load from 40°C	% % Seconds Seconds Seconds
7.	<u>Physical Details</u> Auxiliary fuel storage tank for 72 hour operational running capacity Size of set Total weight of set Overall dimensions of set Weight of heaviest component Weather proofing Integral belly/base fuel tank for daily service for 8 hour operation capacity	Litres mm long   mm wide   mm high Kg. mm long   mm wide   mm high Kg. Litres
8.	<u>Operational Details</u> Description of Operation Sequence of the automatic control Details of drawings, literature, etc., included with tender.	

**3. DEVIATIONS FROM THE SPECIFICATION**

The tenderer shall give details of any equipment which does not meet the specification, or any other deviations, omissions, additions or alternatives in respect of the set which he is offering.

If none, write none

**SECTION C**  
**BILLS OF QUANTITIES**

## GENERAL NOTES TO TENDERERS

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

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

- 3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

Should the sub-contractor install any material not specified here in before receiving **written approval** from the Project Manager, the sub-contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the summary page must be carried forward to the **main summary for Main Works**
6. The technical schedule of items to be supplied **MUST** be filled.

**Statement of Compliance**

- a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.
  
- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

**Signed:** \_\_\_\_\_ *for and on behalf of the Tenderer*

**Date:**  
\_\_\_\_\_

**Official Rubber Stamp:** \_\_\_\_\_

**ELECTRICAL AND GENERATOR SET INSTALLATION WORKS**

**BILL NO. 1: ELECTRICAL INSTALLATION WORKS**

**SCHEDULE NO. 1: BASEMENT FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, test and commission the following :</b>				
	<b><u>LIGHTING POINTS</u></b>				
A	Lighting points wired in 3x1.5mm <sup>2</sup> PVC SC Copper Cables drawn in concealed 20mm Diameter HG PVC conduits complete with all necessary accessories but excluding switches for:-				
	(a) One Way Switching.	12	No.		
	(b) Two Way Switching.	38	No.		
	<b><u>LIGHTING SWITCHES</u></b>				
B	10A moulded ivory switch plates as MK, Clipsal, BG, Crabtree or approved equivalent as follows:				
	(a) 1 gang 1 way	4	No.		
	(b) 2 gang 2 way	8	No.		
	<b><u>LIGHTING FITTINGS</u></b>				
C	Lighting fittings complete with all accessories including lamps of appropriate wattage and colour rendering and fixing materials as follows:				
	(a) Aluminium Bulkhead with moulded glass cover for tungsten lamps, IP65 protection as Thorn DB Bulkhead or an approved equivalent.	2	No.		
	(b) 1200mm, 1x36w, surface mounted bare batten fluorescent luminaire	38	No.		
	(c) 225mm, 18w surface mounted round LED panel as ARIAL Emergency Version or approved equivalent.	8	No.		
	(d) Self-contained double sided EXIT sign with 8W fluorescent lamp for non-maintained emergency lighting for 3 hour duration as Sapphire or approved equivalent.	6	No.		
D	<b><u>TRUNKING &amp; DUCTING</u></b>				
	i) 100x50mm three (2) compartment powder coated steel trunking manufactured in 14 swg galvanized mild steel sheet and finished in cream powder coating to details shown complete with covers, bends and all fixing accessories. The trunking to be angular section. Allow for colour change to Architect's detail.	30	Lm.		
	ii) Factory made powder coated corner bends for the above trunking.	2	No.		
	iii) Powder coated twin punched outlet plate for fixing twin socket outlets.	11	No.		
	iv) Powder coated single punched outlet plate for fixing Data outlets.	8	No.		
	v) Carry out bonding throughout the entire length of the above trunking and connect to earthing.	1	Item		
E	Lay HG/PVC conduiting of size 3x32mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for telecommunication services.	15	Lm.		
	<b><u>POWER POINTS</u></b>				
F	Ring mains socket outlets comprising wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	13	No.		
G	13A switched white moulded case socket outlet plates as MK, Clipsal, BG, Crabtree or an approved equivalent.				
	(a) Twin outlet.	13	No.		
	<b>Sub-Total C/F to the Next Page</b>				



**SCHEDULE NO.1: BASEMENT FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	<b>Extract Fan (1-Φ) Power Point</b> , wired in 3x 4.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	3	No.		
B	16A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as Clipsal, Crabtree or approved equivalent.	3	No.		
	<b><u>TELEVISION POINTS</u></b>				
C	TV outlet point wired in 75 Ohms Screened Coaxial TV cables drawn in concealed 20mm diameter HG/PVC conduits and linked to the outside through the roof space (to the amplifier) via telephone draw in boxes.	2	Lm.		
	a) TV outlet plate with polished brass finish as MK, Clipsal, Crabtree or approved equivalent.	2	No		
	<b><u>DATA&amp;TELEPHONE POINTS</u></b>				
D	Data/Telephone outlet point done in 20mm Dia. HG PVC conduits concealed in building fabric/ trunking complete with all necessary accessories.	8	No.		
	a) White moulded case dual data/telephone outlet plate as MK, Crabtree or approved equivalent.	8	No.		
	<b><u>CCTV &amp; ACCESS CONTROL POINTS</u></b>				
E	CCTV & Access Control System Points done in 20mm Dia. HG PVC conduits concealed in building fabric/trunking complete with all necessary accessories.	8	No.		
	<b><u>DISTRIBUTION BOARDS</u></b>				
	<b>Supply, install, test and commission the following :-</b>				
F	4Ways TPN+E, flush mounted Distribution Board complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	2	No.		
G	MCB's for item above				
	(i) 10A SP	6	No.		
	(ii) 20A SP	6	No.		
	(iii) 32A SP	4	No.		
	(v) SP Spareway	8	No.		
H	Carry out concise permanent traffolyte labelling for all the sub-circuits in item above.	1	Item		
	<b><u>SUB-MAIN POWER DISTRIBUTION</u></b>				
I	16mm <sup>2</sup> 2Core PVC/SWA/PVC Copper cables in 32mmØ concealed HG PVC conduits.	55	Lm.		
J	Cable glands for the above cable.	1	Item		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO.1: BASEMENT FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Sub-Total B/F from Previous Page</b></p> <p><b>FIRE DETECTION AND ALARM SYSTEM</b></p> <p><b>Supply, deliver, install and commission a complete Fire Detection and Alarm system, addressable type and in accordance with BS 5839 :2000, P2 and L2</b></p> <p><b>i) Outlet for fire alarm manual call point/smoke/heat detector comprising box, concealed 20mm HG PVC conduit, wiring in 3 x 2.5mm2 "firetuff" cables and all accessories.</b></p> <p><b>ii) Addressable Manual Fire break glass call point unit as MENVIER or approved equivalent complete with a packet of 5 spare glasses, a packet of 5 spare test keys, a spare back box and a hinged cover to be installed recessed in building fabric.</b></p> <p><b>iii) Addressable Electronic Fire Alarm Sounder complete with Red Flashing Beacon Light as MENVIER or approved equivalent.</b></p> <p><b>iv) Addressable Photometric Smoke Detector as MENVIER or equal and approved.</b></p>	12	No.		
	<p><b>Total for Schedule No.1: Basement Floor C/F to Collection Page</b></p>				

**SCHEDULE NO.2 : GROUND FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, test and commission the following :</b>				
	<b><u>LIGHTING POINTS</u></b>				
A	Lighting points wired in 3x1.5mm <sup>2</sup> PVC SC Copper Cables drawn in concealed 20mm Diameter HG PVC conduits complete with all necessary accessories but excluding switches for:-				
	(a) One Way Switching.	46	No.		
	(b) Two Way Switching.	95	No.		
	<b><u>LIGHTING SWITCHES</u></b>				
B	10A moulded ivory switch plates as MK, Clipsal, BG, Crabtree or approved equivalent as follows:				
	(a) 1 gang 1 way	20	No.		
	(b) 1 gang 2 way	18	No.		
	(c) 2 gang 1 way	6	No.		
	(d) 2 gang 2 way	12	No.		
	(e) 4 gang 2 way	2	No.		
	(f) 1 gang Intermediate Switch	3	No.		
	<b><u>LIGHTING FITTINGS</u></b>				
C	Lighting fittings complete with all accessories including lamps of appropriate wattage and colour rendering and fixing materials as follows:				
	(a) 600mm by 600mm, 4x18W, modular surface/recessed fluorescent luminaire designed for use in lay-in ceiling grids, with louvre retention system, electronic ballast and plug and socket installation method as Thorn. (Type H1)	4	No.		
	(b) 40W, 600mm x 600mm, LED Lighting fitting as Phillips FullGlow or approved equivalent. (Type H)	13	No.		
	(c) 5W, 100mm diameter Low Voltage LED downlight with warm white output, satin finish, aluminium reflector and silver effect and suitable for recessed installation in standard ceiling as Maximus or approved equivalent. (Type D)	36	No.		
	(d) Aluminium Bulkhead with moulded glass cover for tungsten lamps, IP65 protection as Thorn DB Bulkhead or an approved equivalent.	2	No.		
	(e) 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Type N)	14	No.		
	(f) 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Emergency Version)	4	No.		
	(g) 225mm, 18w surface mounted round LED panel as ARIAL or approved equivalent.(Type R)	9	No.		
	(h) 225mm, 18w surface mounted round LED panel as ARIAL (Emergency Version) or approved equivalent.(Type R)	4	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 2: GROUND FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b>(i)</b> GU10 Mains Voltage Spotlight Constructed of rust proof stainless steel. Size: (HxWxProj.) 180x95x100mm. Lamps: 1x35W aluminium reflector GU10 (supplied). IP24.Quote: MM19017 as Micromark Radius Range or approved equivalent. (Type G)	6	No.		
	<b>(j)</b> 1200mm, 1x 36 Watts fluorescent fitting with prismatic diffuser without a socket outlet point, for mirror lighting, as EGLO or approved equivalent.	4	No.		
	<b>(k)</b> 600mm, 1x 18Watts fluorescent fitting with prismatic diffuser without a socket outlet point, for mirror lighting, as EGLO or approved equivalent.	1	No.		
	<b>(l)</b> Compact and flexible LED Strip Light with self adhesive tape on the reverse for fast installation, IP20 rating, upto 60 LED/M for high lighting homogeneity as Thorn ArrowFlex or approved equivalent.	35	Lm		
	<b>(m)</b> Shallow surface luminaire with circular opal diffuser and white stand-off ring as 12W Philips Waterproof Ceiling light.(Type S)	22	No.		
	<b>(n)</b> 2 Light Wall Bracket with 2x60W BC Candle lamps as Micromark Edwardian (Quote MM7232) or an approved equivalent. Type W	2	No.		
	<b>(o)</b> Outdoor Wall Bracket (Halfmoon) with BC Candle lamps as Micromark or an approved equivalent. Type V	8	No.		
	<b>(p)</b> Self-contained double sided EXIT sign with 8W fluorescent lamp for non-maintained emergency lighting for 3 hour duration as Sapphire or approved equivalent. Type Exit	12	No.		
A	<b><u>TRUNKING &amp; DUCTING</u></b>				
	<b>i)</b> 300x50mm three (3) compartment powder coated steel trunking manufactured in 14 swg galvanized mild steel sheet and finished in cream powder coating to details shown complete with covers, bends and all fixing accessories. The trunking to be angular section. Allow for colour change to Architect's detail.	130	Lm.		
	<b>ii)</b> Factory made powder coated corner bends for the above trunking.	27	No.		
	<b>iii)</b> Powder coated twin punched outlet plate for fixing twin socket outlets.	31	No.		
	<b>iv)</b> Ditto but for data/telephone/single switched socket outlets.	31	No.		
	<b>v)</b> Carry out bonding throughout the entire length of the above trunking and connect to earthing.	1	Item		
B	200mm x 50mm, 2 compartment powder coated 'CLIP-ON' metal type trunking as Schneider Electric Kenya, manufacture to approved colour and complete with cover, bends,outlet plates,continuity bonding and all accessories.	35	Lm.		
C	Lay HG/PVC conduiting of size 3x32mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for telecommunication services.	40	Lm.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 2: GROUND FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	Lay HG/PVC conduiting of size 3x50mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for internal power reticulation.	50	Lm.		
B	Lay HG/PVC conduiting of size 3x100mm diameter HG/PVC ducts inter-connecting electrical service ducts.	15	Lm.		
C	Supply and Install a 600mmx400mm powder coated 14SWG steel adaptable box to Engineer's approval.	4	No.		
	<b><u>POWER POINTS</u></b>				
D	Ring mains socket outlets comprising wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	38	No.		
E	13A switched white moulded case socket outlet plates as MK, Clipsal, BG, Crabtree or an approved equivalent. (a) Twin outlet.	28	No.		
F	13A RED coloured non-standard switched socket outlet for clean power sub-circuits complete with 13 Amp. Non Standard Plug Tops as MK, Clipsal, BG or an approved equivalent. (a) Twin outlet.	10	No.		
G	<b>Floor Distribution Systems:</b> Floor recessed/mounted power outlet station complete with 4 No. 13A twin standard switched socket outlets for raw power, 4 No. telephone cord outlet plates, 4 No. data cable outlet plates and wiring in 3 x 2.5mm <sup>2</sup> SC-PVC-CU cables. To be constructed from high quality pre-galvanised steel sheets and stainless steel cover.	4	No.		
H	<b>Air Conditioner's Power Point,</b> comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits complete with all accessories but excluding the D.P switch .	3	No.		
I	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	3	No.		
J	<b>Instantaneous Water Heater's Power Point,</b> comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits in shower room complete with all accessories but excluding the D.P switch.	1	No.		
K	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	1	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 2: GROUND FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	<b>Hand Drier's Power Point</b> , wired in 3x 2.5sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	7	No.		
B	13A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	7	No.		
C	<b>Horse Reel Pump Power Point</b> , wired in 5x 4.0sq mm PVC SC copper cables drawn in concealed 32mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	1	No.		
D	20A TP isolator switch as MK, Crabtree or approved equivalent.	1	No.		
E	<b>Water Booster Pump Power Point</b> , wired in 5x 4.0sq mm PVC SC copper cables drawn in concealed 32mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	1	No.		
F	20A TP isolator switch as MK, Crabtree or approved equivalent.	1	No.		
G	<b>Extract Fan (1-Φ) Power Point</b> , wired in 3x 4.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	6	No.		
H	16A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	6	No.		
	<b><u>TELEVISION POINTS</u></b>				
I	TV outlet point wired in 75 Ohms Screened Coaxial TV cables drawn in concealed 20mm diameter HG/PVC conduits and linked to the outside through the roof space (to the amplifier) via telephone draw in boxes.	7	Lm.		
J	a) TV outlet plate with polished brass finish as MK, Clipsal, Crabtree or approved equivalent.	7	No		
K	b) 300mmx250mmx150mm, 14SWG, powder coated, telephone/data draw box to approval.	2	No		
	<b><u>DATA&amp;TELEPHONE POINTS</u></b>				
L	Data/Telephone outlet point done in 20mm Dia. HG PVC conduits concealed in building fabric/ trunking complete with all necessary accessories.	34	No.		
M	White moulded case dual data/telephone outlet plate as MK, Crabtree or approved equivalent.	34	No.		
	<b><u>CCTV &amp; ACCESS CONTROL POINTS</u></b>				
N	CCTV & Access Control System Points done in 20mm Dia. HG PVC conduits concealed in building fabric/trunking complete with all necessary accessories.	28	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 2: GROUND FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>DISTRIBUTION BOARDS</u></b>				
	<b>Supply, install, test and commission the following :-</b>				
A	6Ways TPN+E, flush mounted Distribution Board complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	3	No.		
B	9Ways SPN+E, flush mounted Consumer Unit complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	2	No.		
C	MCB's for item above				
	(i) 10A SP	16	No.		
	(ii) 20A SP	21	No.		
	(iii) 32A SP	8	No.		
	(iv) 45A SP	2	No.		
	(v) 45A TP	2	No.		
	(vi) 63A TP	1	No.		
	(vii) SP Spareway	10	No.		
	(viii) TP Spareway	2	No.		
D	Carry out concise permanent traffolyte labelling for all the sub-circuits in item above.	1	Item		
	<b><u>SUB-MAIN POWER DISTRIBUTION</u></b>				
E	25mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 50mmØ concealed HG PVC conduits c/w all installation accessories	55	Lm.		
F	35mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 50mmØ concealed HG PVC conduits c/w all installation accessories (AC)	20	Lm.		
G	3x10mm <sup>2</sup> sc PVC Copper cables in 32mmØ concealed HG PVC conduits.	20	Lm.		
H	Cable glands and lugs for the above cables.	1	Item		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 2: GROUND FLOOR CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Sub-Total B/F from Previous Page</b></p> <p><b>FIRE DETECTION AND ALARM SYSTEM</b></p> <p>Supply, deliver, install and commission a complete Fire Detection and Alarm system, addressable type and in accordance with BS 5839 :2000, P2 and L2</p> <p>i) Outlet for Fire Alarm Panel's concealed 20mm HG PVC conduit, wiring in 3 x 2.5mm<sup>2</sup> SC-PVC-CU cables and all accessories, including 5A fused unswitched connection unit with neon light.</p> <p>ii) Outlet for fire alarm manual call point/smoke/heat detector comprising box, concealed 20mm HG PVC conduit, wiring in 3 x 2.5mm<sup>2</sup> "firetuff" cables and all accessories.</p> <p>iii) Addressable Manual Fire break glass call point unit as MENVIER or approved equivalent complete with a packet of 5 spare glasses, a packet of 5 spare test keys, a spare back box and a hinged cover to be installed recessed in building fabric.</p> <p>iv) Addressable <b>Electronic Fire Alarm Sounder</b> complete with <b>Red Flashing Beacon Light</b> as MENVIER or approved equivalent.</p> <p>v) Addressable <b>Photometric Smoke Detector</b> as MENVIER or equal and approved.</p> <p>vi) Addressable <b>Rate of Heat Rise Detector</b> as MENVIER or equal and approved.</p> <p>vii) 12 - Loop zone addressable fire alarm control panel complete with 72hrs autonomous time emergency batteries as Menvier DF6100 or equal and approved.</p>	1	No.		
	<p><b>Total for Schedule. 2: Ground Floor C/F to Collection Page</b></p>				



**SCHEDULE NO. 3: FIRST FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, install, test and commission the following :</b>				
	<b><u>LIGHTING POINTS</u></b>				
A	Lighting points wired in 3x1.5mm <sup>2</sup> PVC SC Copper Cables drawn in concealed 20mm Diameter HG PVC conduits complete with all necessary accessories but excluding switches for:-				
	(a) One Way Switching.	52	No.		
	(b) Two Way Switching.	92	No.		
	<b><u>SWITCHES</u></b>				
B	10A moulded ivory switch plates as MK, Clipsal, BG, Crabtree or approved equivalent as follows:				
	(a) 1 gang 1 way	20	No.		
	(b) 1 gang 2 way	18	No.		
	(c) 2 gang 1 way	6	No.		
	(d) 2 gang 2 way	12	No.		
	(e) 4 gang 2 way	4	No.		
	(f) 1 gang Intermediate Switch	3	No.		
	<b><u>LIGHTING FITTINGS</u></b>				
C	Lighting fittings complete with all accessories including lamps of appropriate wattage and colour rendering and fixing materials as follows:				
	<b>(a)</b> 600mm by 600mm, 4x18W, modular surface/recessed fluorescent luminaire designed for use in lay-in ceiling grids, with louvre retention system, electronic ballast and plug and socket installation method. (Type H1)	12	No.		
	<b>(b)</b> 40W, 600mm x 600mm, LED Lighting fitting as Phillips FullGlow or approved equivalent. (Type H)	22	No.		
	<b>(c)</b> 5W, 100mm diameter Low Voltage LED downlight with warm white output, satin finish, aluminium reflector and silver effect and suitable for recessed installation in standard ceiling as Maximus or approved equivalent.(Type D)	48	No.		
	<b>(d)</b> Aluminium Bulkhead with moulded glass cover for tungsten lamps, IP65 protection as Thorn DB Bulkhead or an approved equivalent. (Type B)	4	No.		
	<b>(e)</b> 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Type N)	28	No.		
	<b>(f)</b> 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Emergency Version)	4	No.		
	<b>(g)</b> 225mm, 18w surface mounted round LED panel as ARIAL (Emergency Version) or approved equivalent.(Type R)	9	No.		
	<b>(h)</b> Shallow surface luminaire with circular opal diffuser and white stand-off ring as 12W Philips Waterproof Ceiling light.(Type S)	16	No.		
	<b>(i)</b> GU10 Mains Voltage Spotlight Constructed of rust proof stainless steel. Size: (HxWxProj.) 180x95x100mm. Lamps: 1x35W aluminium reflector GU10 (supplied). IP24.Quote: MM19017 as Micromark Radius Range or approved equivalent. (Type G)	4	No.		
	<b>(k)</b> 600mm, 1x 18Watts fluorescent fitting with prismatic diffuser without a socket outlet point, for mirror lighting, as EGLO or approved equivalent. (Type M1)	1	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 3: FIRST FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	(l) Compact and flexible LED Strip Light with self adhesive tape on the reverse for fast installation, IP20 rating, upto 60 LED/M for high lighting homogeneity as Thorn ArrowFlex or approved equivalent. (Type S1)	25	Lm		
	(m) 5-Arm decorative outdoor chandellier on chain suspension for c/w candle lamps with crystal glass drops as Thorn . (Type 5)	4	No.		
	(n) Self-contained double sided EXIT sign with 8W fluorescent lamp for non-maintained emergency lighting for 3 hour duration as Sapphire or approved equivalent. (Type Exit)	7	No.		
A	<b><u>TRUNKING &amp; DUCTING</u></b>				
	i) 300x50mm three (3) compartment powder coated steel trunking manufactured in 14 swg galvanized mild steel sheet and finished in cream powder coating to details shown complete with covers, bends and all fixing accessories. The trunking to be angular section. Allow for colour change to Architect's detail.	30	Lm.		
	ii) Factory made powder coated corner bends for the above trunking.	9	No.		
	iii) Powder coated twin punched outlet plate for fixing twin socket outlets.	21	No.		
	iv) Ditto but for data/telephone/single switched socket outlets.	21	No.		
	v) Carry out bonding throughout the entire length of the above trunking and connect to earthing.	1	Item		
B	200mm x 50mm, 2 compartment powder coated 'CLIP-ON' metal type trunking as Schneider Electric Kenya, manufacture to approved colour and complete with cover, bends,outlet plates,continuity bonding and all accessories.	30	Lm.		
C	Lay HG/PVC conduiting of size 3x32mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for telecommunication services.	30	Lm.		
D	Lay HG/PVC conduiting of size 3x50mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for internal power reticulation.	25	Lm.		
E	Lay HG/PVC conduiting of size 2x100mm diameter HG/PVC ducts inter-connecting electrical service ducts.	15	Lm.		
F	Supply and Install a 600mmx400mm powder coated 14SWG steel adaptable box to Engineer's approval.	4	No.		
	<b><u>POWER POINTS</u></b>				
E	Ring mains socket outlets comprising wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	25	No.		
F	13A switched white moulded case socket outlet plates as MK, Clipsal, BG, Crabtree or an approved equivalent.				
	(a) Twin outlet.	17	No.		
G	13A RED coloured non-standard switched socket outlet for clean power sub-circuits complete with 13 Amp. Non Standard Plug Tops as MK,Clipsal, BG or an approved equivalent.				
	(a) Twin outlet.	8	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 3: FIRST FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	<b>Floor Distribution Systems:</b> Floor recessed/mounted power outlet station complete with 4 No. 13A twin standard switched socket outlets for raw power, 4 No. telephone cord outlet plates, 4 No. data cable outlet plates and wiring in 3 x 2.5mm <sup>2</sup> SC-PVC-CU cables. To be constructed from high quality pre-galvanised steel sheets and stainless steel cover.	2	No.		
B	<b>Air Conditioner's Power Point,</b> comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits complete with all accessories but excluding the D.P switch .	5	No.		
C	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	5	No.		
D	<b>Free Standing AC Power Point,</b> comprising wiring drawn in 5x6mm <sup>2</sup> PVC-SC-CU cables in concealed 32mm Diameter HG PVC conduits complete with all accessories but excluding the D.P switch .	1	No.		
E	32A TP Isolator Switch MK, Crabtree or approved equivalent.	1	No.		
D	<b>Instantaneous Water Heater's Power Point,</b> comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits in shower room complete with all accessories but excluding the D.P switch.	1	No.		
E	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	1	No.		
F	<b>Hand Drier's Power Point,</b> wired in 3x 2.5sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	5	No.		
G	13A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	5	No.		
H	<b>Extract Fan (1-Φ) Power Point,</b> wired in 3x 4.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	5	No.		
I	16A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	5	No.		
	<b><u>TELEVISION POINTS</u></b>				
J	TV outlet point wired in 75 Ohms Screened Coaxial TV cables drawn in concealed 20mm diameter HG/PVC conduits and linked to the outside through the roof space (to the amplifier) via telephone draw in boxes.	4	Lm.		
	a) TV outlet plate with polished brass finish as MK, Clipsal, Crabtree or approved equivalent.	4	No		
	b) 300mmx250mmx150mm, 14SWG, powder coated, telephone/Data draw box spray painted to approval.	2	No		
	<b><u>DATA&amp;TELEPHONE POINTS</u></b>				
K	Data/Telephone outlet point done in 20mm Dia. HG PVC conduits concealed in building fabric/ trunking complete with all necessary accessories.	21	No.		
	a) White moulded case dual data/telephone outlet plate as MK, Crabtree or approved equivalent.	21	No.		
	<b><u>CCTV &amp; ACCESS CONTROL POINTS</u></b>				
L	CCTV & Access Control System Points done in 20mm Dia. HG PVC conduits concealed in building fabric/trunking complete with all necessary accessories.	15	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 3: FIRST FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>DISTRIBUTION BOARDS</u></b>				
	<b>Supply, install, test and commission the following :-</b>				
A	6Ways TPN+E, flush mounted Distribution Board 'B' complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	2	No.		
B	9Ways SPN+E, flush mounted Consumer Unit complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	1	No.		
C	MCB's for item above				
	(i) 10A SP	12	No.		
	(ii) 20A SP	18	No.		
	(iii) 32A SP	5	No.		
	(iv) 63A DP	4	No.		
	(v) 32A TP	1	No.		
	(vi) SP Spareway	8	No.		
	(vii) TP Spareway	1	No.		
D	Carry out concise permanent traffolyte labelling for all the sub-circuits in item above.	1	Item		
	<b><u>SUB-MAIN POWER DISTRIBUTION</u></b>				
E	25mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 50mmØ concealed HG PVC conduits.	65	Lm.		
F	3x10mm <sup>2</sup> sc PVC Copper cables in 32mmØ concealed HG PVC conduits.	20	Lm.		
G	Cable glands and lugs for the above cables.	1	Item		
H	<b><u>FIRE DETECTION AND ALARM SYSTEM</u></b>				
	<b>Supply, deliver, install and commission a complete Fire Detection and Alarm system, addressable type and in accordance with BS 5839 :2000, P2 and L2</b>				
	i) Outlet for fire alarm manual call point/smoke/heat detector comprising box, concealed 20mm HG PVC conduit, wiring in 3 x 2.5mm <sup>2</sup> "firetuff" cables and all accessories.	24	No.		
	ii) Addressable Manual Fire break glass call point unit as MENVIER or approved equivalent complete with a packet of 5 spare glasses, a packet of 5 spare test keys, a spare back box and a hinged cover to be installed recessed in building fabric.	7	No.		
	iii) Addressable <b>Electronic Fire Alarm Sounder</b> complete with <b>Red Flashing Beacon Light</b> as MENVIER or approved equivalent.	7	No.		
	iv) Addressable <b>Photometric Smoke Detector</b> as MENVIER or equal and approved.	10	No.		
	<b>Total for Schedule No. 3: First Floor C/F to Collection Page</b>				

**SCHEDULE NO. 4: SECOND FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, test and commission the following :</b>				
	<b><u>LIGHTING POINTS</u></b>				
A	Lighting points wired in 3x1.5mm <sup>2</sup> PVC SC Copper Cables drawn in concealed 20mm Diameter HG PVC conduits complete with all necessary accessories but excluding switches for:-				
	(a) One Way Switching.	73	No.		
	(b) Two Way Switching.	110	No.		
	<b><u>LIGHTING SWITCHES</u></b>				
B	10A moulded ivory switch plates as MK, Clipsal, BG, Crabtree or approved equivalent as follows:				
	(a) 1 gang 1 way	20	No.		
	(b) 1 gang 2 way	18	No.		
	(c) 2 gang 1 way	6	No.		
	(d) 2 gang 2 way	12	No.		
	(e) 4 gang 2 way	2	No.		
	(f) 1 gang Intermediate Switch	3	No.		
	<b><u>LIGHTING FITTINGS</u></b>				
C	Lighting fittings complete with all accessories including lamps of appropriate wattage and colour rendering and fixing materials as follows:				
	(a) 600mm by 600mm, 4x18W, modular surface/recessed fluorescent luminaire designed for use in lay-in ceiling grids, with louvre retention system, electronic ballast and plug and socket installation method.	3	No.		
	(b) 40W, 600mm x 600mm, LED Lighting fitting as Phillips FullGlow or approved equivalent.	7	No.		
	(c) 5W, 100mm diameter Low Voltage LED downlight with warm white output, satin finish, aluminium reflector and silver effect and suitable for recessed installation in standard ceiling as Maximus or approved equivalent.(Type C)	55	No.		
	(d) Aluminium Bulkhead with moulded glass cover for tungsten lamps, IP65 protection as Thorn DB Bulkhead or an approved equivalent. (Type B)	4	No.		
	(e) 1200mm, 2x36W standard waterproof IP65 fluorescent fitting with injection moulded polycarbonae body and polycarbonanate diffuser for T8 lamp with electronic control gear as Thorn Aquaproof or an approved equivalent. (Type L)	8	No.		
	(f) 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Type N)	10	No.		
	(g) 15W slim LED downlighter as Phillips GreenLED Ultima or approved equivalent. (Type N Emergency)	4	No.		
	(h) 12W slim LED warm white downlighter as Phillips or approved equivalent. (Type A)	30	No.		
	(i) 225mm, 18w surface mounted round LED panel as ARIAL or approved equivalent.(Type R)	11	No.		
	(j) 225mm, 18w surface mounted round LED panel as ARIAL (Emergency Version) or approved equivalent.(Type R)	4	No.		
	(k) GU10 Mains Voltage Spotlight Constructed of rust proof stainless steel. Size: (HxWxProj.) 180x95x100mm. Lamps: 1x35W aluminium reflector GU10 (supplied). IP24.Quote: MM19017 as Micromark Radius Range or approved equivalent. (Type G)	4	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 4: SECOND FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b>(l)</b> 600mm, 1x 18Watts fluorescent fitting with prismatic diffuser without a socket outlet point, for mirror lighting, as EGLO or approved equivalent. (Type M1)	1	No.		
	<b>(m)</b> Compact and flexible LED Strip Light with self adhesive tape on the reverse for fast installation, IP20 rating, upto 60 LED/M for high lighting homogeneity as Thorn ArrowFlex or approved equivalent. (Type S1)	80	Lm		
	<b>(n)</b> Shallow surface luminaire with circular opal diffuser and white stand-off ring as 12W Philips Waterproof Ceiling light.(Type S)	22	No.		
	<b>(o)</b> Wall Bracket (Halfmoon) with BC Candle lamps as Micromark or an approved equivalent. (Type W)	6	No.		
	<b>(p)</b> Self-contained double sided EXIT sign with 8W fluorescent lamp for non-maintained emergency lighting for 3 hour duration as Sapphire or approved equivalent. (Type Exit)	7	No.		
	<b>(q)</b> 5-Arm decorative chandellier on chain suspension for c/w candle lamps with crystal glass drops as Thorn or approved equivalent.	6	No.		
A	<b><u>TRUNKING &amp; DUCTING</u></b>				
	i) 200mm x 50mm, 2 compartment powder coated 'CLIP-ON' metal type trunking as Schneider Electric Kenya, manufacture to approved colour and complete with cover, bends,outlet plates,continuity bonding and all accessories.	80	Lm.		
	ii) Factory made powder coated corner bends for the above trunking.	9	No.		
	iii) Powder coated twin punched outlet plate for fixing twin socket outlets.	25	No.		
	iii) Ditto but for data/telephone/single switched socket outlets.	25	No.		
	iv) Carry out bonding throughout the entire length of the above trunking and connect to earthing.	1	Item		
B	Lay HG/PVC conduiting of size 3x32mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for telecommunication services.	35	Lm.		
C	Lay HG/PVC conduiting of size 3x50mm diameter HG/PVC ducts from the electrical service duct to the metal trunkings for internal power reticulation.	40	Lm.		
D	Lay HG/PVC conduiting of size 3x100mm diameter HG/PVC ducts inter-connecting electrical service ducts.	20	Lm.		
E	Supply and Install a 600mmx400mm powder coated 14SWG steel adaptable box to Engineer's approval.	4	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 4: SECOND FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b>POWER POINTS</b>				
A	Ring mains socket outlets comprising wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	34	No.		
B	13A switched white moulded case socket outlet plates as MK, Clipsal, BG, Crabtree or an approved equivalent. (a) Twin outlet.	24	No.		
C	13A RED coloured non-standard switched socket outlet for clean power sub-circuits complete with 13 Amp. Non Standard Plug Tops as MK, Clipsal, BG or an approved equivalent. (a) Twin outlet.	10	No.		
D	<b>Air Conditioner's Power Point</b> , comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits complete with all accessories but excluding the D.P switch .	6	No.		
E	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	6	No.		
F	<b>Dish washer Point</b> , comprising wiring drawn in 3x4mm <sup>2</sup> PVC-SC-CU cables in concealed 25mm Diameter HG PVC conduits in shower room complete with all accessories but excluding the D.P switch.	2	No.		
G	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	2	No.		
H	<b>Undersink Water Heater Power Point</b> , comprising wiring in 3 x 4mm <sup>2</sup> PVC/SC/CU cables drawn in concealed 25mm Dia. HG/PVC conduits complete with all necessary accessories but excluding the D.P switch.	2	No.		
V	20A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	2	No.		
I	<b>Hand Drier's Power Point</b> , wired in 3x 2.5sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	5	No.		
J	13A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	5	No.		
K	<b>Industrial Socket Power Point</b> , wired in 5x 6.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	4	No.		
L	<b>5-Pin Industrial Socket</b> as MK, Crabtree or approved equivalent.	4	No.		
M	32A TP Isolator switch as MK, Crabtree or approved equivalent.	4	No.		
N	<b>Industrial Socket Power Point</b> , wired in 3x 6.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	2	No.		
P	<b>3-Pin Industrial Socket</b> as MK, Crabtree or approved equivalent.	2	No.		
Q	32A SP Isolator switch as MK, Crabtree or approved equivalent.	2	No.		
	<b>Sub-Total C/F to the Next Page</b>				

**SCHEDULE NO. 4: SECOND FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	<b>Extract Fan (1-Φ) Power Point</b> , wired in 3x 4.0sq mm PVC SC copper cables drawn in concealed 25mm Dia. HG PVC conduits complete with all accessories but excluding the D.P switch.	6	No.		
B	16A DP Control Switch marked 'As Per Application' with neon light and cord outlet for item above as MK, Crabtree or approved equivalent.	6	No.		
C	<b>Cooker (1-Φ) Power Point</b> , comprising of 3x6mm <sup>2</sup> PVC SC Copper cables drawn in concealed 25mm Dia. HG PVC conduits c/w all accessories.	2	No.		
D	45A DP Cooker Control Unit with 13A integral Socket Outlet and Pilot Lamp marked 'As Per Application' for item above as MEM or approved equivalent.	2	No.		
E	Cooker Connection Unit wired from Cooker Control Unit.	2	No.		
	<b><u>TELEVISION POINTS</u></b>				
F	TV outlet point wired in 75 Ohms Screened Coaxial TV cables drawn in concealed 20mm diameter HG/PVC conduits and linked to the outside through the roof space (to the amplifier) via telephone draw in boxes.	6	Lm.		
	a) TV outlet plate with polished brass finish as Clipsal or approved equivalent.	6	No		
	b) 300x250x150mm, 16SWG, powder coated, Voice/Data draw box to approval.	2	No		
	<b><u>DATA&amp;TELEPHONE POINTS</u></b>				
G	Data/Telephone outlet point done in 20mm Dia. HG PVC conduits concealed in building fabric/ trunking complete with all necessary accessories.	25	No.		
	a) White moulded case dual data/telephone outlet plate as MK or approved	25	No.		
	<b><u>CCTV &amp; ACCESS CONTROL POINTS</u></b>				
H	CCTV & Access Control System Points done in 20mm Dia. HG PVC conduits concealed in building fabric/trunking complete with all necessary accessories.	15	No.		
	<b><u>INTERNAL POWER DISTRIBUTION</u></b>				
	<b>Supply, install, test and commission the following :-</b>				
I	9Ways TPN+E, flush mounted Distribution Board complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	1	No.		
J	9Ways TPN+E, flush mounted Distribution Board complete with 200A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	1	No.		
K	9Ways SPN+E, flush mounted Consumer Unit complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	1	No.		
L	MCB's for item above				
	(i) 10A SP	8	No.		
	(ii) 20A SP	20	No.		
	(iii) 32A SP	9	No.		
	(iv) 45A DP	2	No.		
	(v) 32A TP	3	No.		
	(vi) SP Spareway	10	No.		
	(vii) TP Spareway	2	No.		
M	Carry out concise permanent traffolyte labelling for all the sub-circuits in item above.	1	Item		
	<b>Sub-Total C/F to the Next Page</b>				



**SCHEDULE NO. 4: SECOND FLOOR CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>SUB-MAIN POWER DISTRIBUTION</u></b>				
A	25mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 50mmØ concealed HG PVC conduits.	45	Lm.		
B	50mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 50mmØ concealed HG PVC conduits.	25	Lm.		
C	3x10mm <sup>2</sup> sc PVC Copper cables in 32mmØ concealed HG PVC conduits.	20	Lm.		
D	Cable glands and lugs for the above cables.	1	Item		
E	<b><u>FIRE DETECTION AND ALARM SYSTEM</u></b>				
	<b>Supply, deliver, install and commission a complete Fire Detection and Alarm system, addressable type and in accordance with BS 5839 :2000, P2 and L2</b>				
	<b>i) Outlet for fire alarm manual call point/smoke/heat detector comprising box, concealed 20mm HG PVC conduit, wiring in 3 x 2.5mm<sup>2</sup> "firetuff" cables and all accessories.</b>	25	No.		
	<b>ii) Addressable Manual Fire break glass call point unit as MENVIER or approved equivalent complete with a packet of 5 spare glasses, a packet of 5 spare test keys, a spare back box and a hinged cover to be installed recessed in building fabric.</b>	7	No.		
	<b>iii) Addressable Electronic Fire Alarm Sounder complete with Red Flashing Beacon Light as MENVIER or approved equivalent.</b>	7	No.		
	<b>iv) Addressable Photometric Smoke Detector as Menvier MENVIER or equal and approved.</b>	6	No.		
	<b>v) Addressable Rate of Heat Rise Detector as Menvier MENVIER or equal and approved.</b>	5	No.		
	<b>vi) Repeater fire alarm control panel complete with 72hrs autonomous time emergency batteries as Menvier or equal and approved.</b>	1	No.		
	<b>Total for Schedule. No. 4: Second Floor C/F to Collection Page</b>				

**SCHEDULE NO. 5: POWER HOUSE & GATE HOUSES**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, test and commission the following :</b>				
	<b><u>LIGHTING POINTS</u></b>				
A	Lighting points wired in 3x1.5mm <sup>2</sup> PVC SC Copper Cables drawn in concealed 20mm Diameter HG PVC conduits complete with all necessary accessories but excluding switches for:- (a) One Way Switching.	18	No.		
	<b><u>LIGHTING SWITCHES</u></b>				
B	10A moulded ivory switch plates as MK, Clipsal, BG, Crabtree or approved equivalent as follows: (a) 2 gang 1 way (b) 1 gang 1 way Weatherproof Switch	5 1	No. No.		
	<b><u>LIGHTING FITTINGS</u></b>				
C	Lighting fittings complete with all accessories including lamps of appropriate wattage and colour rendering and fixing materials as follows: (a) 1200mm, 1x36W Standard IP65 rated fluorescent fitting with corrosion resistant enclosure for T8 lamp with Electronic Switchstart Gear as Thorn Corrosionproof or an approved equivalent. (b) Aluminium Bulkhead with moulded glass cover for tungsten lamps, IP65 protection as Thorn DB Bulkhead or an approved equivalent. (c) 225mm, 18w surface mounted round LED panel as ARIAL (Emergency Version) or approved equivalent.(Type R) (d) Shallow surface luminaire with circular opal diffuser and white stand-off ring as 12W Philips Waterproof Ceiling light.(Type S) (e) Gate Lantern as Phillips or approved equivalent	6 4 2 2 4	No. No. No. No. No.		
	<b><u>POWER POINTS</u></b>				
D	Ring mains socket outlets comprising wiring in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	6	No.		
E	13A switched white moulded case socket outlet plates as Clipsal, Crabtree or an approved equivalent. (a) Twin outlet.	6	No.		
	<b><u>DISTRIBUTION BOARDS</u></b>				
F	4Ways TPN+E, flush mounted Distribution Board complete with 100A integral isolator as SCHNEIDER ELECTRIC or an approved equivalent complete with all accessories but excluding MCBs.	3	No.		
G	MCB's for item above (i) 10A SP (ii) 20A SP (iii) 32A SP (iv) SP Spareway (v) TP Spareway	2 2 1 4 1	No. No. No. No. No.		
H	Carry out concise permanent traffolyte labeling for all the sub-circuits in item above.	1	Item		
	<b>Sub-Total C/F to the Next Page</b>				<b>188,500.00</b>

**SCHEDULE NO. 5: POWER HOUSE & GATE HOUSES CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>SUB-MAIN POWER DISTRIBUTION</u></b>				
A	16mm <sup>2</sup> 4Core PVC/SWA/PVC Copper cables in 38mmØ concealed HG PVC conduits.	155	Lm.		
B	3x10mm <sup>2</sup> sc PVC Copper cables in 32mmØ concealed HG PVC conduits.	20	Lm.		
C	Cable glands and lugs for the above cables.	1	Item		
D	Standard Cable Loop-in Box complete with 80A HRC fuse and fuse carrier +80A HRC fuse, Fuse Carrier with Neutral Block.	3	No.		
E	Concrete Cable Route Markers.	10	No.		
F	Earthing to Kenya Power (KP) standard at the boards & loop-in boxes complete with manholes and covers.	3	Item		
	<b>Total for Schedule No. 5: Power House &amp; Gate Houses C/F to Collection Page</b>				

**SCHEDULE NO. 6: CENTRALIZED ANTENNA SYSTEM**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test &amp; Commission the following: -</b> <b>CENTRALIZED ANTENNA SYSTEM</b>				
A	Mast head High gain amplifier units.	2	No.		
B	VHF aerial as Ellies or approved equivalent complete with mounting bracket.	2	No.		
C	UHF aerial as Ellies or approved equivalent complete with mounting bracket	2	No.		
D	Mast head Combiner unit as Ellies or approved equivalent	2	No.		
E	Eight way splitters as Ellies or approved equivalent	4	No.		
F	13 Amp High voltage guard as Sollatec or approved equivalent	2	No.		
G	Adjustable Telescopic Antenna Mast	2	No.		
H	75 Ohms Screened Coaxial TV cables for interwiring the antennas, combiner units, splitter units and amplifier	400	Lm.		
I	14SWG, powder coated, Security Lockable Box complete with lock and three keys to be handed over to the Client.	2	No.		
J	16 SWG, (300 x 300 x 300) mm <sup>3</sup> powder coated steel draw box for TV works.	6	No.		
K	DSTV System Installation (Dish & 6 Decoders)	1	Item		
<b>Total for Schedule No. 6: Centralized Antenna System C/F to Collection Page</b>					

**SCHEDULE NO. 7: LIGHTNING PROTECTION, EARTHING AND BONDING**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test &amp; Commission the following: -</b>				
	<b><u>AIR TERMINATION</u></b>				
A	Supply and lay along the ridge cap 25mm X 3mm thick bare pure copper tape as Furse P. No. TC030 or approved equivalent.	150	Lm.		
B	State Holdfast to fix the above tape at 1000mm intervals at the roof ridge for air termination system complete with tape jointing clamps and all the necessary accessories all as Furse Cat. No. HF015 or approved equivalent.	150	No.		
C	Air Termination Spike (lightning arrestors) comprising 2000mm by 15mm diameter copper rod as Furse P.No. RA240 complete with; Copper Multiple Point as Furse P. No. RA 600 and Copper Ridge Saddle as Furse P. No. SD115 or approved equivalent.	6	No.		
	<b><u>DOWNWARD CONDUCTOR</u></b>				
D	Downward Conductor comprising 25mm X 3mm thick bare pure copper tape as Furse P. No. TC030 or approved equivalent.	60	Lm.		
E	Copper Square Tape Clamp for making crossing tape joints as Furse CT 105 - FU or approved equivalent.	40	No.		
F	DC Tape Clips for Fixing the Down Conductors to the wall as Furse CT 105-FU or approved equivalent.	60	No.		
G	Copper Oblong Test/Junction Clamp complete with phosphor bronze nuts, washers and screws mounted 1800mm above finished ground level as Furse P. No. CN 105 or approved equivalent.	4	No.		
H	32 mm diameter galvanised steel conduit recessed in wall between test clamp and ground and through the ring beam for sleeving at roof level for securing the down conductors.	20	Lm.		
I	Copper Saddles fixed at 1000mm intervals at the surface on wall for the down conductor system complete with all the necessary accessories all as FURSE or approved equivalent.	40	No.		
	<b><u>EARTHING</u></b>				
J	Earth Inspection Concrete Chamber 300mm x 300mm x 300mm with an air tight inspection cover to approval.	4	No.		
K	Earthing with 16mm nominal diameter by 1500mm long threaded copper bond earth rods, complete with driving head and clamp.	4	No.		
L	Driving Stud for the Item above as Furse ST 300 or approved equivalent.	4	No.		
M	Earth Electrode Rod-to-Downward Conductor Copper Tape Clamps as Furse CR 105 or approved equivalent.	4	No.		
N	1500mm x 1500mm copper earth mat/grid (pure copper electrode) made from 25mm x 3mm thick bare copper tape (as Furse P. No. TC030 or approved equivalent). Copper tape to be spaced at 200mm interval, gas welded joints to Engineer's approval and 6m long 25mm x 3mm insulated copper tape clamped to the down conductors. Include burying the assembled grid to a minimum depth of 750mm below ground finish level (at permanent moisture level) and improving the earth to Engineer's approval. The measured earth resistance to be less than one (1) ohm.	4	No.		
	<b><u>BONDING</u></b>				
P	Bonding and clamping to all metal work including water pipes, gas pipes, hand-rails, air-conditioning units, window frames, cladding, metal roof etc and the main earth for the building.	1	Item		
Q	Testing and Commissioning the entire earthing & lightning protection system.	1	Item		
<b>Total for Schedule No. 7: Lightning Protection, Earthing and Bonding C/F to Collection Page</b>					

**SCHEDULE NO. 8: SOLAR PV AREA LIGHTING**

Item	Description	Qty	Unit	Rate(Kshs)	Amount(Kshs)
	<b>Supply,Install, test and commission the following :</b>				
A	200W mono-crystalline Solar PV Module complete with all installation accessories as UB or approved equivalent	5	No.		
B	75W LED light fitting, color temperature of 6000-6500K as Philips	5	No.		
C	12V/200AH gel type maintenance free battery as Gaston or approved equivalent	5	No		
D	PWM Solar charge controller 10A/24V as Morningstar or approved equivalent	5	No		
E	7M street lighting pole, spray painted, galvanised steel complete with foundation, support brackets for PV module, LED Lamp and battery box	5	No.		
F	2.5mm sq. twin with earth PVC copper cable	50	LM		
G	Any other item necessary for the installation	1	Lot.		
	a)				
	b)				
	c)				
<b>Total for Schedule No. 8: Solar Area Lighting C/F to Collection Page</b>					

**SCHEDULE NO. 9: SWITCHBOARDS, POWER DISTRIBUTION & RETICULATION**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b><u>MAIN LOW VOLTAGE SWITCHBOARD</u></b></p> <p>Supply, install, test and commission a Free-standing, IP66, purpose made front access lockable main switchboard with 800A TP + N + E busbars manufactured in 12SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as per Particular Specification, to be manufactured by SCHNEIDER or approved manufacturer complete with the following details:-</p> <p><b>a) Incoming</b></p> <p>i) 2No. 350TP MCCB with shunt trip (adjustable in the range 0.51-1A) Main incomer.</p> <p>ii) 800A TPN insulated copper bus bar system.</p> <p>iii) 1No. Voltmeter 0-600V plus selector switch.</p> <p>iv) 1No. Ammeter plus selector switch with C.T.s (600/5)</p> <p>v) 3No. Phase indicating lights</p> <p>vi) 1No. Power factor meter</p> <p>vi) All power system parameters (KW, KVA, KW/Hr, KVARs, Frequency, P.F., harmonics etc.). The multimeter should be complete with selector switches for viewing/displaying the various parameters.</p> <p><b>b) Outgoing</b></p> <p>i) 2No. 350A TPN MCCB feeder to the LV Sub-Boards as Merlin Gerin or approved equivalent.</p> <p>ii) 1No. 200A TPN MCCB feeder to the Distribution Boards as Merlin Gerin or approved equivalent.</p> <p>iii) 1No. 100A TPN MCCB feeder to the Distribution Boards as Merlin Gerin or approved equivalent.</p> <p>iv) A suitably rated 415V three-phase surge diverter as Furse ESP 415, fully wired, complete with enclosure with viewing window.</p> <p>v) Space for 2No. TPN MCCBs</p> <p><b>c) Carry out comprehensive labeling of all the bus bars, CT chambers, circuit breakers etc. above, indicating the areas served, outgoing cable sizes etc.</b></p> <p><b>d) Carry out concise load balancing to achieve a maximum imbalance not greater than <math>\pm 10\%</math> between any two phases, measured at the Main LV switchboard</b></p>	1	Item		
	Sub-Total C/F to the Next Page				

**SCHEDULE NO. 9: SWITCHBOARDS, POWER DISTRIBUTION & RETICULATION CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
<p>A</p>	<p><b>Sub-Total B/F from Previous Page</b></p> <p><b><u>LV SUB-SWITCHBOARD</u></b></p> <p>Purpose made weather proof - front access Free standing LV-Board manufactured in 12SWG galvanised mild steel sheet and finished in cream (or appropriate colour) powder coating as described in particular specification with 400A TP+N+E busbars, to be manufactured by SCHNEIDER or approved equivalent complete with the following:-</p> <p>a) 1No. 350A TPN MCCB as Merlin Gerin or approved equivalent.  b) 1No. Voltmeter 0-600V plus selector switch.  c) 1No. Ammeter plus selector switch with C.T.s (600/5)  d) 3No. Phase indicating lights  e) All power system parameters (KW, KVA, KWHr, KVAr, Frequency, P.F., harmonics etc.). The multimeter should be complete with selector switches for viewing/displaying the various parameters.  f) 5No. 100A TPN MCCB feeder to the Distribution Boards as Merlin Gerin or approved equivalent.  g) 1No. 200A TPN MCCB feeder to the Distribution Boards as Merlin Gerin or approved equivalent.  i) 2No. 63A TPN MCCB feeder to the Distribution Board as Merlin Gerin or approved equivalent.  (j) 1 No. 40A TPN MCCBs TO DB  (k) 1 No. 63A SPN MCCB - TO CU  (l) 1 No. 63A SPN MCCB - TO CU  (m) Space for 1No. 3Phase check meter.  (n) Sufficient spare capacity for future development  (p) Sealable studs for all cover plate screws and all necessary accessories  (q) 6mm perspex viewing window for each section  p) Carry out comprehensive labeling of all the bus bars. CT chambers, circuit breakers etc. of item above, indicating the areas served, outgoing cable sizes etc.  q) Fireman's switch system installation</p> <p align="center"><b><u>POWER FACTOR CORRECTION</u></b></p> <p>100KVAr digital programmed modular type automatic power factor correction capacitor bank switched in 2 steps of 25 KVAr, 2 steps of 15 KVAr and 2 steps of 10KVAr as that manufactured by Schneider complete with alarm for low power factor, switching MCBs, contactor controls and interwiring to facilitate dropping out of the capacitor bank in the event of mains power failure to avoid disorientating the generator AVR modules.. The bank to be made from low-loss bio-degradable compactive units, complete with common firmly bonded/earthed metallic enclosure made from 14 gauge cream powder coated galvanised steel sheets. The PFC bank to be integrated in the LV Board.</p>	<p align="center">1</p>	<p align="center">Item</p>		
<p>B</p>		<p align="center">1</p>	<p align="center">No.</p>		
	<p><b>Sub-Total C/F to the Next Page</b></p>				



**SCHEDULE NO. 9: SWITCHBOARDS, POWER DISTRIBUTION & RETICULATION CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>COMPREHENSIVE PROTECTIVE MULTIPLE EARTHING</u></b>				
A	Earthing of the subboard in accordance with KP&LC requirements, IET regulations, the government Electrical Installations regulations and other statutory requirements comprising but not limited to the following				
	a) Establish 450x450x700mm deep earthing chamber, complete with internal plastering, and heavy duty EAFW steel cover clearly marked "EARTH".	3	No.		
	b) 25mm X 3mm pure copper tape as Furse	25	Lm.		
	c) Pure copper earth rod (1500mm x 16mm)	3	No.		
	d) Driving head for earth rod	3	No.		
	e) Tape to earth rod clamp as Furse	3	No.		
	f) 70mm <sup>2</sup> single core green PVC/SWA/PVC armoured copper cable	30	Lm.		
	<b><u>CENTRALISED VOLTAGE STABILIZER</u></b>				
B	Supply, install, test and commission a 60KVA 415V, 50Hz Modular centralised voltage stabiliser complete with appropriate TP MCCB & all installation accessories	1	No.		
	<b><u>MAIN DISTRIBUTION CABLES, DUCTS &amp; MANHOLES</u></b>				
C	<b>Supply, install, test and commission the following cables complete with cable glands and lugs where necessary. As manufactured by East African Cables Ltd. or approved equivalent.</b>				
	a) 2x150mm sq. 4-core PVC/SWA/PVC Copper Cable complete with appropriate all installation accessories.	75	Lm.		
	b) Cable lugs and glands complete with plastic sleeves for the above cables	1	Item		
	c) 50mm sq. 4-core PVC/SWA/PVC Copper Cable complete with appropriate all installation accessories.	45	Lm.		
	d) Cable glands complete with plastic sleeves for the above cable	2	No.		
	e) Cable glands complete with plastic sleeves for the above cable	1	Item		
	f) 450mm x 50mm deep perforated GI cable tray complete with all fixing accessories As Manufactured by Schneider or approved equivalent.	45	Lm.		
D	100mm dia. HG PVC duct in 100mm concrete surround buried 600mm underground for power supply cable way along road and parking crossings.	125	Lm.		
E	2x50mm dia. HG PVC duct in 50mm concrete surround buried 600mm underground for power supply/data cable way along road and parking crossings.	155	Lm.		
F	Establish 630 x 550 x 700mm deep standard power manholes, complete with internal plastering, and heavy duty EAFW steel cover. (manholes to be selfdraining)	7	No.		
G	Establish 450 x 450 x 700mm deep standard data/telephone manholes, complete with internal plastering, and heavy duty EAFW steel cover. (manholes to be selfdraining)	6	No.		
H	75mm diameter HG PVC ducts encased in concrete surround buried in ground for incoming data/telephone supply cables.	55	Lm.		
I	Excavate trenches for ducts and armoured cables above, average depth 700mm, remove soft earth, lay ducts, cover with "DANGER-HATARI" tiles, back fill soft earth and compact to natural ground level.	235	Lm.		
	<b>Total for Schedule No. 9: Switchboards, Power Distribution &amp; Reticulation C/F to Collection Page</b>				

**ELECTRICAL INSTALLATION WORKS SUMMARY PAGE**

ITEM	DESCRIPTION	AMOUNT (KSHS)
1.00	TOTAL FOR SCHEDULE NO. 1: BASEMENT FLOOR	
2.00	TOTAL FOR SCHEDULE NO. 2: GROUND FLOOR	
3.00	TOTAL FOR SCHEDULE NO. 3: FIRST FLOOR	
4.00	TOTAL FOR SCHEDULE NO. 4: SECOND FLOOR	
5.00	TOTAL FOR SCHEDULE NO. 5: POWER HOUSE & GATE HOUSES	
6.00	TOTAL FOR SCHEDULE NO. 6: CENTRALIZED ANTENNA SYSTEM	
7.00	TOTAL FOR SCHEDULE NO. 7: LIGHTNING PROTECTION, EARTHING AND BONDING	
8.00	TOTAL FOR SCHEDULE NO. 8: SOLAR PV AREA LIGHTING	
9.00	TOTAL FOR SCHEDULE NO. 9: SWITCHBOARDS, POWER DISTRIBUTION & RETICULATION	
10.00	Allow for preparation and production of 3No. Sets of "As Installed Drawings" (Hard & Soft Copies in AutoCAD 2018)	
	<b>TOTAL FOR ELECTRICAL INSTALLATION WORKS C/F TO SUMMARY PAGE</b>	

**BILL NO. 2 : GENERATOR SET INSTALLATION WORKS**

**NOTE: Bidders are to advised to price with a view of taking over and offer credit to the client, an existing 100KVA Standby Generator Set. Details & Status of the existing genset to be ascertained during the pre-tender site visit)**

**SCHEDULE NO. 1 : GENERATING SET**

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
A	<p><b>Supply, install, test and commission the following :</b></p> <p>Supply, deliver to site, install, test and commission a standby rated 250 KVA 3 phase, 415V, 50Hz diesel generating set with a continuous power factor of 0.8 lagging and as fully described in the particular specifications. The generator set is to be complete with a sound attenuated canopy and an integral base/belly daily service fuel tank with an operational running capacity of 8 hours.</p>	1	No.		
B	Supply, deliver to site and install a steel exhaust pipe of not less than 14 SWG and of adequate diameter running from the generating set to the outside of the generator house	15	M		
C	Connect the exhaust pipe above in item B using steel pipes of adequate diameter, and flexible piping off engine exhaust manifold complete with heavy duty silencer	Item			
D	Complete earthing of generating set to electrical engineer's approval	Item			
<b>SUB-TOTAL C/F TO COLLECTION PAGE</b>					

**SCHEDULE NO. 2: AMF CONTROL PANEL**

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
A	<p><b>Supply, install, test and commission the following :</b></p> <p>An electrical control panel complete with suitable rated incoming MCCBs and contactors for automatic change over operation and complete with all other control accessories as fully described in the particular specifications</p>	1	No.		
B	<p>Suitable rated manual by-pass switch with clearly labeled <b>NORMAL-OFF-BYPASS</b> positions, <b>and shall such be wired that when the switch is on either OFF or BYPASS position, the generator shall receive no signal to start</b></p>	1	No.		
C	<p>An automatic synchronising and load sharing panel complete with suitable rated incoming MCCBs and contactors for 1No. 250Kva and 1No. 100Kva Gensets complete with module &amp; all other control accessories as fully described in the particular specifications</p>	1	No.		
D	<p>240V AC/12V DC mains power supply trickle battery charger as specified in particular specifications. The trickle charger shall charge the battery when the set is on <b>IDLE mode</b>, otherwise when the set is <b>RUNNING</b>, the battery shall be charged by the <b>generator charger</b>. Wiring shall be done such that the two chargers shall not operate at the same time.</p>	1	No.		
D	<p>12 volts battery as specified in the particular specifications</p>	2	No.		
E	<p>Armoured cables complete with lugs, glands and pvc sleeves:</p> <p>(a) 240 mm sq, 4 core PVC/SWA/PVC copper cable</p> <p>(b) 2.5mm<sup>2</sup>, 4 core, PVC/SWA/PVC copper cable</p>	40	LM		
F	<p>Interwire the control panel with the existing Mains distribution board</p>	Item	Item		
<b>SUB-TOTAL C/F TO COLLECTION PAGE</b>					

**SCHEDULE NO. 3-RECOMMENDED SPARE PARTS AND LUBRICANTS**

ITEM	DESCRIPTION	UNIT	QTY	RATE	KSHS
	<b>For the supply to the site of the following spare parts and lubricators:</b>				
A	Oil Filters	No.	4		
B	Air Filters	No.	4		
C	Fuel Filters	No.	4		
D	Set of Fan belts to suit the set	No.	1		
E	10 litres container of sump oil of grade.....*	No.	1		
F	2 kilogram grease in a tin of grade.....*	No.	1		
G	10 litre plastic container of distilled water	No.	1		
H	20 litre of engine oil in a tin of grade.....*	No.	1		
I	Any other spare parts recommended by Tenderer **				
	*The tenderer to fill in the Grade quality to be supplied				
	**The tenderer to fill in the details and price of items but the price not to be included in total carried forward to summary page				
<b>SUB-TOTAL C/F TO COLLECTION PAGE</b>					

**SCHEDULE NO. 4 -TOOLS TO BE SUPPLIED WITH THE SET**

ITEM	DESCRIPTION	UNIT	QTY	RATE	KSHS
	<b>For the supply to site of the following tools:</b>				
A	Metal tool box with lock and two keys		1		
B	Set of 8 No. Chrome vanadium ring spanners in sizes to suit the set		1		
C	Set of 3 screwdrivers, 75mm, 200mm and 300mm plus one 200mm Philips type		1		
D	- ditto -but open ended spanners		1		
E	Set of feeler gauges		1		
F	Grease gun to suit greasing points		1		
G	Oil can, trigger type				
H	Any other special tools which the tenderer recommends should be purchased as an optional:*		1		
	<b>NOTE*</b> Tenderer should give detail and prices of item H but the price not to be included in total carried forward.				
<b>SUB-TOTAL C/F TO COLLECTION PAGE</b>					

**SCHEDULE NO. 5: AUXILIARY FUEL TANK**

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
A	Supply, deliver to site and install, to the approval of the project manager, and connect to the daily service base/belly fuel tank, an auxiliary fuel tank with level indicator and with an operational running capacity of 72 hours. The tank is to be complete with stand and all interconnecting G.I pipe work.		1 No		
B	Supply, install, test and commission a manually operated fuel pump complete with all interconnecting accessories and G. I piping		1 Item		
<b>SUB-TOTAL C/F TO COLLECTION PAGE</b>					

**GENERATOR INSTALLATION WORKS COLLECTION PAGE**

Item	Description		Amount (Kshs)
1	Sub-Total for Schedule No. 1 - Generating Set		
2	Sub-Total for Schedule No. 2 - AMF Panel		
3	Sub-Total for Schedule No. 3 - Recommended Spare Parts and Lubricators		
4	Sub-Total for Schedule No. 4 - Tools to be Supplied with the Set		
5	Sub-Total for Schedule No. 5 - Auxiliary Fuel Tank b/f from page C/33		
6	Allow for preparation and production of 3No. Sets of "As Installed Drawings" (Hard & Soft Copies in AutoCAD 2018)		
<b>TOTAL FOR GENERATOR INSTALLATION WORKS C/F SUMMARY PAGE</b>			

**ELECTRICAL & GENERATOR SET INSTALLATION WORKS SUMMARY PAGE**

ITEM	DESCRIPTION	AMOUNT (KSHS)
1.00	TOTAL FOR BILL NO. 1: ELECTRICAL INSTALLATION WORKS	
2.00	TOTAL FOR BILL NO. 2: GENERATOR INSTALLATION WORKS	
	TOTAL FOR ELECTRICAL & GENERATOR INSTALLATION WORKS C/F TO MAIN WORKS SUMMARY PAGE	

Total Amount in Words (Kenya Shillings)

.....

Total Amount in Words (Kenya Shillings)

.....

Bidder's Name & Official Stamp

.....

P.O. Box.....

Signature.....

Date.....

PIN NO.....

V.A.T Certificate NO.....

Witness.....

Address.....

Signature of Witness.....

Date.....



**SECTION D**

**SCHEDULE OF UNIT RATES**

## SCHEDULE OF UNIT RATES

1. The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.
2. The unit rates shall include for supply, transport, insurance, delivery to site, storage as necessary, assembling, cleaning, installing, connecting, profit and maintenance in defects liability and any other obligation under this contract.
3. The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.
4. Where trade names or manufacturer's catalogue numbers are mentioned in the specification, the reference is intended as a guide to the type of article or quality of material required. Alternative brands of **equal** and **approved** quality will be accepted.

SCHEDULE OF UNIT RATES

NO	DESCRIPTION	UNIT RATE (KSHS)
1	<b>PVC/SWA/PVC Copper cables per metre</b> a) 2.5mm sq. 2 core b) 4.0 mm sq 4 core c) 6.0 mm sq 4 core d) 10 mm sq 4 core e) 16.0 mm sq 4 core f) 25.0 mm sq 4 core g) 35 mm sq 4 core h) 50 mm sq 4 core i) 70 mm sq 4 core j) 95 mm sq 4 core k) 120 mm sq 4 core	
2	<b>IP 65 rated Isolators as KATKO, 3 Phase</b> a) 20A b) 32A c) 63A d) 100A e) 200A	
3	<b>IP 65 rated Isolators as KATKO, Single Phase</b> a) 20A b) 32A c) 63A d) 100A	
4	<b>Emergency Shutdown switch</b>	
5	<b>LED Flood Lights</b> a) 30A Watts b) 100 Watts c) 200 Watts	
6	<b>Distribution Boards</b> a) 8 Ways TPN b) 9 Ways TPN	
7	<b>Industrial Sockets outlets, 5 pin</b> a) 20A b) 32A	
8	<b>Industrial Sockets outlets, 3 pin</b> a) 20A b) 32A	

**SECTION E**  
**TECHNICAL SCHEDULE**  
**OF**  
**ITEMS TO BE SUPPLIED**

## TECHNICAL SCHEDULE

1. The technical schedule shall be submitted by tenderers to facilitate and enable the Project Manager to evaluate the tenders, especially where the tenderer intends to supply or has based his tender sum on equipment which differs in manufacture, type or performance from the specifications indicated by the Project Manager.
2. This schedule shall form part of the technical evaluation criterion, and tenderers are therefore advised to complete the schedule as they shall be considered responsive.

**TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED**

(To be completed by the Tenderer. MANDATORY)

ITEM	DESCRIPTION	TYPE/MAKE	MODEL	COUNTRY OF ORIGIN
1	LIGHTING FITTINGS ❖ Slim Batten LED fitting ❖ 2D light luminaire ❖ Ceiling downlight LED fitting			
2	Lighting Switches			
3	Voltage Stabiliser			
4	Socket outlet plates			
5	Fire Alarm Control Panel			
6	LV Board			
7	Consumer Units/ Distribution Boards			
8	MCCB			
9	Cables ❖ Armoured Copper (PVC/SWA/PVC)			
10	Solar Panel			
11	Battery			
12	Synchronising Panel			

**PART NO. 9**

**PLUMBING AND DRAINAGE**  
**INSTALLATION WORKS**

**TABLE OF CONTENTS**

<u>CONTENTS</u>	<u>PAGE</u>
CONTENTS PAGE.....	(i)
SECTION A: GENERAL MECHANICAL SPECIFICATION.....	A-1 to A-5
SECTION B: PARTICULAR SPECIFICATIONS FOR PLUMBING AND DRAINAGE INSTALLATION .....	B-1 to B-32
SECTION C: BILLS OF QUANTITIES AND SCHEDULE OF UNITS RATES .....	C-1 to C-34
SECTION D: TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED .....	D-1 to D-2



**SECTION A**

**GENERAL MECHANICAL SPECIFICATIONS**

## SECTION A

### GENERAL MECHANICAL SPECIFICATION

<u>CLAUSE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.01	GENERAL	A-1
1.02	QUALITY OF MATERIALS	A-1
1.03	REGULATIONS AND STANDARDS	A-1
1.04	ELECTRICAL REQUIREMENTS	A-2
1.05	TRANSPORT AND STORAGE	A-2
1.06	SITE SUPERVISION	A-3
1.07	INSTALLATION	A-3
1.08	TESTING	A-3
1.09	COLOUR CODING	A-4
1.10	WELDING	A-5

## SECTION A

### GENERAL MECHANICAL SPECIFICATION

#### 1.01 **General**

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

#### 1.02 **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 connection by the Sub-contractor shall be carefully examined on receipt. 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.

#### 1.03 **Regulations and Standards**

The Sub-contract Works shall comply with the current editions of the following:

- a) The Kenya Government Regulations.
- b) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
- a) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.

- d) British Standard 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 Authority By-laws.
- h) The Kenya Building Code Regulations.
- i) The Kenya Bureau of Standards

#### 1.04 **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 and connections to equipment shall form part of this Sub-contract and be the responsibility of the Sub-contractor.

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 (KPLC) 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 240Volts, 50Hz, 1-phase.

Any equipment that is not rated for the above voltages and frequencies shall be rejected by the Engineer.

#### 1.05 **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.

1.06 **Site Supervision**

The Sub-contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

1.07 **Installation**

Installation of all special plant and 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 2.03 of this Section.

1.08 **Testing**

1.08.1 **General**

The Sub-contractor's attention is drawn to Part 'C' Clause 1.38 of the "Preliminaries and General Conditions".

1.08.2 **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 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 specially 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.

#### 1.08.3 Manufactured Plant and Equipment – Work 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 such tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The cost 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.

#### 1.08.4 Pressure Testing

All pipework installations shall be pressure tested in accordance with the requirements of the various sections of this Specification. The installations may be tested in sections 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 pressure 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 section of the work that has been tested.

#### 1.09 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 and to the approval of the Engineer or Architect.

## 1.10 **Welding**

### 1.10.1 **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 imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

### 1.10.2 **Method**

All welding shall be carried out by the electric arc processing 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.

### 1.10.3 **Welding Code and Construction**

All welded joints shall be carried out in accordance with the following Specifications:

a) **Pipe Welding**

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

b) **General Welding**

All welding of mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

### 1.10.4 **Welders Qualifications**

Any welder employed on this Sub-contractor shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate 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.

**SECTION B**

**PARTICULAR SPECIFICATIONS FOR PLUMBING AND DRAINAGE  
INSTALLATION WORKS**

**PARTICULAR SPECIFICATIONS FOR PORTABLE FIRE EXTINGUISHER AND  
HOSEREEL SYSTEM INSTALLATION WORKS**

**PARTICULAR SPECIFICATIONS FOR SOLAR HOT WATER HEATING  
INSTALLATION WORKS**



## **PARTICULAR SPECIFICATIONS FOR PLUMBING AND DRAINAGE INSTALLATION WORKS**

### **GENERAL**

This section specifies the general requirements for plant, equipment and materials forming part of the plumbing and drainage installations.

### **MATERIALS AND STANDARDS**

#### **Pipework and Fittings**

Pipework materials are to be used as follows:

a) **Galvanized Steel Pipework**

Galvanized steel pipe work up to 65mm nominal bore shall be manufactured in accordance with B.S. 1387 Medium Grade, with tapered pipe threads in accordance with B.S. 21. All fittings shall be malleable iron and manufactured in accordance with B.S. 143.

Pipe joints shall be screwed and socketed and sufficient coupling unions 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.

Galvanized steel pipe work, 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 jointing of pipes to valves and other items of plant. All flanges shall comply with the requirements of B.S. 10 to the relevant classifications contained hereinafter under Section 'C' of the Specification.

Galvanizing shall be carried out in accordance with the requirements of B.S. 1387 and B.S. 143 respectively.

b) **Copper Tubing**

All copper tubing shall be manufactured in accordance with B.S. 2871 from C.160 'Phosphorous De-oxidized Non-Arsenical Copper' in accordance with B.S. 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fittings manufactured in accordance with B.S. 864.

Short copper connection tubes between galvanized pipe work and sanitary fittings 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 way than the use of copper tubing, then a brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

c) **P.V.C. (Hard) Pressure Pipes and Fittings**

All P.V.C. pipes and fittings shall be manufactured in accordance with B.S. 3505: 1968.

**Joining**

The method of joining to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal ring joint shall be introduced where it is necessary to accommodate thermal expansion.

**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 practical after laying and when the pipeline is adequately 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.

d) **A.B.S. Waste System**

Where indicated on the Drawings and Schedules, the Sub-contractor shall supply and fix A.B.S. waste 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.

Joining of pipes shall be carried out by means of solvent welding, the manufacturer's instructions and B.S. 5572: 1978.

Joining of pipes 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, centers of which shall not exceed one meter.

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

e) **PVC Soil System**

The Sub-contractor shall supply and fix PVC soil pipes and fittings as indicated on the Drawings and Schedules.

Pipes and fittings shall be in accordance with relevant British Standards, including B.S. 4514 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 adhere to.

Connections to WC pans shall be effected by the use of a WC connector, gasket and cover, fixed to suit pan outlet.

Suitable supporting brackets and pipe clips shall be provided at maximum of one metre centres.

The Sub-contractor shall be responsible for the joint into the Gully Trap on Drain as indicated on the Drawings.

**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 the requirements of B.S.1010.

b) **Gate Valves**

All gate 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 requirements 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.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 valves shall depend upon the pressure conditions pertaining to the site of works.

c) Globe Valves

All globe valves up to and including 65mm 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.

**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-Syphon Traps

Where anti-syphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hughes Limited, Deacon Works Littlehampton, Sussex, England.

The trade name for traps manufactured by this company is 'Grevak'.

**Pipe Supports**

a) General

This sub-clause deals with pipe supports 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 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 works commence.

b) Steel and Copper Pipes and Tubes

Pipe runs shall be secured by clips connected to pipe angers, 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 supports spacing in metres for steel and copper pipe and tube is given in the following table for horizontal runs.

Size Nominal Bores	Copper Tube to B.S. 659	Steel Tube to B.S. 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	3.0m	4.5m
150mm	3.5m	4.5m

The support spacing for vertical runs shall not exceed one and a half times the distances given for horizontal runs.

c) 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.

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.

### **Sanitary Appliances**

All sanitary appliances supplied and installed as part of the Sub-contract works shall comply with the general requirements of B.S. Code of Practice 305 and the particular requirements of the latest B.S. Specifications.

### **Pipe Sleeves**

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeves 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.

## **INSTALLATION**

### **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.

### **Above Ground Installation**

#### a) Water Services

Before any joint is made, the pipes shall be hung in their supports and adjusted to ensure that the joining faces are parallel and any falls which shall 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 lines 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 user 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 reach from a small step ladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to 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 allowances shall be made for the expansion and contraction of pipework, precautions being taken to ensure that any force produced by the pipe movements are not transmitted to valves, equipment or plant.

All screwed joints to piping and fittings shall be made with P.T.F.E. tape.

The test pressure shall be maintained by the pump 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 4.5 litres 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 system 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 waste fittings are discharged to a gully trap before passing to the sewer via a manhole.

The Sub-contractor shall provide all necessary rodding and inspection facilities within the draining system in positions where easy accessibility is available.

Where a branch requires rodding facilities in a position to which normal access is unobtainable, then that branch shall be extended so as to provide a suitable purpose made rodding 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 rodding 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 C.P. 305 to the approval of the Engineer.

## **TESTING AND INSPECTION**

### **Site Tests – Pipework Systems**

#### a) 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 to design working pressure.

If preferred, the Sub-contractor may test the pipelines in sections. 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.

#### b) 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 respects, tests shall comply with the requirements of B.S. 5572.

### **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 pre-formed 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 "sweating", 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 painting as follows:



- i) Apply a coating of suitable filler until the canvas weave disappears and allow to dry.
- ii) Apply two coats of an approved paint and finish in suitable gloss enamel to colors approved by the Engineer.

All lagging for cold and hot water pipes erected in crawlways, 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 banded in colours to be approved by 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 of 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 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.

### **STERILISATION OF COLD WATER SYSTEM**

All water distribution system shall be thoroughly sterilised and flushed out after the completion of all tests and before being fully commissioned for handover.

The sterilisation procedures shall be carried out by the Sub-contractor in accordance with the requirements of B.S. Code of Practice 301, Clause 409 and to the approval of the Engineer.

## **PARTICULAR SPECIFICATIONS FOR PORTABLE FIRE EXTINGUISHER AND HOSE REEL INSTALLATIONS**

### **GENERAL**

The particular specification details the requirements for the supply and installation and commissioning of the Portable Fire Extinguishers and Boosted Hose Reel System. The Sub-contractor shall include for all appurtenances and appliances not necessarily called for in this specification or shown on the contract drawings but which are necessary for the completion and satisfactory functioning of the works.

If in the opinion of the Sub-contractor there is a difference between the requirements of the Specifications and the Contract Drawings, he shall clarify these differences with the Engineer before tendering.

### **SCOPE OF WORKS**

The Sub-contractor shall supply, deliver, erect, test and commission all the portable fire extinguishers and Hose Reel which are called for in these Specifications and as shown on the Contract Drawings.

### **WATER/CO2 EXTINGUISHERS**

These shall be 9-litre water filled CO2 cartridge operated portable fire extinguishers and shall comply with B.S. 1382: 1948 and to the requirements of B.S.4523: 1977. Unless manufactured with stainless steel, bodies shall have all internal surfaces completely coated with either a lead tin, lead alloy or zinc applied by hot dipping. There shall be no visibly uncoated areas.

The extinguishers shall be clearly marked with the following:

- a) Method of operation.
- b) The words 'WATER TYPE' (GAS PRESSURE) in prominent letters.
- c) Name and address of the manufacturer or responsible vendor.
- d) The nominal charge of the liquid in imperial gallons and litres.
- e) The liquid level to which the extinguisher is to be charged.
- f) The year of manufacture.
- g) A declaration to the effect that the extinguisher has been tested to a pressure of 24.1 bar (350 psi).
- h) The number of British Standard 'B.S' 1382 or B.S. 5423: 1977.

## **PORTABLE CARBON DIOXIDE FIRE EXTINGUISHERS**

These shall be portable carbon dioxide fire extinguishers and shall comply with B.S. 3326: 1960 and B.S. 5423: 1977.

The body of extinguisher shall be a seamless steel cylinder manufactured to one of the following British Standards; B.S. 401 or B.S. 1288.

The filling ratio shall comply with B.S. 5355 with valves fittings for compressed gas cylinders to B.S.341. Where a hose is fitted it shall be flexible and have a minimum working pressure of 206.85 bar (3000 p.s.i.). The hose is not to be under internal pressure until the extinguisher is operated.

The nozzle shall be manufactured of brass gunmetal, aluminium or stainless steel and may be fitted with a suitable valve for temporarily stopping the discharge if such means are not incorporated in the operating head.

The discharge horn shall be designed and constructed so as to direct the discharge and limit the entrainment of air. It shall be constructed of electrically non-conductive material.

The following markings shall be applied to the extinguishers:-

- a) The words “Carbon Dioxide Fire Extinguisher” and to include the appropriate nominal gas content.
- b) Method of operation.
- c) The words “Re-charge immediately after use”.
- d) Instructions for periodic checking.
- e) The number of the British Standard B.S. 3326: 1960 or B.S. 5423.
- f) The manufacturers name or identification markings

## **DRY CHEMICAL POWDER PORTABLE FIRE EXTINGUISHER**

The portable dry powder fire extinguishers shall comply with BS3465: 1962 and BS 5423. The body shall be constructed to steel not less than the requirements of BS 1449 or aluminium to BS 1470 : 1972 and shall be suitably protected against corrosion.

The dry powder charge shall be not-toxic and retain its free flowing properties under normal storage conditions. Any pressurizing agent used as an expellant shall be in dry state; in particular compressed air.

The discharge tube and gas tube if either is fitted shall be made of steel, brass, copper or other not less suitable material. Where a hose is provided it shall not exceed 1,060mm and shall be acid and alkali resistant. Provision shall be made for securing the nozzle when not in use.

The extinguisher shall be clearly marked with the following information

- a) The word "Dry Powder Fire Extinguisher"
- b) Method of operation in prominent letters.
- c) The working pressure and the weight of the powder charge in Kilogramme.
- d) Manufacturers name or identification mark
- e) The words "RECHARGE AFTER USE" if rechargeable type.
- f) Instructions to regularly check the weight of the pressure container (gas Cartridge) or inspect the pressure indicator on stored pressure types when fitted, and remedy any loss indicated by either.
- g) The year of manufacture.
- h) The Pressure to which the extinguisher was tested.
- i) The number of this British Standard BS 3465 or BS 5423: 1977.
- j) When appropriate complete instructions for charging the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

## **AIR FOAM FIRE EXTINGUISHER**

These shall be of 9 litres capacity complete with refills cartridges and wall fixing brackets and complying with B.S. 5423 with the following specifications:-

**Cylinder:** to B.S. 1449

**Necking:** to be 76mm outside diameter steel EN 3A 2<sup>3</sup>/<sub>4</sub> X 8TPI female thread.

**Head cap:** to be plastic moulding acetyl resin.

**CO<sub>2</sub> Cylinder:** to be 75gm P.V.C coated.

**Internal Finish:** to be polythene lining on phosphate coating.

**External finish:** to be phosphated - One coat primer paint and one coat stove enamel B.S. 381 C.

## **FIRE BLANKET**

The fire blanket shall be made from cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1800 x 1210 mm and shall be fitted with special tapes folded so as to offer instantaneous single action to release blanket from storing jacket.

## **BOOSTED HOSE REEL SYSTEM**

### **General**

The Particular Specification details the requirements for the supply, installation and commissioning of the hose reel installation. The hose reel installation shall comply in all respects to the requirements set out in C.O.P 5306 Part 1: 1976, B.S 5041 and B.S 5274. The System shall comprise of a pumped system.

### **Hose Reel Pumps**

The fire hose reel pumps shall consist of a duplicate set of multi-line centrifugal pumps from approved manufacturers. The pumps shall be capable of delivering 2.1 lit/sec at a running pressure of 2 bars.

The pump casing shall be of cast iron construction with the impeller shaft of stainless steel with mechanical seal.

### **Control Panel**

The control panel shall be constructed of mild steel 1.0mm thick sheet, be moisture, insect and rodent proof and shall be provided complete with circuit breakers and a wiring diagram enclosed in plastic laminate.

The pump shall be controlled by a flow switch therefore, the control panel shall include the following facilities:

- (a) 'On' push button for setting the control panel to live.
- (b) Green indicator light for indicating control panel live.
- (c) Duty / Stand-by pump auto change over.
- (d) Duty pump run green indicator light.
- (e) Stand-by pump run green indicator light.
- (f) Duty pump fail red indicator light.
- (g) Stand-by pump fail red indicator light.
- (h) Low water condition pump cut-out with red indicator light.

The pumps are to be protected by a low level cut-out switch to prevent dry pump run when low level water conditions occur in the water storage tank.

### **Hose Reel**

The hose reel to the installation shall consist of a recessed, swing-type hose reel as Angus Fire Armour Model III or from other approved manufacturers.

The hose reel shall comply with B.S. 5274: 1975 and B.S 3161: 1970 and is to be installed to the requirements of C.P. 5306 Part 1: 1976.

The hose reel shall be supplied and installed complete with a first-aid Non-kinking hose 30 meters long with a nylon spray / jet / shut-off nozzle fitted. A screw down chrome - plated globe valve to B.S 1010 to the inlet to the reel is to be supplied.

The orifice to the nozzle is to be not less than 4.8mm to maintain a minimum flow of 0.4 lit / sec to jet.

The hose reels shall be installed complete with electro-galvanised cabinet recessed on the wall.

The hose reels shall be installed at 1.5 metres centre above the finished floor level in locations shown in the contract drawings.

### **Pipe Work**

The pipe work for the hose reel installation shall be galvanised wrought steel tubing heavy grade Class C to B.S 1387: 1967 with pipe threads to B.S 21. The pipe work and all associated fittings shall be in approved colour for fire fittings.

### **Pipe Fittings**

The pipe fittings shall be wrought steel pipe fittings, welded or seamless fittings conforming to B.S. 1740 or malleable iron fittings to B.S 143.

All changes in direction will be with standard bends or long radius fittings. No elbows will be provided.

### **Non-return Valves**

The non-return valves up to and including 80mm diameter shall be to B.S. 5153: 1974. The valves shall be of cast iron construction with gunmetal seat and bronze hinge pin.

### **Gate Valves**

The gate valves up to and including 80mm diameter shall be non-rising stem and wedge disc to B.S 5154: 1974 with screwed threads to B.S. 21 tapes thread

### **Sleeves**

Where pipe work passes through walls, floors or ceilings, a sleeve shall be provided one diameter larger than the diameter of the pipe, the space between them to be packed with mineral wool, to the Engineer's approval.

### **Earthing**

The hose reel installation shall be electrically earthed by a direct earth connection. The installation of the earthing shall be carried out by the Electrical Sub- contractor.

### **Finish Painting**

Upon completion of testing and commissioning the hose reel installation, the pipework shall be primed and finish painted with 2 No. coats of paints to the Engineer's requirements.

### **Testing and Commissioning**

The hose reel installation shall be flushed out before testing to ensure that no builder's debris has entered the system. The installation is to be then tested to one and half times the working pressure of the installation to the approval of the Engineer. Simulated fault conditions of the pumping equipment are to be carried out before acceptance of the System by the Engineer.

### **Instruction Period**

The Sub-contractor shall allow in his contract sum for instructing of the use of the equipment to the Client's maintenance staff. The period of instruction may be within the contract period but may also be required after the contract period has expired.

The period of time required shall be stipulated by the Client but will not exceed two days in which time the Client's staff shall be instructed on the operation and maintenance of the equipment.

## Signage-Fire Instruction /Fire Exit

### Fire Instruction Notice

Print fire instruction on the Perspex plates with White Colour  
Background measuring 510mm length x 380mm width x 4mm thick as follows;

#### **FIRE INSTRUCTION NOTICE**

In the event of fire;

1. Raise the alarm by actuating the nearest alarm system point, Sound Siren /gong or **Shout Fire**
2. Attack fire using the nearest available equipment
3. Call nearest fire Brigade or Police 999 and inform your switchboard (PABX) Operator
4. Ensure that all personnel not involved in fire fighting evacuation to safety outside the building.
5. Close but **DO NOT LOCK** doors behind as you leave.
6. Evacuate the building using stairs or fire escapes. Do not use Lifts/escalators. Walk calmly. Avoid panic. Do not stop or return for personal belongings.
7. Assemble as per floor outside the building for roll call.

### Fire Exit Sign

Print Fire Exit signs on the Perspex plate, 4mm thick, with white colour background as follows:-

1. Lettering **IN RED COLOUR** of not less than 50mm in height.
2. A pendant sign bearing words, **FIRE EXIT** and with a directional arrow.

The sign must be capable of being read from both approaches to exit and so is double sided.

### Hose Reel Label

Print Fire Exit signs on the Perspex plate, 4mm thick, with white colour background as follows:-

1. Lettering **IN RED COLOUR** of not less than 50mm in height.
2. A pendant sign bearing words, **HOSE REEL** and with a directional arrow.

The sign must be capable of being read from both approaches to exit and so is double sided.



## **GENERAL SOLAR WATER HEATING SPECIFICATIONS**

### **SOLAR WATER HEATING SYSTEM**

#### **GENERAL SOLAR WATER HEATING SPECIFICATIONS**

##### **1.1.0 QUALITY OF MATERIALS AND WORKMANSHIP**

###### **1.1.1 General**

All materials, equipment and accessories are to be new and in accordance with the requirements of the current rules and regulations where such exist, or in their absence with the relevant British/European standard.

Uniformity of type and manufacture of equipment or accessories is to be preserved as far as practicable throughout the whole work.

If in this specification, the practice is adopted of specifying a particular item as “similar” to that of a particular firm’s product, it is to be clearly understood that this is to indicate the type and quality of the equipment required. No attempt is being made to give preference to the equipment supplied by a firm whose name or products is being quoted.

Where particular manufacturers are specified herein, no alternatives makes will be considered, and the Engineer shall be allowed to reject any other makes.

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

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

The works shall be carried out strictly in accordance with:

- a) British Standard B.S. 5918, Domestic hot water supply and solar water heating System
- b) “British code of Practice” C.P. 310: Water Supply
- c) British Standard code of Practice” C.P. 342: Centralized Hot water supply
- d) All other relevant British standard Specifications and Codes of Practice (herein after referred to as B.S and C.P respectively.)
- e) By-Laws of the Local Authority
- f) The “Specification” and the “Particular Specification”
- g) The tenderer/working drawings
- h) The engineer’s Instructions.

The drawings and specifications are to be read as a whole and are to explain each other. Work shown on the drawings and not described in the specifications or vice versa shall be duly executed under the contract.

### 1.1.2 Solar Panel – Construction

Solar panels shall be flat plate solar collectors. The structure of the collector and its components must withstand local extreme environmental conditions including winds, storm etc.

#### 1.1.2.1 Solar Panel – External Construction

- a) Glazing material shall be transparent and non-reflective to solar radiation. Total surface heating area of the solar panel shall be as specified elsewhere. The top of the panel shall be a single transparent glazed glass sheet. The glazed glass shall be as low-iron tempered glass or equivalent. The thickness of the glazed glass shall be 3 mm.

The glazing and the holding construction shall have thermal characteristics to withstand extreme local temperatures and also thermal shock due to storms etc. Gasket for the glazing shall be EPDM gasket or similar.

During accidental breakage of the glazing, the glazed glass sheet shall be replaceable at site.

- b) Solar panel collector casement shall be rigid, structurally sound and corrosion resistant. Sides and bottom of panel shall be 24 gauge galvanized mild steel sheet or 2mm aluminium sheet.

Galvanized mild steel sheet shall be etched primed and applied with two coats of approved oil-base paint.

4 mm to 6 mm breathing hole shall be provided on the galvanized mild steel casing for the removal of moisture content formed due to condensation within the panel.

- c) The panel/glass construction shall be weatherproof. Pipework joints and collector interconnection shall be water proof. Approved silicone gasket or similar to be used at the panel connections.

#### 1.1.2.2 Solar Panel - Internal Construction

- a) **Absorber** - Shall be located directly beneath the glass sheet and fully cover the internal area of the panel.

Absorber shall be made of copper sheet or aluminium with a selective surface chemically treated similar to the black chrome finish or similar. The selective surface shall achieve 95% absorptivity of solar radiation and 15 to 20% emissivity of infra-red radiation. The absorber and the selective surface shall not be affected during life span of the absorber.

b) **Heat Exchanger**

Copper tubes and fittings shall be utilized for internal panel pipework and in accordance with B.S. 2871 or similar. All joints and connections between the riser and header tubings shall be leak proof and stand to hydraulic pressure tests.

The collector to be pressure tested to withstand a pressure of 8 kg/cm<sup>2</sup>. whichever is greater. In general, collectors shall be pressure tested at 15 times the rated operating gauge pressure of 8kg/cm<sup>2</sup>, which ever is greater.

A certificate of pressure testing to be issued when required and requested by the Engineers.

c) **Insulation**

The underside of the absorber, inclusive headers and the outer casing internal sides shall be insulated with 50 mm fibre glass insulation, minimum density 64 kg/m<sup>3</sup>. The insulation shall be non-combustible and shall withstand maximum continuous operating temperature of 200°C (and minimum operating temperature of -50°C).

**1.1.2.3 Hot Water Solar Cylinder**

- a) The hot water solar cylinder shall have a nominal capacity as specified on the contract drawing and particular specification to the designed highest water level. The hot water cylinder shall have a separate feed tank attached to it.
- b) The cylinders and the feed tanks shall comply with B.S. 417, 699, 2777, 4214, 1565, 1566 and 3198. Refer also Water Storage tanks as specified elsewhere. The Cylinder and tanks shall be supplied complete with screwed BSPF parallel thread flanged connections for flow, return, vent, overflow and drain pipes.
- c) Cylinder shall be provided with a magnesium electrode as corrosion protection, weight: minimum 1.5 kg. and have an inspection cover to facilitate renewal of the electrode.
- d) The cylinder shall be galvanized, after manufacture in accordance with the requirements of BS. 729 Part 1 and pressure tested in accordance with the above B.S. A certificate of pressure testing to be issued when required and requested by the Engineers/Project Manager's Representative. Refer also to "Protection of Metal surface" as specified elsewhere in the specification.
- e) Insulation  
The cylinder shall be insulated on all the sides with 100 mm fibreglass, or 100 mm thick foam injected polyurethane. At the inspection cover the insulation shall be easily removable.
- (f) Cladding  
The insulation shall be fully laded with 24 gauge galvanized M.S. Sheet.

#### **1.1.2.4 Flow and Return Pipework**

Pipework shall be galvanized mild steel medium duty and in accordance with BS. 1387, and insulated as specified.

### **1.1.3 INSTALLATION**

#### **1.1.3.1 Solar panel**

- a) **Location**  
The solar panel shall where physically possible be installed facing South. Where it is not practical for the solar panel to face due South, the maximum allowance variation shall be 45<sup>0</sup>.
- b) **Angle of Inclination**  
The solar panels for maximum efficiency should be fitted at an angle equal to the latitude of the installation area. Minimum angle of inclination should be 5<sup>0</sup>.
- c) Solar panel shall be mounted on angle frame and rise to flow outlet according to manufacturer's specifications.

#### **1.1.3.2 Solar Cylinder**

- a) **For Standard Thermosyphon**  
The solar cylinder shall maintain a minimum horizontal distance of 300mm above the highest point of the solar panel installation
- b) **For low Thermosyphon**  
The solar cylinder shall maintain a flow line up grade of 1. 20 minimums where the low profile thermosyphon system is utilized.

#### **1.1.3.3 Flow and Return Pipework**

- (a) **Joints**  
All joints between ferrous and copper piping shall be made with dielectric pipe unions for the prevention of electrolytic corrosion.
- (b) **Penetration through Roof decking.**  
Where pipes penetrate the roof decking, they shall be provided with a sleeve that fits around the pipe making a weatherproof joint between roof and pipe.
- (c) **Insulation**  
All pipework between solar panel and storing tank to be insulated with 25 mm fibreglass where exposed to weather, covered with 24 gauges galvanized M.S. sheet cladding and weatherproofed.

All insulation for supply and return pipework in roof space shall be covered with cotton canvas.

All insulation shall be in accordance with BS. 1334 unless otherwise specified.

#### **1.3.3.4 Drain, overflow and Vent Pipework**

- (a) The drain and overflow pipework from the solar cylinder shall Terminate approximately 75 mm away from the nearest drain outlet.
- (b) Vent pipe from the solar cylinder shall terminate approximately 150 mm over the top water level in the solar cylinder feed tank.
- (c) Provided drain valve for the solar panel. Drain valve shall be firmly Clamped in order to avoid leaks at the joints during operation.

#### **1.3.3.5 Valves**

- (a) Copper alloy gate valves complying with BS.1952 shall be installed on flow and return pipework prior to it being connected to the solar cylinder.
- (b) The solar cylinder and panel shall be supplied with stop valves for Draining and to comply with BS 1010.

#### **1.3.3.6 Inter connection of solar panels**

Shall be done utilizing Neoprene tubing or Stainless Steel connector or equivalent, fitted with clamps and able to withstand the working pressure.

#### **1.3.3.7 Precaution**

Solar panel glass shall be adequately protected against cracking and the protection removed only when the solar system is commissioned.

#### **1.1.4 Alternate Solar Heating System**

Should the contractor intend utilizing an alternate equivalent solar heating system to the one specified under this contract, he shall when submitting his tender provide the Engineer with all necessary information such as material used, construction detail, installation procedure etc. for his approval.

#### **1.1.5 Test and Efficiency Certificates**

The Contractor shall provide test and efficiency certificates for the solar panels proposed for the installation in accordance with methods outlined in ASHRAE 23-77.

Certificates for the following tests shall be provided:

1. No flow 30 day exposure
2. Peak exposure test
3. Solar collector Thermal Shock/Water spray test
4. Solar Collector Thermal Shock/Cold Fill test
5. Solar Collector leak and pressure test
6. Thermal efficiency/performance test.

The Contractor shall also provide documentary evidence regarding the absorber sheet, the selective coatings and its optical performances (absorptivity and emissivity factors).

### 1.1.6 Pipework above Ground

Before any joint is made, the pipes shall be hung in their supports and adjusted to ensure that the joining faces are parallel and any falls which shall 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 lines of the building.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other user 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 a position as to be difficult to reach from a short step ladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with a sufficient number of unions to facilitate easy removal of valves and fittings, and to enable alterations of the 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 made to ensure that any forces produced by pipe movements are not transmitted to valves, equipment or plant.

All tubing exposed on faces of walls shall, unless otherwise specified, be fixed at least 25mm clear of adjacent surfaces with approved holder bats built into the walls, cut and pinned to walls in cement mortar. Where fixed to woodwork, suitable clips shall be used.

All tubings specified as chased into walls shall have the wall face neatly cut and chased, the tubing wedged and fixed and plastered over.

All tubing specified as fixed to ceilings, roofs or roof structures shall be fixed with approved mild steel hangers cut and pinned to ceilings, roofs or roof structures.

Where three or more tubes are fixed to the ceilings, roofs or roof structures close to each other, they shall be fixed in positions, which leave the lower surfaces at the same horizontal level, unless otherwise specified. Tubes fixed to steel work shall be fixed with clips and tap screws.

Tubes shall be fixed to true lines parallel to adjacent lines of the building unless otherwise specified. Where insulated, tubing shall be fixed with the insulation at least 25mm clear of the adjacent surfaces.

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 the pipe clips without prior approval of the Engineer. An approximate guide to the maximum permissible supports spacing in meters for the steel and copper pipe is given in the following table for horizontal runs.

<u>Size</u> <u>Nominal Bores</u>	<u>Maximum support</u> <u>Spacing</u>
15mm	2.0m
20mm	2.5m
25mm	2.5m
32mm	3.0m
40mm	3.0m
50mm	3.0m
65mm	3.5m
80mm	3.5m
100mm	4.0m

Each support shall take its due proportion of the weight of the pipe and shall allow free movement for expansion and contraction. The support spacing for vertical runs shall not exceed one and a half times the distances given for the horizontal runs.

Sleeves shall provided where pipes pass through walls and solid floors to allow movement of the pipes without damage to the structure. The overall length of the sleeve shall be such that it projects at least 2mm beyond the finished thickness of the wall or partition.

Sleeves passing through the structure shall be of mild steel. Elsewhere they shall be of PVC. The sleeves shall have 5-15mm clearance all round the pipe, or for insulated pipework, all round the insulation. The sleeves shall be packed with slag wool or similar.

Unless anything else is stated in the specification, the tenderer must include in his tender for all protective and finish painting of the works including colour coding of special requirements, if any, are specified in the text of the particular specification. The painting shall be carried out by skilled painters.

#### **1.1.6.1 Galvanised Mild steel Tubing**

Galvanized mild steel tubing shall be in accordance with B.S 1387 with screwed and socketed joints.

Fittings for the same shall be galvanized malleable iron to B.S 143 & 1256 threads to BS 21.

Joints shall be made with fine hemp and an approved jointing compound or with Teflon sealing tape. Compound containing red lead must be used, unless otherwise specified.

All changes of direction shall be obtained by use of proper fittings. Formed bends shall not be accepted.

Long screw connectors and flat-faced unions shall not be used, unless otherwise specified.

Where chased into walls or cast in concrete, galvanized mild steel tubing carrying hot water shall be wrapped with hair felt secured by copper wire.

The fixing of galvanized mild steel tubing shall be done using:

- a) Malleable iron “school board” pattern brackets for building in or screwing to structure or
- b) Malleable pipe rings, with either back plate, plugs or girder clips or
- c) Purpose made straps to Engineer’s Approval.

### 1.1.6.2 Copper Tubing

Copper tubing shall be light gauge conforming to B.S. 2871 and the fittings shall be capillary or compression fittings to B.S. 864 of approved manufacture.

Joints on tubing up to and including 50 mm diameter, shall be compression or capillary joints or direct joints using zinc-free self-fluxing silver brazing alloys. Joints on tubing above 50 mm diameter shall be welded or blazed joints.

Copper tubing shall be jointed to steel cisterns by the use of copper-alloy connector having a shoulder to bear on the outside of the cistern and secured by a back nut inside. Washers shall be used both inside the cistern.

Where chased into walls or cast in concrete, copper tubing shall be wrapped with corrugated cardboard or hair felt secured by copper wire.

The fixing of copper tubing shall be done by using :-

- a) Copper-alloy holderbats for building in, or screwing to structure.  
Or
- b) Strap clips of copper, copper-alloy or other suitable material.  
Or
- c) Gunmetal holderbats similar to "YORKSHIRE",

Iron or steel supports shall not be used for copper tubing.

All bends and sets shall be formed without diminishing the internal diameter in any part or causing fracture or weakness of the tube walls.

### 1.1.6.3 Valves, Cocks, Taps Etc.

#### Gate Valves

All gate valves up to and including 65mm nominal bore and above, other than those required for fitting to buried water mains shall be of bronze construction in accordance with the requirements of B.S. 5154. The pressure classification of all gate valves shall depend upon the pressure conditions pertaining to the site of the works.

The pressure classification of all gate valves shall depend upon the pressure conditions pertaining to the Site of Works.

#### Globe Valves

All globe valves up to and including 65 mm nominal bore shall be of bronze construction in accordance with B.S. 2060.

All globe valve 80 mm nominal bore and above shall be of cast iron construction in accordance with the requirements of B.S. 3961.

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the Site of Works.



### **Check or Non-Return Valves**

All check or non-return valves up to and including 65 mm nominal bore shall be of the swing check type of bronze construction in accordance with B.S. 1953.

All check or non-return valves 80 mm nominal bore and above shall be of the swing check type of cast iron construction in accordance with the requirements of B.S. 4090.

The pressure classification of all check or non-return valves shall depend on the pressure conditions pertaining to the Site of work

### **Ball Float 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 classification as follows:-

- (i) Low pressure – 3.588 bar maximum
- (ii) Medium pressure – 7.725 bar maximum.
- (iii) High pressure – 12.620 bar maximum.

The pressure Classification required for each ball valve will be designated in the description of its associated equipment.

### **Safety Valves**

Safety valves for thermal storage water heaters shall comply with B.S. 759

### **Draw-Off Taps and Stop Valves (up to 50 mm nominal bore)**

Draw-off taps and stop valves up to 50 mm nominal bore, unless otherwise stated or specified, for attachment or connection to sanitary fittings shall be manufactured in accordance with the requirements of B.S. 1010.

Mixing valves for shower fittings and other appliances shall be manufactured in accordance with the requirements of B.S. 1415 from bronze or other corrosion resistant materials.

#### **1.1.6.4 Thermal Insulation**

Insulation shall be installed by tenderer specializing in this type of work.

All primary hot (flow and return pipes) and secondary hot water and circulation pipes shall be insulated. Thermal insulating material for hot water supply insulation shall conform to B.S. 1334 unless otherwise specified. Materials shall have fire retardant qualities.

Insulation shall be fiberglass, minimum density 64 kg/m<sup>3</sup>. Premolded fittings shall be used, or if unavailable, metered sections or built-up blanket insulation shall be used.

Insulation shall be fastened in concealed locations with aluminium bands or soft annealed wires and shall be fastened in exposed locations with aluminium bands, 30 cm. (12 inches) o.c.

Each pipe item shall be insulated separately. Insulation must be carried through or around hangers.

All insulating materials, however fixed, shall be in close contact with the surface to which it is applied and all joints shall be sealed after ensuring that edges or ends of any section built up close to one another. Edges or ends shall be cut or sharpened on site as necessary.

All surfaces to be insulated shall be cleaned carefully before fixing the insulating material. Whereby subject to outside weather or other potentially damp or wet conditions, the insulation shall be adequately protected against moisture pick-up with weatherproof jacketing. Elsewhere, the insulation shall be finished with open weave glass cloth and finish coats of adhesive or paint to approval.

Fixing of insulating material shall suit the progress of other installation works in the building.

All thermal insulating materials shall be delivered to the site in a dry condition and housed in a store until drawn upon for use. If nothing else is specified, the minimum thickness of insulating material for hot water pipes shall be 25 mm.

Equipment, such as tanks, shall be insulated with 50 mm fibre glass board and finished with open weave glass cloth and finish coats of adhesive or paint to approval.

### **1.1.7 Water Storage Tanks**

#### **1.1.7.1 Cold Water Storage Tanks**

Where specified as galvanized mild steel, water storage tanks shall comply with B.S. 417. Galvanizing shall take place after manufacture.

Pressed steel sectional water storage tanks shall comply with B.S. 1564, and shall be similar in manufacture to "BRAITH-WAITE".

Water storage tanks shall be mosquito proofed by means of well fitting bolted cover bedded on a thick gasket of felt or bitumen.

Overflow pipes from tanks shall discharge into air or floor gullies where nearby positioned, with splay cut ends mosquito proofed by means of wire gauze tightly bound on with stout galvanized wire or soldered on.

#### **1.1.7.2 Thermal Storage Water Heaters**

The pressure and low pressure types domestic electric water heaters shall comply with B. S. 843; high pressure types shall be of a Standard not less than the appropriate B.S.

Domestic heaters shall, if nothing else is specified, be supplied with 50 mm thick fibre glass lagging.

Electric thermostatically controlled immersion heaters shall comply with B.S. 3456: Section 2:21 and C.P. 324.202.

Purpose made storage water heaters of the specified size 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.

### 1.1.7.3 Pressure Vessels

Pressure vessels shall be manufactured in accordance with B.S. 1500 A for the specified pressure and be fitted with all necessary openings and connections.

### 1.1.8 Protection of metal surfaces

Machinery, equipment, etc. shall be tropicalized and with protective treatment fully suitable for application and in the prevailing climatic conditions.

Full details of tropicalization and comprehensive paint treatments, to a dry film thickness of nowhere less than 200 microns, shall be submitted for the approval of the Consultant.

All metalwork shall be protected by either:-

- (a) Hot dip galvanizing; where painted treatment shall be 50 microns epoxy primer or 5-10 microns wash-primer; 30 microns modified alkyd undercoat and 30 microns enamel finish,

Or

- (b) Metallic lead epoxy primer, epoxy micaceous iron oxide, micaceous iron oxide modified alkyd undercoat and enamel finish, layers minimum 30 microns each.

Surfaces of metalwork shall be thoroughly brushed down with wire brushes to remove all scale, rust, etc., and structural steelwork shall be grit blasted before protective treatment.

All paint shall be applied fully in accordance with the manufacturer's instructions.

All water tanks inclusive covers, machinery casings, claddings and whosoever specified shall be protected by hot dip galvanizing.

Hot dip galvanized coatings shall be executed in accordance with British Standard BS 729.

The values for coating weight shall be as follows to B.S 729:-

5 mm thick and over	- 610 to 630 g/m (87 –90 um)
Under 5 mm but not less than 2 mm	- 460 to 490 g/m (66 – 70 um)
Under 2 mm but not less than 1 mm	- 335 to 350 g/m (48 – 50 um)
Grey and malleable iron castings	- 610 to 630 g/m (87 – 90 um)
Threaded work and other articles which are centrifuged	- 305 to 315 g/m (44 –45 um)

For conversion to coating thickness unit weight of zinc shall be assumed  $7 \text{ g/cm}^3$ . The values stated shall be taken as minimum average values for a set of samples. Individual minimum values shall be introduced as the above mentioned minus 10%.

When galvanized coats are damaged, e.g. threaded pipe connections made on site, the exposed parts shall be repaired with same paints as for additional coating. Colour grey.

### **1.1.9 Instrumentation**

Instrumentation shall be provided as indicated on the drawings and specified in the specifications.

Pressure gauges shall be installed on the pipe at both sides of pumps.

Pressure gauges shall be fitted with shutoff cock, read in the pressure range of system, minim 12 cm. ( $4 \frac{1}{2}$  inch) dial, adjustable angle face, white face with black figures and pointer.

Thermometers shall be installed with separable sockets. Bronze sockets shall be used in nonferrous systems and stainless steel in ferrous systems.

Thermometers shall be mercury actuated, 12 cm ( $4 \frac{1}{2}$  inch) dial, adjustable angle face with black figures and pointer.

Where recording thermometers are required, they shall have chart 25 cm.(10 inches) in diameter, shall operate with one pen on 24 hour charts, with a range  $10^{\circ}\text{C}$  to  $105^{\circ}\text{C}$  ( $50^{\circ}\text{F}$  to  $220^{\circ}\text{F}$ ).

## **1.2 COMMISSIONING AND MAINTENANCE**

### **1.2.1 Commissioning and Testing**

The tenderer for solar heating system shall be responsible for testing and commissioning of the solar installation. The testing and commissioning shall be done in the presence of the Engineer. The tenderer shall be held responsible for any damage to the builders work, during the installation, initial system testing etc.

When installation is completed, an acceptance test shall be carried out on the tenderer's own expense.

All hot water pipes, including flow and return, solar absorbers, cylinders, cisterns, tanks, calorifiers, pumps, etc. shall be thoroughly sterilized and flushed out after the completion of all tests and before being fully commissioned for handover.

The sterilization procedure shall be carried out by the tenderer or specialists employed by the tenderer in accordance with the requirements of B.S. Code of Practice 310, Clause 409, to the approval of the Engineer.

Before handing over, the tenderer shall confirm that the installation has been examined, tested, is ready for use, that it will operate and can be maintained efficiently.

The whole of the solar heating installation shall be tested to the satisfaction of the Engineer and the Local Authority.

The tenderer shall provide all necessary testing apparatus and facilities for testing the installations and any defective work shall be replaced immediately and shall be the subject of re-testing until found satisfactory.

Where pipes are to be lagged, chased into walls or otherwise concealed, the work shall be tested prior to lagging, making good chases, etc.

The complete solar heating installations, including flow and return pipes shall, if nothing else is specified, be tested to a cold water pressure of not less than 1.5 times the working pressure, minimum 8 kg/cm<sup>2</sup>.

The test pressure shall be applied by means of a manually operated test pump or, by a power-driven test pump. Pressure gauges shall be recalibrated before the test.

The test pressure shall be maintained by the pump for about one hour and a leakage as specified in C.P 310, Section 502 J shall be approved, but any visible individual leak shall be repaired.

Valves, cocks and taps shall be absolutely tight under the test pressure for the corresponding pipes as well as under a small pressure.

Upon completion of the work, including re-testing if necessary, the installations shall be thoroughly flushed out and water pipes refilled with clean water ready for use.

Any defects revealed by the tests shall be made good by the tenderer and the test repeated to the approval of the Engineer.

In all other respects, test shall comply with the requirements of B.S. Code of Practice 304.

Following satisfactory pressure tests on the pipework system, operational tests shall be carried out in accordance with the relevant B.S. Codes of practice on the systems as a whole to establish that special valves, gauges, controls, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

### **1.2.2 Spare Parts**

The tenderer shall submit with the tender a guarantee that he will hold a sufficient number of spare parts for the maintenance of the equipment.

If specific requirements for supply of spare parts are specified in the bill of quantities or schedule of prices, these spare parts shall be supplied to the client/employer, when the installations are handed over.

The tenderer shall submit with his tender a priced list of any optional extras, which he recommends should be purchased for the plants and are not supplied as standard with the unit.

### **1.2.3 Defects Liability and Contractual Maintenance Period**

The tenderer shall maintain the complete installation in the total defects liability period and shall be responsible for the initiation and execution of the clients/employer planned programme of maintenance during this period.

During this maintenance period the tenderer shall carry out all necessary adjustments and repairs, cleaning and lubricating, ect. A report of any work shall be submitted to the Client and incorporated in the maintenance records.

The tenderer shall be held responsible for and shall make good all defects in materials that appear during the maintenance period; he shall supply expendable items, such as gaskets, filters, indicator lamps, etc. The period of liability shall not end until all defects which appear during the maintenance period have been rectified.

The tenderer shall allow in his Contract price for this maintenance and inspection service and shall provide for all tools, instruments, plant and scaffolding, and the transportation thereof, as required for the correct and full execution of these

obligations, and the provision, use or installation of all materials whether they are normal maintenance materials such as oils, greases, sandpaper, etc. and parts which are periodically renewed such as relay contracts or parts which are faulty for any reason whatsoever excepting always Acts of God such as a storm, tempest or flood, lightning and earthquake; civil revolt, acts of war and vandalism.

### **1.2.4 Maintenance Manual**

Upon completion the tenderer shall furnish to the Client four copies of a manual size A4 of loose leaf type containing all the following items:-

- a. Description of equipment
- b. Full operation and maintenance instructions
- c. Valve operation
- d. Fault-finding chart
- e. Emergency procedure
- f. Maintenance and service periods
- g. Lubricating instruction
- h. Colour code legend
- i. Schedule of primary and secondary spares
- j. Record drawing – Folded to size A4.

The manual must be specially written and not standard manufacturers manual unless approved by the Engineer.

Tags giving instructions are not permitted. All instructions must be written into the manual with reference to the drawings.

All valves, terminals and controls on the plant shall be labeled to correspond with the maintenance and operation manuals.

### **1.2.5 Maintenance and Service After Expirations of the Contractual Maintenance Period**

The tenderer shall if required, enter into a maintenance and service agreement with the employer for the complete installation, for a period of up to five years from the day of expiration of the contractual maintenance period.

The terms of any such agreement shall not be less beneficial to the Client, than the terms of agreement for other similar installations.

SOLAR WATER HEATING SYSTEM TECHNICAL QUESTIONNAIRE

The following information shall be supplied by tenderer regarding the solar flat plate collectors proposed:

1. Manufacturer/Trade Mark .....
2. Construction Details of the Collector:  
Aperture Dimensions & Area (m & m<sup>2</sup>).....  
Gross Dimensions & Area (m & m<sup>2</sup>).....  
Dimensions and Area absorbing surface (m & m<sup>2</sup>).....
3. Solar Panel  
Collector Casement material .....
- Thickness .....
- Corrosion Treatment .....
4. Glazing  
Material.....  
Thickness.....  
Physical Properties.....
5. Insulation  
Material.....  
Thickness (mm).....  
Thermal properties.....
6. Absorber  
Material Absorber plate.....  
Material for tubes for heat exchange .....
- Selective Coating.....  
Absorption Factor.....  
Emissivity Factor.....
7. Solar Cylinder  
Material.....  
Thickness.....  
Insulation Material.....  
Thickness.....  
Cladding Material.....
8. Normal Operating Temperature Range °C.....
9. Minimum and Maximum Transfer Fluid Flow Rate kg/sec.....





**SECTION C**

**BILLS OF QUANTITIES**

**AND**

**SCHEDULE OF UNIT RATES**

**BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES**

**CONTENTS**

<u>CLAUSE No.</u>	<u>PAGE</u>
1. GENERAL NOTES TO TENDERERS.....	C-1
2. STATEMENT OF COMPLIANCE.....	C-2
3. BILLS OF QUANTITIES .....	C-3 to C-32
4. SUMMARY PAGE.....	C-33
5. SCHEDULE OF UNIT RATES .....	C-34

## **GENERAL NOTES TO TENDERERS**

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

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

3. All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

Should the sub-contractor install any material not specified here in before receiving **written approval** from the Project Manager, the sub-contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the summary page must be carried forward to the **main summary for Main Works**
6. The technical schedule of items to be supplied **MUST** be filled.

1. **Statement of Compliance**

- a) I confirm compliance of all clauses of the General Specifications and Particular Specifications in this tender.
- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed: .....*for and on behalf of the Tenderer*

Date: .....

Official Rubber Stamp: .....

**Bill No 1:Sanitary Fittings**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p>Supply, deliver, install, test and commission the following sanitary appliances complete with all the accessories including all connections to the services, waste, jointing to water supply overflows, supports and all plugging and screwing to walls and floors.</p> <p>(i) All sanitary fittings shall be in approved colour.                      (ii) The Model and Ref No. indicated is only a guide to the type and quality of fittings.                      (iii) Equivalent and Approved models may be acceptable.</p> <p><b>Water Closet (WC) Pan</b></p> <p>WC pan with 'P'-trap in approved colour complete with horizontal outlet to BS 3402 with heavy plastic seat and cover with metal top fixed (chrome plated) hinges. All to be as IDEAL STANDARD water closet or equal and approved.</p>	28	No.		
B	<p><b>Water closet Flush Valves</b></p> <p>32mm water closet flush valve for the above water closets complete with, back entry with integral vacuum breaker, non-hold-open features and non-return valve, inlet control stop and wall plate comprising flush valve, bent chrome plated flush pipe and rubber pipe connector. The flush valve to be push button type. The fittings shall be as COBRA or equal and approved.</p>	28	No		
C	<p><b>Wash hand basin (WHB)</b></p> <p>Wash hand basin size 650 x 500mm with one tap hole, 32mm diameter chrome plated waste and heavy duty plastic bottle trap (32mm 'P' trap) with 75mm seal. To be as IDEAL STANDARD or equal and approved.</p>	28	No.		
<b>Total Carried Forward to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<b>Wash hand basin (WHB) Tap</b> Chrome plated non-conculsive time delay press action pillar tap as VADO or equal and approved.	28	No.		
B	<b>Toilet Roll Holder</b> Fully recessed toilet roll holder in Vitreous China of size 165 x 165mm in approved colour as IDEAL STANDARD or equal and approved.	28	No.		
C	<b>Robe Hook</b> Chrome plated robe hook mounted with concealed screws. To be as IDEAL STANDARD or equal and approved.	28	No.		
D	<b>Mirror</b> 6mm thick polished plate glass silver backed mirror with bevelled edges, size 610 x 610mm, Plugged and screwed to wall with 4No. chrome plated dome capped screws. The mirror shall rest against a layer of 5mm thick foam.	28	No.		
E	<b>Shower Fittings</b> Concealed shower fitting consisting of 15mm chrome plated riser pipe to connect the concealed three way diverter single lever shower mixer as of Cobra Model "Trini TR 856" or approved equivalent for hot and cold water to a 100mm diameter swivel/ adjustable shower rose as Cobra or approved equivalent, shower arm and other necessary fittings and accessories. All to be as Cobra or equal and approved.	1	No.		
F	<b>Soap Dish</b> Semi recessed built in soap tray in vitreous china of size: 150 x 150mm in approved colour as IDEAL STANDARD or equal and approved.	1	No.		
G	<b>Bathroom Shelf</b> Chrome plated bathroom shelf as Ideal Standard or approved equivalent.	1	No.		
<b>Total Carried Forward to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Toilet Brush and Holder</b></p> <p>Wall mounted toilet brush holder and brush of approved colour as GROHE "Atrio accessories Tier:G5 Prestige" Model- 40 314 toilet brush set or approved equivalent.</p>	28	No.		
B	<p><b>Soap Dispenser</b></p> <p>Wall mounted soap dispenser with a capacity of about one litre having a press action soap release mechanism complete with fixing screws. Allow for initial soap supply. To be as Mediclinic or approved equivalent.</p>	28	No.		
C	<p><b>Hand Driers</b></p> <p>Automatic hand drier in white colour, operating on an infra-red automatic sensing system with heating element safety cut-out complete with a 30 seconds safety timer, plastic rawl plugs and fixing screws. The hand drier to have a heating capacity of 2.1kw and performance flow rate of 135cfm (3.82m<sup>3</sup>/min) and to be of size 270x264x143mm deep It shall have a noise level below 72.5 dBA at 1.5m. It shall be as Medclinic or approved equivalent.</p>	20	No.		
D	<p><b>Urinals bowls</b></p> <p>2No.Ceramic urinal bowl complete with 40mm heavy duty plastic bottle trap and 40mm diameter chrome plated outlet with grating firmly fixed on the wall with chrome plated screws. The fittings shall be as IDEAL STANDARD or equal and approved.</p>	14	No		
E	<p><b>Urinal Flush Valves</b></p> <p>32mm water closet flush valve for the above water closets complete with, back entry with integral vacuum breaker, non-hold-open features and non-return valve, inlet control stop and wall plate comprising flush valve, bent chrome plated flush pipe and rubber pipe connector. The flush valve to be push button type. The fittings shall be as COBRA or equal and approved.</p>	14	No		
F	<p><b>Urinal Bowl Divisions</b></p> <p>Ceramic urinal bowl divisions separating the above described urinal bowls fixed firmly on the wall. The fittings shall be as IDEAL STANDARD or equal and approved.</p>	14	No		
<b>Total Carried Forward to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Disabled Persons Water Closet and Wash Hand Basin Facility</b></p> <p>Wheel chair accessible W.C facility Comprising of the following:-</p> <p>i) Close coupled W.C with 7.5 litre cistern with bottom inlet and overflow.The bowl shall be of size 375x560x420mm high.The bowl and cistern shall be manufactured from vitreous china complying with B.S 3402 .The unit shall be complete with valveless cistern fittings including syphon, 1 /2" side inlet ballvalve, 3 /4" side overflow, plastics flushbend, inlet connector and reversible metallic chrome plated cistern lever.There shall also be a heavy duty seat(25mmhigh) and cover with chrome plated metal hinges, toilet roll holder, 610 x 610 x 6mm thick mirror and robe hook.</p> <p>ii) Semi pedestal wall mounted W.H.B of size 600x500x545mm high with flexible connectors to waste and taps.The basin shall be manufactured from vitreous china complying with B.S 3402.It shall have one L/H tap hole with 1/2" chrome plated lever action pillar tap, chrome plated waste with height adjustable trap, pedestal and wall fixing bolts.</p> <p>iii) Hinged support rail with toilet roll holder 770mm long manufactured in nylon coated aluminium and mounted on a wall fixing plate plate size 230x100 mm, 4No 600mm grab rails with covered wall plates.</p> <p>The set shall be as Twyfords DOC.M wheelchair accessible W.C. facility or approved equivalent.</p> <p><b>Kitchen sink</b></p> <p>Single bowl, single drainer single bowl stainless steel kitchen sink of size 1000 x 500mm as manufactured by ASL 140 or equal and approved. The bowl size to be 420 x 355 x 150mm deep complete with chrome plated 40mm waste fittings, plugs, chain stays, overflow, 1No. 15mm diameter chrome plated sink bib tap, chrome plated bottle trap with 75mm deep seal and chain waste fitting.</p>	6	Set		
B	<p><b>Kitchen sink</b></p> <p>Single bowl, single drainer single bowl stainless steel kitchen sink of size 1000 x 500mm as manufactured by ASL 140 or equal and approved. The bowl size to be 420 x 355 x 150mm deep complete with chrome plated 40mm waste fittings, plugs, chain stays, overflow, 1No. 15mm diameter chrome plated sink bib tap, chrome plated bottle trap with 75mm deep seal and chain waste fitting.</p>	4	No		
<b>Total Carried Forward to Collection Page</b>					



**COLLECTION PAGE FOR SANITARY FITTINGS**

<b>Item</b>	<b>Description</b>	<b>Amount (Kshs)</b>
1	Total carried forward from page C-3 .....	
2	Total carried forward from page C-4 .....	
3	Total carried forward from page C-5 .....	
4	Total carried forward from page C-6 .....	
<b>Total Carried Forward to summary Page</b>		

**Bill No. 2:Plumbing and drainage**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>INTERNAL PLUMBING</b>				
	<b>PPR Pipes</b>				
	Supply, deliver and install Polypropylene Random (PP-R) 20 pipework to DIN 8077 with joints, couplings, reducers, tees, adaptors, pipe fixing clips etc all to DIN 16962 and DIN 16928 .Pipe jointing shall be by polyfusion or use of electric coupling. Where pipework is not chased proper anchoring using approved fixtures shall be done. No pipework shall be left exposed to the sun. Rates must allow for all Metal/plastic threaded adaptors where required for the connection of sanitary fixtures, valves, sockets, sliding and fixed joints, support raceways, isolating sheaths, elastic materials, expansion arms and bends, crossovers, couplings, clippings, connectors, joints etc. as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holder bats plugged and screwed for the proper and satisfactory functioning of the system.				
	<b>Pipe work-PPR PIPES</b>				
A	20mm diameter pipework	160	Lm		
B	25mm diameter pipework	300	Lm		
C	32mm diameter pipework	60	Lm		
D	40mm diameter pipework	60	Lm		
E	50mm diameter pipework	190	Lm		
F	65mm diameter pipework	120	Lm		
	<b>Bends</b>				
G	20mm diameter bend	128	No.		
H	25mm diameter bend	128	No.		
I	32mm diameter bend	64	No.		
J	40mm diameter bend	6	No.		
K	50mm diameter bend	31	No.		
L	63mm diameter bend	12	No.		
	<b>Total Carried to Collection Page</b>				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Tees</b>				
A	25mm equal tee	64	No.		
B	32mm equal tee	32	No.		
C	40mm equal tee	4	No.		
D	50mm equal tee	62	No.		
E	65mm equal tee	8	No.		
	<b>Reducers</b>				
F	25 x 20mm diameter reducer	60	No.		
G	32 x 20mm diameter reducer	60	No.		
H	32 x 25mm diameter reducer	60	No.		
I	40 x 25mm diameter reducer	10	No.		
J	40 x 32mm diameter reducer	10	No.		
K	50 x 32mm diameter reducer	26	No.		
L	50 x 40mm diameter reducer	12	No.		
M	65 x 50mm diameter reducer	24	No.		
N	65 x 40mm diameter reducer	4	No.		
	<b>Male/Female Adapters (Brass threaded)</b>				
O	20mm brass threaded adapter	60	No.		
P	25mm brass threaded adapter	32	No.		
Q	32mm brass threaded adapter	6	No.		
R	40mm brass threaded adapter	2	No.		
S	50mm brass threaded adapter	8	No.		
T	65mm brass threaded adapter	8	No.		
	<b>Male/Female Bend (Brass threaded)</b>				
U	20mm brass threaded bend	10	No.		
V	25mm brass threaded bend	10	No.		
W	32mm brass threaded bend	15	No.		
X	40mm brass threaded bend	15	No.		
	<b>Total Carried to Collection Page</b>				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	50mm brass threaded bend	8	No.		
B	65mm brass threaded bend	2	No.		
	<b>Flexible Tubing</b>				
C	15mm diameter x 300mm long flexible connectors complete with integral chrome plated angle valve as Cobra or equal and approved.	128	No.		
	<b>Threaded Brass Coupling</b>				
D	25mm threaded brass coupling	8	No.		
E	32mm threaded brass coupling	20	No.		
F	40mm threaded brass coupling	8	No.		
G	50mm threaded brass coupling	4	No.		
H	65mm threaded brass coupling	4	No.		
	<b>Valves</b>				
I	25mm gate valve	6	No.		
J	32mm gate valve	1	No.		
K	40mm gate valve	1	No.		
L	50mm gate valve	24	No.		
M	65mm gate valve	8	No.		
	<b>Unions</b>				
N	25mm diameter pipe union	6	No.		
O	32mm diameter pipe union	1	No.		
P	40mm diameter pipe union	1	No.		
Q	50mm diameter pipe union	24	No.		
R	65mm diameter pipe union	8	No.		
	<b>Roof pipework</b>				
S	PPR 65mm diameter pipework from the roof storage to form a ring manifold around the tanks	200	Lm		
	<b>Pipe Sleeves</b>				
T	100mm diameter heavy duty PVC pipe sleeves for crossing over columns and beams.	20	Lm		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>FOUL WATER INTERNAL DRAINAGE</b> Supply ,deliver and install the following UPVC, MUPVC, soil and waste systems respectively to B.S 5255 with fittings fixed to Manufactures Printed instructions and manufactured by reputable manufacturers. Tenderers must allow in their pipework prices for all the couplings, clippings, connectors, joints etc. as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holder bats plugged and screwed for the proper				
	<b>MuPVC and uPVC Waste and Soil pipework</b>				
A	100mm diameter heavy gauge golden brown UPVC pipe	250	Lm		
B	100mm diameter heavy gauge grey mUPVC pipe	120	Lm		
C	50mm diameter waste pipe	200	Lm		
D	40mm diameter waste pipe	30	Lm		
E	32mm diameter waste pipe	250	Lm		
	<b>Bends</b>				
F	100mm diameter long radius bend	10	No.		
G	100mm diameter short radius bend	64	No.		
H	100mm diameter bend with access	20	No.		
I	100mm diameter sweep bend	20	No.		
J	50mm diameter sweep bend	66	No.		
K	40mm diameter sweep bend	12	No.		
L	32mm diameter sweep bend	128	No.		
	<b>Tees</b>				
M	100mm diameter sweep tee	64	No.		
N	50mm diameter sweep tee	60	No.		
O	40mm diameter sweep tee	12	No.		
P	32mm diameter sweep tee	32	No.		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Access Caps</b>				
A	100mm diameter access cap	27	No.		
B	50mm diameter access cap	12	No.		
C	40mm diameter access cap	8	No.		
D	32mm diameter access cap	32	No.		
	<b>Boss Connectors</b>				
E	100 x 50mm diameter boss connector	36	No.		
F	100 x 40mm diameter boss connector	12	No.		
	<b>Single Branches</b>				
G	100mm diameter single branch	27	No.		
	<b>WC Connectors</b>				
H	100mm diameter WC connector	27	No.		
	<b>Traps</b>				
I	100 x 50mm diameter floor trap and grating	25	No.		
M	Stainless steel kitchen floor drains	4	Item		
J	Allow for a standard 300 x 300 x 450mm masonry gully trap complete with concrete cover.	8	No.		
K	2700 x 900 x 600mm deep concrete three chamber grease trap complete with all the fittings including the grease collector basket, interconnecting pipes, gully traps and 3No. heavy duty manhole covers. It shall be constructed with 125mm thick reinforced concrete and water proofed.	1	No.		
L	100mm diameter heavy gauge grey MUPVC pipe	150	Lm		
	<b>Weathering Slates and Vent Cows</b>				
M	100mm diameter weathering slate and apron.	15	No.		
N	100mm diameter vent cowl	15	No.		
	<b>Supporting Brackets</b>				
O	Allow for suitable supporting steel brackets for anchoring and supporting drainage pipes bends on the lower floor. To be painted to match the walling colour.	10	No.		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Rainwater drainage</b>				
A	100mm diameter heavy gauge grey mUPVC down pipes	250	Lm		
B	100mm diameter 45 <sup>0</sup> bend	15	No.		
C	100mm diameter sweep bend	15	No.		
D	50mm diameter bend	15	No.		
E	100mm diameter tee	15	No.		
F	100mm diameter cast iron fulbora	15	No.		
	<b>Supporting Brackets</b>				
G	Allow for suitable supporting steel brackets for anchoring and supporting pipes bends .To be painted to match the walling colour.	45	No.		
	<b>Testing and Commissioning</b>				
H	Allow for testing and commissioning of the plumbing and drainage installations to the satisfaction of the Engineer.	1	Item		
<b>Total Carried to Collection Page</b>					

**COLLECTION PAGE FOR PLUMBING AND DRAINAGE PIPEWORK**

<b>Item</b>	<b>Description</b>	<b>Amount (Kshs)</b>
1	Total carried forward from page C-8 .....	
2	Total carried forward from page C-9 .....	
3	Total carried forward from page C-10 .....	
4	Total carried forward from page C-11 .....	
5	Total carried forward from page C-12 .....	
6	Total carried forward from page C-13 .....	
<b>Total Carried Forward</b>		



**Bill No 3:Fire Protection**

<b>Item</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate (Kshs)</b>	<b>Amount (Kshs)</b>
	<b>FIRE FIGHTING</b>				
	Supply, deliver and install the following fire fighting equipment in positions indicated on the contract drawings or as shall be instructed by the Engineer.				
	<b>Hose Reel System</b>				
	<b>Hose Reel</b>				
A	Swinging type hosereel fitted with 30 metres long, 20mm diameter reinforced non-kink rubber hose with 5/6 mm lever operated shut-off nozzle, mild steel feed pipe, isolation valve, guide and all other accessories as 'Angus Fire Armour' or equal and approved.	7	No.		
	<b>GMS Pipes Class B</b>				
B	25mm diameter pipework	20	Lm		
C	50mm diameter pipework	50	Lm		
	<b>Extra Over Pipework Bends</b>				
D	25mm diameter bend	14	No.		
E	50mm diameter bend	6	No.		
	<b>Tees</b>				
G	50mm diameter equal tee	7	No.		
	<b>Reducers</b>				
H	50 x 25 mm diameter reducer	7	No.		
	<b>Valves</b>				
I	25mm diameter approved medium pressure screw down full way non-rising stem wedge gate valve to BS 1952, with wheel and head joints to steel tubing. The gate valve to be as PEGLER or approved equivalent.	7	No.		
J	50mm diameter gate valve	2	No.		
	<b>Unions</b>				
K	25mm diameter pipe union	7	No.		
L	50mm diameter pipe union	2	No.		
	<b>Total Carried to Collection Page</b>				

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Hosereel Pumpset</b>                      Hose reel pumpset, one duty, the other standby mounted on a frame with a mild steel base plate. Each pump shall have a duty 5m<sup>3</sup>/hr against 65m head as Grundfos model or approved equivalent. In addition, there shall be a 60 litres diaphragm pressure vessel (as Varem or approved equivalent), pressure switches, a switch to protect dry run, 65mm foot valve and strainer, tank connections, gate valves and non-return valves. The pressure set to be as Dayliff or equal and approved. Control shall be effected via a pressure switch through a pre-wired control panel which shall give automatic change-over from duty to standby pump within 5 seconds should the duty pump fail to deliver for any reason. The pumpset shall include all non-returns valves, timer, isolating valves and pipe connections. with necessary control panels</p>	1	Set		
B	<p><b>Painting</b>                      Allow for painting of the hose reel pipework as per particular specifications.</p>	1	Item		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Portable Fire Extinguishers</b>				
	Supply, deliver, install, test and commission the following portable fire extinguishers and conforming to BS EN 3 / BS 1449.				
	<b>Water/Carbon Dioxide Gas Fire Extinguisher</b>				
A	9 litres water/carbon dioxide gas portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	10	No		
	<b>Carbon Dioxide Gas Fire Extinguisher</b>				
B	5 Kg carbon dioxide gas portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	10	No		
	<b>Dry Chemical Powder Fire Extinguisher</b>				
C	6kg dry chemical powder portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	10	No		
	<b>Manual Alarm Bell</b>				
D	9" (225mm) manual operated alarm bell (Gong)	10	No		
	<b>Fire Blanket</b>				
E	Fire blanket made of cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1800 x 1210 mm. It shall be fitted with special tapes folded so as to offer instantaneous single action to release blanket from storing jacket to BS 1721.	1	No		
	<b>Fire Notices</b>				
F	Allow for fire signage for the hose reel system, fire exits and fire instructions as directed by the Project Engineer.	10	No		
	<b>Total Carried to Collection Page</b>				

**COLLECTION PAGE FOR FIRE SYSTEMS**

<b>Item</b>	<b>Description</b>	<b>Amount (Kshs)</b>
1	Total carried forward from page C-15 .....	
2	Total carried forward from page C-16 .....	
3	Total carried forward from page C-17 .....	
<b>Total Carried Forward to summary page</b>		

**Bill No 4:Water Tanks**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Roof Level Water Tank</b>				
A	Supply, deliver and assemble a Roof level water tanks, made of Galvanized pressed steel sectional tank plates 6mm thick plates (type 1 and 4) and of size 1000mm x 1000mm capacity of tank to be 24,000 litres and of preferred dimensions 4000mm x 3000mm x 2000mm. The tank to come complete with tank cover, mosquito proof inspection vent, internal stays, jointing material, bolts and nuts including applying two coats of non-toxic bituminous paint on the inside and two coats of aluminum paint on the outside. The tank shall be complete with the following pipe connections:-	1	No		
	<b>Concrete Ground Level Water Tank Accessories</b>				
B	100mm diameter overflow	1	No		
C	50mm diameter outlet	2	No		
D	100mm diameter outlet	2	No		
E	40mm diameter inlet	1	No		
F	50mm diameter inlet	1	No		
C	100mm diameter inlet	1	No		
G	100mm diameter washout with gate valve	2	No		
H	Float switch regulator	1	No		
I	Water level indicator	1	No		
I	Internal ladder	1	No		
J	50mm diameter high pressure ball valve	2	No		
K	50mm diameter pipework PPR water supply pipe from council line to underground tank	100	Lm		
L	50mm diameter pipework PPR water supply pipe from pump to roof tanks	40	Lm		
M	50mm diameter bends/elbow	4	No		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	50mm diameter approved medium pressure screw down full way non-rising stem wedge gate valve to BS 5154 PN 20 for series B rating, with wheel and head joints to tubing and complete with round male threaded transition fittings and associated unions.	2	No		
B	50mm diameter plug	2	No		
	<b>Water Meter</b>				
C	50mm water meter as 'Kent' or equal and approved equivalent for the connection to the water main supply to site and include local council charges.	1	No.		
	<b>Water Meter Chamber</b>				
D	Mains Meter chamber size 450x450x600mm deep with 100mm concrete (1: 3: 6) base 50mm block sides rendered all round in cement and sand (1:4) and with approved hinged and flanged cast iron cover and frame including all necessary excavation, disposal and formwork.	1	No.		
	<b>Booster Pumpset</b>				
E	Set of automatic electrically driven twin water pumps. One duty and the other one standby with automatic changeover, capable of delivering 5 metres per hour against a head of 30 meters. The pumpset shall be complete with 60 litres pressure vessel (as Dayliff pressure set or equal and approved) and all accessories required for proper and satisfactory operation. It includes pressure switches, time delay switch, a switch to protect against dry run, timer, gate valves. non-return valves and control panel. The pump to be as GRUNDFOS or approved equivalent. Pump to be installed on mild steel platform.	1	Set		
<b>Total Carried to Collection Page</b>					

**COLLECTION PAGE FOR WATER TANKS**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>Amount (Ksh.)</b>
A	Total carried forward from page C-19	
B	Total carried forward from page C-20	
<b>Total amount for Water Storage Tanks carried to Summary page</b>		

**Bill No 5:Solar Hot Water Heating Installation Works**

Item	Description	Qty	Unit	Rate (Kshs)	Cost (Kshs)
A	<p>Supply, delivery, installation, test and commission of the following solar hot water system appliances complete with all the accessories including all connections to the services, jointing to water supply, overflows, supports and all plugging and screwing to walls and frames. The hot water cylinder shall be installed inside the roof space or on the roof as shall be directed by the project manager.</p> <p><b>Solar Panels and Hot Water Storage Cylinder</b></p> <p>Solar water heating system comprising of 1No. 300litres capacity hot water cylinder with 3KW electric booster element with solar panels of double layer concentric borosilicate glass vacuum tube configuration as solaris or equal and approved in array set of 3no.solar units capable of heating 300 litres of water per day or 36 vacuum tubes in number whichever is higher, safety valves and all other necessary interconnectors. The insulated cylinder shall be treated against corrosion by ceramic lining and shall be fitted with an anode. The system shall be a closed circuit type of the solar heating system.</p> <p><b>Supporting Frames</b></p> <p>Allow for support 3mm hollow mild steel tubes and angle line mild steel plates fixed on roof to support 2No. Solar panels to engineer's to approval.</p> <p><b>Automatic Air Eliminator</b></p> <p>Air relief valve as manufactured by "Spirax Sarco" model No. AES 50 Air Eliminators for use on hot water services.</p> <p><b>Thermomixing Valve</b></p> <p>Solar Thermomixing Valve</p> <p><b>Pressure gauge</b></p> <p>Pressure gauge as manufactured by Honeywell to be fitted as instructed by the Engineer</p>	4	Item		
B	<p>Allow for support 3mm hollow mild steel tubes and angle line mild steel plates fixed on roof to support 2No. Solar panels to engineer's to approval.</p>	4	No.		
C	<p><b>Automatic Air Eliminator</b></p> <p>Air relief valve as manufactured by "Spirax Sarco" model No. AES 50 Air Eliminators for use on hot water services.</p>	4	No.		
D	<p><b>Thermomixing Valve</b></p> <p>Solar Thermomixing Valve</p>	4	No.		
E	<p><b>Pressure gauge</b></p> <p>Pressure gauge as manufactured by Honeywell to be fitted as instructed by the Engineer</p>	1	No.		
<b>Total Carried to Collection Page</b>					



Item	Description	Qty	Unit	Rate (Kshs)	Cost (Kshs)
	<b>Gate valves</b>				
A	25mm diameter screwed- in bonnet, full way non-rising stem, solid wedge disk, bronze gate valve to BS 5154 PN 20 for series 'B' ratings with wheel head and transition fitting for jointing to GMS pipework.	4	No.		
	<b>Non return valves</b>				
B	25mm diameter non return valve	4	No.		
	<b>Unions</b>				
C	25mm diameter pipe union	6	No.		
	<b>Solar Header Tank</b>				
D	920 litres capacity rectangular water storage tank in roof complete with cover and having screwed connections for inlet (25mm), outlet (32mm), overflow (20mm) and 40mm drain as ROTO or equal and approved equivalent.	2	No		
	<b>Ball Valve</b>				
E	25mm diameter medium pressure ball valve as "PORTSMOUTH" type or approved equivalent with brass stem and plastic float, screwed to threaded socket of tank including union	2	No		
	<b>Wiring</b>				
F	Allow for all wiring to booster heater from local isolator supplied by others within two meter to the solar heating systems to the switch in the kitchen.	1	Item		
	<b>Water Connection</b>				
G	Allow for connections to rising mains for all solar heating systems and to the hot water delivery line.	1	Item		
	<b>Testing and commisioning</b>				
H	Allow for testing and commissioning for all solar heating systems to the satisfaction of the engineer.	1	Item		
<b>Total Carried to Collection Page</b>					

**COLLECTION PAGE FOR SOLAR HOT WATER HEATING**

<b>Item</b>	<b>Description</b>	<b>Amount (Ksh)</b>
1	Total carried forward from page C-22	
2	Total carried forward from page C-23	
	<b>Total amount for solar water heating installation carried to Summary page</b>	

<b>Bill No. 6: Dry Riser Installations Works</b>					
Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>DRY RISER INSTALLATION</b> Supply and installation the following fittings for dry riser				
	<b>Sheet Metal Box</b> Inlet breeching sheet metal box with wired glass door secured with spring locks openable from inside by smashing the glass and releasing the locking devices on the lock. Approximate size to be 595 x 295 x 395mm high.	1	No.		
A					
	<b>Fire Brigade Breeching Inlet</b> 100mm diameter inlet breeching with twin inlets, each inlet consisting of a 65mm diameter male instantaneous coupling with a non-return valve and black cap secured with a short length of chain.	1	No.		
B					
	<b>Landing Valve</b> 65 mm diameter, gunmetal gate pattern landing valve with flanged inlet and female instantaneous outlet fitted with plug secured by short chains and fixed on 100mm diameter dry riser pipe.	4	No.		
C					
	<b>Fire Hose</b> 65mm diameter, 30 metres long canvas fire hose complete with branch pipe, nozzle, female instantaneous coupling head, hanging hook and other associated fittings for its proper functioning.	4	No.		
D					
	<b>Associated Pipework</b> Supply and installation of Galvanized mild steel piping and fittings with screwed & socketed joint to medium grade class "B" to BS. 1387.				
E					
	<b>GMS Pipework</b>				
F	100mm diameter pipe	12	Lm		
G	65mm diameter ditto	9	Lm		
H	50mm diameter ditto	4	Lm		
	<b>Extra over Pipework</b>				
	<b>Bends/Elbows</b>				
I	100mm diameter bends/elbows	2	No.		
J	65mm diameter bends/elbows	6	No.		
K	50mm diameter bends/elbows	1	No.		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Tees</b>				
A	100 x 100 x 65mm tee	4	No.		
B	100 x 100 x 50mm tee	1	No.		
	<b>Reducers</b>				
C	100 x 65mm reducer	4	No.		
D	100 x 50mm reducer	1	No.		
	<b>Valves</b>				
E	65mm isolating valve with its associated unions	4	No.		
F	65mm diameter flange	4	No.		
G	50mm automatic air release valve	1	No.		
	<b>Testing and Commissioning</b>				
H	Allow for testing and commissioning of the dry riser, Hosereel and portable fire extinguishers installations to the satisfaction of the Engineer.	1	Item		
<b>Total Carried to Collection Page</b>					

**COLLECTION PAGE FOR DRY RISER**

<b>Item</b>	<b>Description</b>	<b>Amount (Kshs)</b>
1	Total carried forward from page C-25 .....	
2	Total carried forward from page C-26 .....	
<b>Total for Dry Riser Installations to Summary Page</b>		

**LP Gas Installation Works**

<b>Item</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate (Ksh)</b>	<b>Total</b>
A	1tonne bulk storage tank Complete with pressure gauge and safety valves	1	No.		
B	Initial L.P Gas to fill the bulk storage tank	1000	Kg		
C	50kg cylinder L.P gas cylinders with initial L.P gas	2	No.		
D	First stage gas pressure regulator	1	No.		
E	Second stage gas pressure regulator / valve	1	No.		
F	L.P. Gas pressure gauge	1	No.		
G	L.P. Gas meter	1	No.		
	<b>Gas Isolating Valve</b>				
H	25mm diameter L.P gas isolation valve shall be quarter turn, lever operated ball valve of stainless steel construction	2	No.		
	<b>Pipe work</b>				
I	25mm diameter Seamless schedule 40 L.P gas pipe with pipe threads and pipe fittings (unions, elbows e.t.c)	80	LM		
	<b>Bends</b>				
J	25mm diameter bend	8	No		
	<b>Tees</b>				
K	25mm equal diameter tee	2	No		
N	Switch over Switch	1	No.		
O	Testing and commissioning	1	Item		
	<b>Total carried to summary page</b>				

FIRE SUPPRESSION SYSTEM					
Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	Supply and install fire suppression system with the following items to the satisfaction of the Engineer. The tenderer to submit the technical brochures and working calculations together with the tender for evaluation. Alternative and approved systems utilising inert gases or a mixture of such gases may be provided.				
A	80litre (32.1Kg) normal charged capacity Argonite specified containers charged with Argonite gas at 300bar with dimensions 267mm diameter and 1910mm high when fitted with valve cylinders to be complete with discharge valves gauges and hoses for connection to the manifold. All to be as "Fike" or approved equivalent.	2	No.		
B	Test Argonite specified containers charged with Argonite gas	1	No		
C	Cylinder support bracket system	1	Item		
D	50mm schedule 40 discharge manifold kit with 2 No. ports complete with end caps and a threaded port for pressure switch. All to be as "Fike" or approved equivalent.	1	Item		
E	25mm selector switch	1	No		
F	Actuation package	1	Item		
G	Solenoid valve/ manual release valve assembly inclusive of hoses, connectors etc.	1	Item		
H	50mm pressure reducing valve	1	No.		
I	15mm Argonite discharge Nozzles V type 6 orifice, Nozzle coverage 360 degrees pattern and a radius of 3M. The Nozzle will be located less than 300mm below the ceiling as "Fike" or approved equivalent.	4	No.		
J	Relief valve	1	No		
<b>Total Carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	Check valve	1	No		
B	Pressure gauge	1	No		
C	Pressure relief/vent	1	No		
D	Discharge pressure switch	1	No.		
E	Flexible discharge horse	1	No.		
F	Controls, adresable Control panel and wiring complete with standby batterries	1	Item		
G	Maintenance switch	1	No.		
H	Double Action manual /electric releasing switch	1	No.		
I	Abort switch	1	No.		
J	Ionization sensors	4	No.		
K	Photo electric sensors	4	No.		
L	Audible alarms	1	No.		
M	Visual alarm	1	No.		
	<b>Pipework</b>				
N	25mm diameter seamless black pipe Schedule 40	6	LM		
O	20mm diameter seamless black pipe Schedule 40	12	LM		
P	15mm diameter seamless black pipe Schedule 40	12	LM		
Q	20mm diameter pipe bend/elbow	2	No		
R	15mm diameter pipe bend/elbow	4	No		
S	25mmX20mm pipe reducer	2	No		
T	25mmX15mm pipe reducer	2	No		
U	20mmX15mm pipe reducer	2	No		
V	25mm equal tee	2	No		
W	20mm equal tee	1	No		
<b>Total Carried to Collection Page</b>					



Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	Allow for associated Builders work	1	Item		
B	Allow for pipework anchorage/hangers	1	Item		
C	Allow for painting system pipework	1	Item		
D	Electrical works and earthing	1	Item		
E	Labelling and warning signs inside and outside the rooms	2	No		
F	Calculations,working drawings and as installed drawings	1	Item		
	<b>Dry Chemical Powder Fire Extinguisher</b>				
G	6kg dry chemical podwer portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	2	No		
	<b>Total Carried to Collection Page</b>				

**COLLECTION PAGE FOR FIRE SUPPRESSION**

<b>Item</b>	<b>Description</b>	<b>Total Cost</b>
1	Total carried forward from page C-29	
2	Total carried forward from page C-30	
3	Total carried forward from page C-31	
<b>Total Cost for Fire Suppression System for server room</b>		

**SUMMARY PAGE**

<b>Item</b>	<b>Description</b>	<b>Amount (Ksh)</b>
1	Total for sanitary fittings Installation Works	
2	Total for plumbing and drainage Installation Works	
3	Total for Fire Hosereel and Portables installation Works	
4	Total for Water Booster Pumps and Tanks installation Works	
5	Total for Solar Hot Water Heating installation Works	
6	Total for Dry Riser installation Works	
7	Total for LP Gas installation Works	
8	Total for Fire Suppression installation Works	
	<b>Totals for Plumbing and Drainage Installation Works Carried to the Main Summary Page 14/1</b>	

Amount in words.....

.....

Tenderer's Name and Stamp

.....  
 .....

Address

.....  
 .....

Mobile Phone No. ....

Tenderer's Signature ..... Date.....

### SCHEDULE OF ITEMS

ITEM	DESCRIPTION	RATE
1	Asian Type Water closet	
2	Stainless Steel Hand drier	
3	Stainless Steel Soap dispenser	
4	1000 litres Plastic Water tank	
1	5000 litres Plastic Water tank	
2	100 litres Solar Panel system	
3	1.22mm x 1.22mm Steel Tank Panel	

**SECTION D:**

**TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED**

**CONTENTS**

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

## TECHNICAL SCHEDULE

### **1. General Notes to the Tenderer**

- 1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- 1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.
- 1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

### TECHNICAL SCHEDULE

The tenderer must complete in full the technical schedule. Apart from the information required in the technical schedule, the tenderer **MUST SUBMIT** comprehensive manufacturer's technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No. etc.)
1	Water closet			
2.	Wash hand basin			
3.	Urinal valves			
4.	Gate valves			
5.	Fire extinguisher			
6.	Hand drier			
7.	Soap dispenser			
8	Water Booster pump			
9	Fire booster pump			
10	Hosereel			
11	Plastic Water tank			
12.	Solar Panel			
13	Steel Tank Panel			

The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings, as described in the technical schedule.

**PART NO. 10**

**AIR CONDITIONING AND**  
**MECHANICAL VENTILATION**  
**INSTALLATION WORKS**



**TABLE OF CONTENTS**

<u>CONTENTS</u>	<u>PAGE</u>
CONTENTS PAGE.....	(i)
SECTION A: GENERAL MECHANICAL SPECIFICATION.....	A-1 to A-5
SECTION B: PARTICULAR SPECIFICATIONS FOR AIR CONDITIONING AND MECHANICAL VENTILATION INSTALLATION .....	B-1 to B-9
SECTION C: BILLS OF QUANTITIES AND SCHEDULE OF UNITS RATES .....	C-1 to C-15
SECTION D: TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED .....	D-1 to D-2

**SECTION A**

**GENERAL MECHANICAL SPECIFICATIONS**

## SECTION A

### GENERAL MECHANICAL SPECIFICATION

<u>CLAUSE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
1.01	GENERAL	A-1
1.02	QUALITY OF MATERIALS	A-1
1.03	REGULATIONS AND STANDARDS	A-1
1.04	ELECTRICAL REQUIREMENTS	A-2
1.05	TRANSPORT AND STORAGE	A-2
1.06	SITE SUPERVISION	A-3
1.07	INSTALLATION	A-3
1.08	TESTING	A-3
1.09	COLOUR CODING	A-4
1.10	WELDING	A-5

## SECTION A

### GENERAL MECHANICAL SPECIFICATION

#### 1.01 **General**

This section specifies the general requirement for plant, equipment and materials forming part of the Sub-contract Works and shall apply except where specifically stated elsewhere in the Specification or on the Contract Drawings.

#### 1.02 **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 connection by the Sub-contractor shall be carefully examined on receipt. 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.

#### 1.03 **Regulations and Standards**

The Sub-contract Works shall comply with the current editions of the following:

- a) The Kenya Government Regulations.
- b) The United Kingdom Institution of Electrical Engineers (IEE) Regulations for the Electrical Equipment of Buildings.
- a) The United Kingdom Chartered Institute of Building Services Engineers (CIBSE) Guides.

- d) British Standard 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 Authority By-laws.
- h) The Kenya Building Code Regulations.
- i) The Kenya Bureau of Standards

#### 1.04 **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 and connections to equipment shall form part of this Sub-contract and be the responsibility of the Sub-contractor.

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 (KPLC) 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 240Volts, 50Hz, 1-phase.

Any equipment that is not rated for the above voltages and frequencies shall be rejected by the Engineer.

#### 1.05 **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.

1.06 **Site Supervision**

The Sub-contractor shall ensure that there is an English-speaking supervisor on the site at all times during normal working hours.

1.07 **Installation**

Installation of all special plant and 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 2.03 of this Section.

1.08 **Testing**

1.08.1 **General**

The Sub-contractor's attention is drawn to Part 'C' Clause 1.38 of the "Preliminaries and General Conditions".

1.08.2 **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 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 specially 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.

#### 1.08.3 Manufactured Plant and Equipment – Work 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 such tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The cost 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.

#### 1.08.4 Pressure Testing

All pipework installations shall be pressure tested in accordance with the requirements of the various sections of this Specification. The installations may be tested in sections 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 pressure 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 section of the work that has been tested.

#### 1.09 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 and to the approval of the Engineer or Architect.

## 1.10 **Welding**

### 1.10.1 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 imperfection due to shearing or flame cutting operation, etc., and shall be free from rust scale, grease and other foreign matter.

### 1.10.2 Method

All welding shall be carried out by the electric arc processing 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.

### 1.10.3 Welding Code and Construction

All welded joints shall be carried out in accordance with the following Specifications:

a) Pipe Welding

All pipe welds shall be carried out in accordance with the requirements of B.S.806.

b) General Welding

All welding of mild steel components other than pipework shall comply with the general requirements of B.S. 1856.

### 1.10.4 Welders Qualifications

Any welder employed on this Sub-contractor shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate 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.



**SECTION B**

**PARTICULAR SPECIFICATIONS  
FOR  
AIR CONDITIONING AND MECHANICAL VENTILATION**

## **PARTICULAR SPECIFICATIONS FOR AIR-CONDITIONING**

### **1.1 SCOPE OF WORKS**

The works shall comprise of the supply, delivery and installation, setting to work, testing and commissioning of all the materials and equipment called for in this specification. The works shall include split air-conditioning and toilet mechanical extract installations.

The amount quoted shall include for all materials and items not particularly called for in this specification but which are necessary for the completion and satisfactory functioning of the works.

### **1.2 CLIMATIC CONDITIONS**

The following climatic conditions apply at the site and all the materials and equipment used shall be suitable for these conditions:

Maximum Design Temperature	- 32° C
Minimum Temperature	-12° C
Average Diurnal Range	-20° C
Relative Humidity	-72%
Altitude	-1850m
Longitude	-0.3031° S
Latitude	-36.0800° E

### **1.3 AIR-CONDITIONING INSTALLATION**

#### **1.3.1 Split Air-conditioning System**

The split air-conditioning system shall be designed to maintain room inside temperature of  $23\pm 1^{\circ}$  C and relative humidity of  $50\pm 10\%$ .

The air-conditioning system shall comprise of an indoor ceiling mounted fan-coil cooling unit and an outdoor condensing unit. The whole system shall be complete with the following:

- 1 No. evaporator unit
- Direct expansion cooling coil with copper tubes and aluminium fins
- Refrigeration pipework
- Distributor with refrigeration control
- Refrigerant (R134A) charge
- 1 No. air-cooled condensing unit
- Fixing brackets
- Thermostat to control room temperature
- High and low pressure units
- Condensate discharge pipework
- Service access valves

The system shall be suitable for 240V, 1 – Phase, 50Hz power supply

## 1.4 PARTICULAR SPECIFICATIONS MECHANICAL VENTILATION

### INSTALLATION

#### 1.4.1 Internal Extract Grille

The internal extract louvre grille shall be fabricated from anodised aluminium and shall be of size 300 x 300mm. It shall be mounted with screws on a grille box at high level on the internal wall.

The grille box shall incorporate an air volume damper for balancing air flow rate.

The internal extract grille and the grille box shall be as Xpelair Model IG30 and Model GB20/100 respectively, or approved equivalent.

#### 1.4.2 Ducting

Flexible ducting of nominal diameter 100mm, interlocked and secured by adhesive tape and worm-drive clips, shall be fabricated from aluminium.

The ducting shall terminate on an appropriate spigot plate.

The ducting shall be as Xpelair FD 100 or approved equivalent.

#### 1.4.3 Y-Piece Connector

The Y-piece connector shall be made from resin bonded glass fibre and shall be used in connecting common ducting between two different grille boxes.

The Y-piece connection shall be as Xpelair YP 100/110 or approved equivalent.

#### 1.4.4 Extract Fan

The extract fan shall be an in-line centrifugal duct fan of extract performance 200m<sup>3</sup>/hr against 100N/m<sup>2</sup> static pressure suitable for 240V, 1-Phase, 50Hz power supply.

It shall be of compact and robust zinc-steel construction and be mounted on a mounting plate with screws, supplied complete with a wire guard.

The fan suction and extract opening shall be of diameter 100mm.

The extract fan to be as Xpelair XID 100 or approved equivalent.

#### 1.4.5 Extract Grille

The external extract grille shall be of size 300x300mm and fabricated from aluminium.

It shall be a window-mounted air-operated louvre shutter.

The grille shall be as Xpelair Model XLG 100 or approved equivalent.

#### 1.4.6 Controls

The controls shall comprise of the following:

A single fan controller, surface mounted with on/off and variable speed settings and “power on” indicator light, passive infra-red sensor which automatically switches the fan on upon detection of body movement and a time delay unit to be incorporated to provide delay of up to 20 minutes after the fan has been switched off.

## 1.5 **ELECTRICAL WORKS**

The Sub-contractor shall include for supply, installation and commissioning of all starters, control apparatus, control panels and interconnecting wiring and conduits for equipment that the sub-contractor will supply.

The Electrical Sub-contractor will provide a power point positioned within 2- metres of the equipment supplied by the Sub-contractor and the Sub-contractor shall connect his equipment from this point.

## **PARTICULAR SPECIFICATIONS FOR KITCHEN EXTRACT SYSTEM**

### **1.0 Scope of Work**

The scope of the works comprises Installation, Testing, and Commissioning of Kitchen Extract and Cold room Installation 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 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**

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 Extract Hood**

The cooking island extract hood shall be of size 6100 x 2800mm manufactured from 16 S.W.G (1.62mm thick) aluminium sheets and stiffened by a frame of galvanized 38mm (3.5mm thickness) square steel tubes. It shall have a 75mm x 25mm grease channel all around the bottom edge with 20mm diameter drainage holes all round. The holes shall have plastic plugs for drainage of grease. It shall be provided with water proof light fitting and the power shall be provide by others to Electrical Engineers detail within two meters.

The hood supports shall be made of suitable galvanized chains of one inch links of at least 3.5mm thickness and with strength to carry the weight of the hood suspended from the roof trusses as shown on the drawing and to Structural Engineers directions.

The Hood shall have a greased eliminator made of a STAINLESS STEEL Vee Insurance unit incorporating 6 No filter panels with a grease drip tray (Stainless Steel) at the bottom. The assembly shall be as VOKE DS 20/6/W (washable) or equal and approved.

The oven extract hood shall be of size 2400 x 700mm manufactured as above. The hood shall have grease eliminator constructed as above incorporating 1 No. unit filter panels and shall be as VOKES RE 10/1/W washable or equal and approved

## **5.1 Extract Ductwork**

The ductwork shall be constructed as shown on the drawing using galvanized mild steel sheets, 18 S.W.G (1.2mm thick). Duct shall be manufactured in conformity with specification DW 142, 1982 published by H.V.C.A.

## **5.2 Fire Damper**

The fire damper shall be of single blade with flanges for mounting. The blade shall be held in position by a spring-loaded fusible link, set to release at a temperature of 70°C. The fire damper shall have a fire resistance of not less than three (3) hours. It shall be as manufactured by BETA industries or equal and approved. It shall have an access door for fusible link.

The damper shall have a switch operated by the blade, which shall switch off the fan when the blade shuts off airflow.

## **5.3 Extract Fan**

The cooking island extract fan shall be of Purlin mounted mixed flow fan of duty 2.75m<sup>3</sup>/s against 210Pa. The fan shall be complete with roof cowl and soaker sheet. The fan shall be as Solau and Palau Roof Fans or equal and approved with 3-phase motor or equal and approved. The fan shall be mounted in accordance with manufacturers' instruction and as shown on the drawing.

The oven extract fan shall be Purlin mounted centrifugal fan of duty 0.2 m<sup>3</sup>/s against 110pa. It shall be constructed as above.

#### 5.4 Fan Control Panel

The panel shall be fabricated from G.I. sheet of minimum 18 SWG (1.2mm) with a hinged door and the powder coated after manufacture. It shall be provided with an integral lock. It shall be complete with the following:-

1. Isolator on the door
2. Motor starter with current overload relay
3. Miniature circuit breaker
4. Phase failure relay with over voltage and under voltage protection
5. Timer switch to switch off the fan at a preset time.
6. Push buttons for start and stop.
7. Indicator Lights to show the off position of the fan when the fire damper closes.

#### 6.0 Ductwork

##### 6.1 General 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 aluminium, zinc or other corrosion – resisting 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 holes 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.

##### 6.2 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 size – 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.

## **7.0 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.

## **8.0 Joints**

### **8.1 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.

## **8.2 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).

## **9.0 Finish Painting**

Upon completion of the installation and after all tests have been carried out to the satisfaction 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.

## **10.0 Inspection, Commission and Testing**

### **10.1 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.

### **10.2 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.

#### **10.2.1 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.

## **11.0 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.

## **12.0 Operating and Maintenance 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.

## **13.0 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.

**SECTION C**

**BILLS OF QUANTITIES  
AND  
SCHEDULE OF UNIT RATES**

**BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES**

**CONTENTS**

<u>CLAUSE No.</u>	<u>PAGE</u>
1. GENERAL NOTES TO TENDERERS.....	C-1
2. STATEMENT OF COMPLIANCE.....	C-2
3. BILLS OF QUANTITIES .....	C-3 to C-17
4. SUMMARY PAGE.....	C-18
5. SCHEDULE OF UNIT RATES .....	C-19

## **GENERAL NOTES TO TENDERERS**

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

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

3. All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the sub-contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

Should the sub-contractor install any material not specified here in before receiving **written approval** from the Project Manager, the sub-contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the summary page must be carried forward to the **main summary for Main Works**
6. The technical schedule of items to be supplied **MUST** be filled.

1. **Statement of Compliance**

- a) I confirm compliance of all clauses of the General Specifications and Particular Specifications in this tender.
- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed: .....*for and on behalf of the Tenderer*

Date: .....

Official Rubber Stamp: .....

**Bill No.1 Air Conditioning Installation Works**

Item	Description	Qty	Unit	Rate	Amount
	<b>Supply, deliver and install the following as described</b>				
A	<b>Air Conditioner</b> Air handling unit, single packed(self contained) air cooled conditioner capable of cooling loads upto 120Kw with an air flow of 6m <sup>3</sup> /s, complete with its accessories. It shall have variable compressor, washable filters to trap 20micron particles with 95% efficiency, motor/compressor protective devices and phase failure protection. Unit as CARRIER or equal and approved.	1	No.		
B	<b>Room Thermostat</b> An analogue room thermostat to control the room temperature at 220C+10C. As "YORK" or approved equivalent.	1	No.		
C	<b>Air Supply Diffusers</b> 4-Way laminar flow high wall air diffusers of size 400x300mm, set to discharge 0.40m <sup>3</sup> /s of air at jet velocity of 1.0m/s with a throw of 4.4 to 8.8 to 0.5m/s and a maximum noise criterion of 5. Diffusers as "TECNALCO", LFR Series with opposed blade dampers or equal and approved.	18	No.		
D	<b>Extract air Grilles</b> 4-way extract air grill of size 300x200mm each capable of extracting 0.34m <sup>3</sup> /s at 1.7m/s with a throw of 8.8m to 0.5m/s and a maximum noise criterion of 5. Grilles as "TECNALCO" LBR series with opposed bladed dampers or equal and approved.	24	No.		
E	<b>Duct work</b> Galvanised mild steel ductwork for supply and extract system, 1.2mm thick complete with bends, hangers, supports, sleeves, flexible connectors, branch duct take-offs, flanges, access doors, test reducers, splitters, turning vanes and accessories.	320	SM		
F	<b>Duct work Thermal Insulation</b> Line the air supply duct with 25mm thick expanded polyurethane bonded with thermal setting frame with suitable lining outside the duct to act as thermal and acoustic insulation	320	SM		
<b>Total carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Cost (Kshs)
	<b>Acoustic Insulation</b>				
A	Allow for the lining of the ductwork with a 25mm thick flame attenuated fiber glass, bonded with thermal setting frame. The inside lining to be done on sections of ductwork as will be pointed out by the engineer on site and shall act as the acoustic insulation.	320	SM		
	<b>Cladding</b>				
B	Allow for cladding of exposed ductwork with SWG 24 aluminium sheet.	320	SM		
	<b>Balancing Air-flow Dampers</b>				
C	Control air-flow dampers size 500X500mm with a galvanised steel frame of 80mm deep and blades of 50mm pitch, complete with operating gear wheels and servomotors. As "FRANCE AIR" LDRI 50 and servomotor type LM 230 or equal and approved.	2	No.		
D	Ditto but size 500x400mm	1	No.		
E	Ditto but size 400x300mm	6	No.		
F	Ditto but size 300x200mm	6	No.		
	<b>Flexible Connection</b>				
G	The flexible connection shall be rubber bellows or neoprene and not canvas, to isolate vibrations from the air conditioning unit/fan from the interconnecting ductwork.	18	No.		
	<b>External Weather Louvres</b>				
H	External Weather Louvres size 600x600mm high. Shall be mounted at the air inlet and outlet external surfaces. This shall consist of a perimeter angle frame enclosing louvre blades set at 45° and overlapped on 40mm pitch centre. A bird mesh screen shall be mounted on the rear of the louvre, made from extruded aluminium sections of 19 S.W.G. As "TECNALCO" EWLM series or equal and approved.	1	No.		
<b>Total carried to Collection Page</b>					



**COLLECTION PAGE FOR AIR HANDLING SYSTEM**

<b>Item</b>	<b>Description</b>	<b>Cost (Kshs)</b>
1	Total carried from page C-3.....	
2	Total carried from page C-4.....	
<b>Total Cost Works Carried to Summary Page</b>		

**Bill No.2 Split Air Conditioning Installation Works**

<b>Item</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate (Kshs)</b>	<b>Amount (Kshs)</b>
	<b>SPLIT AIR CONDITIONING SYSTEM</b> Supply , Installation, testing and commissioning, upon approval of working drawings, of the following items. NB: Outdoor units shall be mounted on external walls.				
	<b>SPLIT AIR CONDITIONING SYSTEM FOR OFFICES</b> The indoor unit shall be High Wall type air-cooling unit of capacity 5.3KW (18,000 Btu/hr). The air conditioning unit shall be supplied complete with room thermometer, room thermostat controls and remote control device. It shall charged with R410A refrigerant or any other non ozone depleting refrigerant. The unit shall be such that if the power supply goes off, it will start automatically after power is restored with three minute delay. The outdoor unit shall have matching capacity with the indoor unit. The unit shall be “Carrier” Model or equal and approved.				
A		6	No.		
	<b>Refrigeration Pipework</b>				
B	Refrigeration liquid line pipework including 25mm Amaflex insulation.	60	LM		
C	Refrigeration gas line pipework including 25mm Amaflex insulation.	60	LM		
	<b>Refrigerant</b>				
D	Allow R410A refrigerant for charging air conditioning system.	6	Item		
	<b>Drain</b>				
E	25mm PVC condensate drainage pipework, class D, including bends, clips, joints and tees in the running lengths of the pipe.	60	LM		
	<b>Surge Protector</b>				
F	Power surge protector as Solatek to suite or equal and approved.	6	No.		
	<b>Electrical Works</b>				
G	Allow for associated electrical works from the local isolator provided by others within one meter to the air conditioning units and wiring from indoor unit to outdoor unit.	6	Item		
	<b>Mounting Bracket</b>				
H	Mounting bracket for the outdoor unit complete with a cage and provided with purpose-made protective steel iron angle frame and all other anchoring accessories including rawl bolts and anti-vibration rubber mountings to engineer’s approval.	6	Item		
	<b>Wall Mounted Wired Remote Controller</b>				
I	Fully wired wall mounted remote controller panel, wiring and conduit works including but not limited to interconnecting cable between the outdoor and indoor units.	6	No.		
	<b>Trunking</b>				
J	75x50mm approved PVC trunking for concealing the refrigerant pipework.	60	LM		
<b>Total Split Air Conditioning carried to the summary to the summary page</b>					

## Bill No.3 Server Room Air Conditioning Installation Works

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>The air conditioning system</b>				
A	10.5kw (36,000Btu/h) floor mounted close control split air conditioner inclusive of wall mounted outdoor unit complete with support brackets. It shall be air cooled direct expansion type with top inlet and bottom outlet. The indoor unit shall be installed on a raised floor with a void beneath to act as a supply plenum. It shall have microprocessor controls that monitor status of unit components and environmental parameters like temperature and humidity. It shall be equipped with a signalling alarm to indicate deterioration of conditions, electronic expansion valve, a status display panel and all other necessary control devices. It shall operate on R410A refrigerant or any other non ozone depleting refrigerant and shall be Energy Star Rated. The unit shall be as UNIFLAIR Amico series downflow type or approved equivalent.	1	No.		
	<b>Refrigeration Pipework</b>				
B	Refrigeration liquid line pipework including 25mm Amaflex insulation.	10	LM		
C	Refrigeration gas line pipework including 25mm Amaflex insulation.	10	LM		
	<b>Refrigerant</b>				
D	Allow R410A refrigerant for charging air conditioning systems.	1	Item		
	<b>Drain</b>				
E	25mm PVC condensate drainage pipework, class D, including bends, clips, joints and tees in the running lengths of the pipe.	10	LM		
	<b>Surge Protector</b>				
F	Power surge protector as Solatek to suite or equal and approved.	1	No.		
	<b>Electrical Works</b>				
G	Allow for associated electrical works from the local isolator provided by others within one meter to the air conditioning units and from indoor unit to outdoor unit.	1	Item		

	<b>Total carried to Collection Page</b>	
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Item	Description	Qty	Unit	Rate (Ksh)	Amount (Ksh)
A	<p><b>Mounting Bracket</b></p> <p>Mounting bracket for the outdoor unit complete with a cage and provided with purpose-made protective steel iron angle frame and all other anchoring accessories including rawl bolts and anti-vibration rubber mountings to engineer's approval.</p>	1	Item		
B	<p><b>Trunking</b></p> <p>75x50mm approved PVC trunking for concealing the refrigerant pipework.</p>	20	LM		
C	<p><b>Wall Mounted Wired Remote Controller</b></p> <p>Fully wired wall mounted remote controller panel, wiring and conduit works including but not limited to interconnecting cable between the outdoor and indoor units.</p>	1	No.		
D	<p><b>Raised Floor Panels</b></p> <p>Light duty tile replacement panel floor designed to withstand a light loading and or foot traffic. Constructed entirely from aluminium extrusions and having a reinforced frame fitted with an opposed blade damper. The shall comply with the specification and structural integrity requirements of British and European test standard BS EN 13264:2001, Light Duty classification. Allow for at least 4No. Grilles of size 600mm x600mm overall and shall be as manufactured by Air-Diffusion Co. of U.K or approved equivalent.</p>	18	sm		
E	<p><b>Trunking</b></p> <p>75x50mm approved PVC trunking for concealing the refrigerant pipework.</p>	10	LM		
<b>Total carried to Collection Page</b>					

**COLLECTION PAGE FOR SERVER ROOM INSTALLATION WORKS**

<b>Item</b>	<b>Description</b>	<b>Amount (Kshs)</b>
1	Total carried from page C-7 .....	
2	Total carried from page C-8 .....	
<b>Total Cost for Close Control Installation Works Carried to Summary Page</b>		

**Bill No.4 Kitchen Extract System Installation Works**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Cooker Cooking Area</b></p> <p>Supply, deliver, install and fix the following equipment/ items as described. Where trade names are mentioned the tenderer must provide the same materials as other brands shall not be accepted without a written authority to supply alternative brands by the Mechanical Engineer.</p> <p><b>Cooker Extract Hood</b></p> <p>4500 x 3000 x 600mm deep kitchen extract hood manufactured from 16 SWG anodized Aluminium sheet complete with its framework, supports and stiffened by a frame of 38 x 38mm galvanized mild steel R.H.S. The hood shall have a 75mm wide by 25mm deep grease drainage channel all round with 2No. 20mm diameter drain holes and a plenum box.</p>	1	No		
B	<p><b>Grease Filter Bank</b></p> <p>The grease filter unit consisting of a Single Angle unit housing with top exit for use in island canopy applications for housing 2No. 508 x 254 mm top exit washable type stainless steel filter panels. The unit shall have removable grease trays and framework made out of stainless steel. As "Vokes" TE 10/2 Single Angle unit housing with top exit or equal and approved.</p>	2	No		
C	<p><b>Grease Filter</b></p> <p>The grease filters of size 508 x 254mm washable type stainless steel filter panels. The unit shall have removable grease trays and framework made out of stainless steel. The filter shall be composed of folded woven metal material interspersed with layers of expanded metal mesh of stainless steel and shall be capable of filtering a total of 1080m<sup>3</sup>/hr. The filter panels shall be easily removable for washing as and when necessary. As "Vokes" or equal and approved.</p>	2	No		
D	<p><b>Ductwork</b></p> <p>600 x 500mm extract duct from hood to fan, constructed from 18 S.W.G. rolled galvanized steel sheet and connected to the fan by flexible connections and flanged joints. All joints and seams shall be sealed with mastic to make them airtight.</p>	40	SM		
<b>Total carried to Collection Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
A	<p><b>Cooking Island Extract Fan</b></p> <p>Axial case fan capable of extracting 0.75m<sup>3</sup>/s of air against 100Pa static pressure. The fan will be driven by an electric motor. The fan shall be installed complete with guard kit, plate fan inlet guard, protection guard, silencer and flexible connector, in accordance with the manufacturer's printed instructions. To be as 'S &amp; P Model HXBR/2-250H' or equal and approved.</p>	1	No		
B	<p><b>Vapor Proof Light Fitting</b></p> <p>Vapor proof light fittings, capacity 65 watts in a heat resistant and watertight enclosure all complete with in approved heat resistant conduits and wiring in the kitchen hood.</p>	2	No		
C	<p><b>Fire Damper</b></p> <p>Shutter fire damper complete with fusible link and micro switch for de-activating the fan when damper closes suitable for a duct size 600 x 500mm</p>	2	No		
D	<p><b>Testing and Commissioning</b></p> <p>Testing and commissioning, setting to work to the requirements of the specification and to the satisfaction of the Project Engineer.</p>	1	Item		
<b>Total carried to Collection Page</b>					



**COLLECTION PAGE FOR KITCHEN EXTRACT WORKS**

<b>Item</b>	<b>Description</b>		<b>Amount (Kshs)</b>
1	Total cost from page C-10	.....	
2	Total cost from page C-11	.....	
<b>Total Cost for Kitchen Extract Works</b>			

**Bill No.5 Toilet Extract Installation Works**

Item	Description	Qty	Unit	Rate (Kshs.)	Amount (Kshs.)
A	<p><b><u>EXTRACTION</u></b></p> <p><b>Wall Extract Fans for Bathrooms</b></p> <p>Wall Mounted Extract fan capable of a volume flow rate of 0.14m<sup>3</sup>/s .Fan to be complete with air operated shutters,weather cap,wall rods,supports, flexible connections and anti vibrations mountings.To be as S &amp;P' HCM-225N Model or equal and approved.Allow for associated builders works</p>	20	No.		
B	<p><b>Wall Extract Fans for Basement</b></p> <p>Wall Mounted Extract fan capable of a volume flow rate of 0.99m<sup>3</sup>/s. Fan to be complete with air operated shutters,weather cap,wall rods,supports, flexible connections and anti vibrations mountings.To be as S &amp;P' HxM-400 Model or equal and approved.Allow for associated builders works</p>	3	No.		
C	<p><b>Electrical Works</b></p> <p>Allow for associated electrical works from the local isolator provided by others within one meter to the air extract fans.</p>	1	Item		
<b>Total Cost for Toilet Extract Carried to Summary Page</b>					

**SUMMARY PAGE**

<b>Item</b>	<b>Description</b>	<b>Total Cost (Kshs)</b>
1	Total Carried Forward from Collection Page for Air Handling Air Conditioning Installation Works .....	
2	Total Carried Forward from Collection Page for Split Air Conditioning Installation Works .....	
3	Total Carried Forward from Collection Page for Server Room Air Conditioning Installation Works .....	
4	Total Carried Forward from Collection Page for Kitchen Extract Installation Works .....	
5	Total Carried Forward from Collection Page for Basement and Toilet Extract Installation Works .....	
<b>Total Cost for Mechanical Ventilation and Air Conditioning Carried to the Main Summary Page 14/1</b>		

Amount in words.....

.....

Tenderer's Name and Stamp

.....  
 .....

Address

.....  
 .....

Mobile Phone No. ....

Tenderer's Signature ..... Date.....

**SCHEDULE OF ITEMS**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>RATE</b>
1	200kw air handling unit	
2	50kw air handling unit	
3	3.5 kw split air conditioning unit	
4	4.1 kw split air conditioning unit	

**SECTION D:**

**TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED**

**CONTENTS**

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

## TECHNICAL SCHEDULE

### **1. General Notes to the Tenderer**

- 1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- 1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.
- 1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

### TECHNICAL SCHEDULE

The tenderer must complete in full the technical schedule. Apart from the information required in the technical schedule, the tenderer **MUST SUBMIT** comprehensive manufacturer's technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM	DESCRIPTION	MANUFACTURER	COUNTRY OF ORIGIN	REMARKS (Catalogue No. etc.)
1	Air Handling unit			
2.	Grease filter			
3.	Supply Register			
4.	Extract Grilles			
5.	Air extract fan			
6.	Split Air Conditioner			
7.	Close Control air Conditioner			

The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings, as described in the technical schedule.

**PART NO. 11**

**LIFT INSTALLATION WORKS**



**SECTION D**  
**GENERAL SPECIFICATIONS**  
**OF**  
**MATERIALS AND WORKS**

## GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

- 2.1 General
- 2.2 Standard of Materials
- 2.3 Workmanship
- 2.4 Procurement of Materials
- 2.5 Shop Drawings
- 2.6 Record Drawings
- 2.7 Regulations and Standards
- 2.8 Setting out Works
- 2.9 Testing on Site

## **2.1 GENERAL**

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

## **2.2 STANDARD OF MATERIALS**

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

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

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

## **2.3 WORKMANSHIP**

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

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

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

## **2.4 PROCUREMENT OF MATERIALS**

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

Contractors are warned that they must make their own arrangements for the supply of materials and/or products specified or required. Where necessary, advance payment shall be granted as stipulated in the Appendix to Instruction to Tenderers clause 9 page A/17

## **2.5 RECORD DRAWINGS**

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

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

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

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

## **2.6 REGULATIONS AND STANDARDS**

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

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

## **2.7 SETTING OUT WORK**

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

## **2.8 TESTING ON SITE**

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

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

**SECTION E**

**SCHEDULE OF CONTRACT DRAWINGS**

## SCHEDULE OF CONTRACT DRAWINGS

- 1.0 Bidders shall be required to view the architectural and electrical drawings to ascertain dimensions of the lift pit, headroom and shaft, cable routes and cable lengths before pricing the Bills of Quantities of this tender document.

**SECTION F**  
**GENERAL AND PARTICULAR SPECIFICATIONS**  
**FOR**  
**LIFT INSTALLATIONS**

## GENERAL SPECIFICATIONS FOR LIFTS INSTALLATION WORKS

### 1. REGULATIONS

All Apparatus and materials supplied and work carried out shall comply with the provisions of the following documents:-

- (a) The latest Edition of I.E.E Regulations
- (b) The Kenya Power and Lighting Co. Ltd By-laws
- (c) The Electric Power Act and the Rules made there under.
- (d) EN81 and C.P 407 (1972)
- (e) The requirements of the Chief Inspector of Factories for the Kenya Government, Factories Act Chapter 514 SECTION 30. **The contractor shall avail all the certificates.**
- (f) Any other regulations governing lift installations in Kenya
- (g) Kenya Bureau of Standards (KBS) lifts standard KS 2169 -1

### 2. BUILDER'S WORK BY LIFT CONTRACTOR

#### A. Lifts Shaft

- (i) The dimensions of the lifts shafts are:
  - a) 1800mm by 1800mm for each VIP lift (1No.)
  - b) 2400mm by 1850mm for each passenger lift (1No.)
- (ii) The lifts Contractor shall provide cut-outs for hall buttons, hall position indicators, hall lanterns, shaft ventilations and fire man's switch.  
  
It shall be the responsibility of the lifts Contractor to provide, properly position and fix the hall buttons, hall indicators, hall lanterns, fire man's switches, door frames, sills and architraves.
- (iii) The lifts Contractor shall provide the necessary scaffolding for erection of equipment and hoarding to secure the work area from general public and maintain safety of the people and other installations in the building.
- (iv) The lifts Contractor shall provide temporary electricity supply for erection and shaft lighting, and thereafter a permanent supply from an appropriate isolator.

#### B. Lifts Pit

The lifts contractor shall provide and fix ladders where such facility may be required as stipulated in BS 5655, and terminal and over travel limit switches.



### **C. Lift Motor Room**

The lifts Contractor shall provide the following in the lifts motor room:

- (i) Cut-outs for roping, safety gear ropes, selector tapes (where provided) cabling etc. in the lifts motor room floor.
- (ii) Lifting beam in the form of a rolled steel joist if required.
- (iii) General lighting cable ducts and conduits and power and ventilation equipment.

### **D. Access**

The lifts Contractor shall provide stairway access with lockable doors to the lifts motor room. On the outer side of the door shall be written in red letters:

“DANGERS 415 VOLTS – LIFT MOTOR ROOM – NO UNAUTHORISED PERSON ALLOWED INSIDE”

### **E. Builder's Work**

The lifts Contractor shall provide for:

- (i) All chasing, shaft ventilation and making good
- (ii) All drilling and plugging of holes in floors, walls, ceiling and roofs for security services, and for equipment requiring screw or bolt fixing.
- (iii) Any purpose made fixing brackets

## **3. FIREMAN'S SWITCH FOR THE LIFTS**

A fireman's control switch shall be provided in the down terminal floor, main entrance lobby. The Fireman's switch shall be of the type approved by the Engineer.

Operation of the Fireman's switch shall stop the lift car on the next landing but without opening the car and landing doors and immediately return the lift to the ground floor irrespective of any other calls and park lift with doors open. The car will then become in-operative with the exception of the 'Fireman's Lift' which shall operate in answer to the car buttons until only the fireman s switch is reset.

## **4. EMERGENCY ALARM SYSTEM**

An emergency alarm system in the form of an intercom shall be installed between the car, the motor room, and the reception desk on the ground floor.

The alarm system shall be clearly labeled “Emergency Alarm”. On pushing an alarm button, the system should ring simultaneously in the car, motor room and the reception desk.

The lifts Contractor shall carry out the wiring in the lift car and between machine and the reception desk. The power supply for the alarm system shall be derived from a self-recharging unit.

#### **5. EMERGENCY DOOR KEYS**

It shall be possible to open every lift-landing door by the use of a release key whether or not the lift car is in the landing zone. The key hole shall be unobtrusive and located at high level.

#### **6. CALL STATION AND OPERATING PANEL BUTTONS**

The call station, distributed between the lifts on each landing, and operating panel buttons shall be micro-motion push button.

#### **7. INTERFERENCE SUPPRESSION**

The lift motor and auxiliary controls shall be suppressed so as not to interfere with local radio and television reception and closed circuit television or Electro mechanical equipment within the building. The suppression shall be carried out in accordance with B.S. 800 and all suppression devices incorporated shall comply with B.S. 5655.

#### **8. PROTECTION PADS**

The lifts Contractor shall supply one set of protective quilted cover pads to approval for passenger lift cars.

#### **9. CAR EMERGENCY LIGHTING**

The lift cars shall be provided with an emergency light fitting operating from a self-recharging battery unit. The emergency light will be built in the car-operating panel.

#### **10. TEST**

Both on completion of his work on the lifts and at the end of the guarantee period, the lifts Contractor shall carry out all the tests as required and in accordance with B.S 5655 part 7 in the presence of the Engineer and shall provide all the necessary instruments, labour and materials to do so at his cost.

Damage occurring, as a result of these tests will be made good by the Lifts Contractor to the Engineer’s satisfaction at his expense.

4No. (Four) copies of the test certificates for each lift should be forwarded to the Engineer within 4 days of completion of the last test.

## **11. TRAINING**

The tenderer shall provide in his tender for the training of 2No.technicians on site in the maintenance of the lifts during the dismantling, installation, testing and commissioning period.

## **12. PROTECTION AGAINST POWER/VOLTAGE FLUCTUATIONS, SURGES AND TRANSIENT CURRENTS**

12.1 The lift equipment and all its controls shall be protected against power/ voltage fluctuations, surges and transient currents. The contractor shall provide for and install all the necessary equipment for this protection.

## **13. INITIAL STATUTORY INSPECTION**

13.1 The tenderer shall allow in his tender for the initial statutory inspection of the lift by an Approved Government Lift Inspector during the commissioning of the new lift, and thereafter for inspection at intervals of three (3) months periodic time during the 6 months defects liability period. One of the inspections shall be done after the expiry of the defects liability period on confirming that all the defects (if any) have been corrected by the lift contractor.

13.2 The employer and the contractor shall, at each inspection, each retain a copy of the lift inspection certificates while the original will be submitted to the Ministry of Labour.

## **14. INITIAL MAINTENANCE**

14.1 The tenderer shall allow in his tender for the initial routine service maintenance of the new lift once a month during the 6 months defects liability period and shall carry out all necessary adjustments and repairs, cleaning, greasing and oiling of moving parts.

14.2 During the initial maintenance of the new lift, the tenderer shall also allow in his tender for all tools, instruments, plant and scaffolding and the transportation thereof, as required for the correct and full execution of these obligations and the provision, use or installation of all materials or parts which are periodically renewed such as brake linings etc., or parts which are faulty for any reason whatsoever excepting always acts of God such as storm, tempest, flood, earthquake and civil revolt, acts of war and vandalism.

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

14.4 A monthly report of any works done upon the installation shall be supplied to the Engineer.

## **15. 15.0 REGISTRATION OF THE NEW LIFTS**

15.1 The tenderer shall allow in his tender for the registration of the new lifts with the Ministry of Labour including payments of any fees that may be required. It is the responsibility of the Contractor to avail the registration certificate to the client once the registration has been done.

## **16. INTERIOR LIFT CAR FINISHES**

- 16.1 The interior lift car finishes including ceiling, floor, cabin panels, car door, landing door and architraves shall be to the Engineers approval in liaison with the Client. The approval will be within the range of the manufacturers' range of finishes in their brochures. The tenderer must therefore allow for this in their bid.

## **17. LIFT MONITORING SYSTEM**

- 17.1 This is to be a software based system with a 20" colour monitor and a key board to monitor and control security functions at all times. It shall be located at the reception/security desk.

## **18.0 FACTORY INSECTION**

18.1 The employer shall be entitled to have the quantity and quality of the imported lifts materials inspected by two number (2No.) representatives of the Project Manager, and two number (2No.) representatives for the Employer and two number (2No.) representatives of the Contractor.

18.2 The said inspection shall be carried out at the factory of manufacture of the lifts materials during normal working hours and the successful tenderer shall give written notice to the Project Manager at the latest thirty (30) calendar days in advance of the date that the lifts materials are ready for inspection.

18.3 Travel (including ground, air travel and airport passage taxes) and full board accommodation expenses in at least a Four (4) star hotel incurred by the representatives appointed by the Project Manager and the Employer shall be borne by the contractor. The contractor shall also meet out of pocket expenses for the officers at Government of Kenya rates for the duration of the factory inspection. The costs incurred shall be re-imbursed to the contractor from the provisional sum allowed in page (G/8) of the Bills of Quantities.

18.4 The inspection period shall be Seven (7) working days excluding travelling time.

18.5 If as a result of the inspection any of the lift materials are found to be defective, the successful tenderer shall replace the defective materials and determine a new date as when a new inspection shall be performed at the expense of the contractor.

18.6 The successful tenderer shall only ship the lift materials after the said factory inspection.

## PARTICULAR SPECIFICATIONS

### 1.00) LOCATION OF SITE

The site of the proposed works is at County Assembly of Nakuru –Nakuru County.

### 2.00) DESCRIPTION OF THE WORKS

The project comprises the supply, installation, testing and commissioning of **2No.modern microprocessor control based lifts.**

### 3.00) CLIMATE CONDITIONS

The following climatic conditions apply at the site of the contract work and the equipment, materials and the installations shall be suitable for these conditions.

Altitude	1850 M
Mean Maximum Temperature	27.4°C
Mean Minimum Temperature	8.9°C
Range of Relative Humidity	39%-97%
Longitude (approximately)	36° 08'E
Latitude (approximately)	0°30'S
Salt in the atmosphere	0.02%
Solar radiation, June Mean Max	543 Langleys

Extremely heavy rainfall is experienced at certain periods of the year and the contractor shall be deemed to have taken account of this factor both in his prices and his planning of the execution of the contract works.

### 4.00) GENERAL REQUIREMENTS

The lift Contractor shall supply, deliver unload, hoist, fix and erect, test and commission all the equipment, plant and materials in accordance with all specifications contained in this document including the Building plans to provide a complete and operable installation.

The lifts Contractor shall become liable for defects and be responsible for the initial maintenance of the lifts installed all as specified here in.

### 5.00) PARTICULAR REQUIREMENTS

The tenderer shall provide factory compliance certificate for EN 81 – 1/1998 to prove compliance with this European code. Failure to provide this shall render the tender non – responsive and hence the bid will not be considered.

### 6.00) TECHNICAL SPECIFICATION FOR THE LIFTS

#### 6.0.1

#### V.I.P LIFT

No. of Unit	:	One (1No.)
Load	:	630Kg (8 persons)
Speed	:	1.2m/s
Drive	:	Closed loop digital VVVF
Control system:	:	Electronic. Fully software based microprocessor controlled system.
Machinery	:	Gearless. Any other machinery to be located either in shaft or in the machine room
No.of stops	:	4 ( G,1, 2 floor)
Travelling cable	:	Travelling cable to serve interface for fire alarm system, C.C.T.V and Audio System to be installed.

Lift Pit	:	To be agreed upon after site handing over
Head room	:	To be agreed upon after site handing over
Shaft Dimensions	:	1800mm Width x 1800mm Length (INTERNAL)
Normal Operation	:	Simplex function
V.I.P Operation	:	The car should be programmed to operate for VIP service by key switches located on all the floors. The car should however clear all the car calls in the direction of travel of the lift made prior to the VIP call.
Power requirements	:	415V ac, 3 phase, at 50Hz

### 6.0.2 PASSANGER LIFTS

No. of Unit	:	One (1No.)
Load	:	1,000Kg (13 persons)
Speed	:	1. 2m/s
Drive	:	Closed loop digital VVVF
Control system:	:	Electronic. Fully software based microprocessor controlled system and an advanced intergrated lift management system to serve the one (1No.) lifts
Machinery	:	Gearless. Any other machinery to be located either in shaft or in the machine room
No.of stops	:	4 (B,G,1, and 2 floor)
Travelling cable	:	Travelling cable to serve interface for fire alarm system, C.C.T.V and Audio System to be installed.
Lift Pit	:	To be agreed upon after site handing over.
Head room	:	To be agreed upon after site handing over
Shaft Dimensions	:	2400mm width x 1850mm Length (INTERNAL)
Normal Operation	:	Simplex function, with locations of one (1No.) call button in each floor
Power requirements	:	415V ac, 3 phase, at 50Hz

### 6.0.3 **Other main facilities and functions to be included**

- : Car door operation shall be fully automatic with (infra-red) electronic door sensors
- : Car position indicator
- : Door button – re-open
- : Voice guidance system (voice synthesizer)
- : Emergency power operation and system backing
- : Intercom facility – 3 way
- : Alarm power unit and bell complete with a maintained back-up power supply
- : Safe landing with deviation of not more than 3mm
- : Floor position indicator on every floor
- : Independent service key operation
- : Signal floor lantern with sounders or car arrival chimes on all floors
- : All the lift call buttons and car operation pannels must have **buttons for the disabled** ( Braille for the blind and button for wheel chair users)

	:	Remote control car stop (emergency)
	:	Cabin ventilation shall be tropicalised high Capacity cylinder type operation.
	:	Car extract fan should be powerful, quiet, drought free and multi-directional complete with a maintained back-up power supply
	:	Shall incorporate an Audio Visual car overload device.
	:	Shall have forced ventilation key switch.
Code compliance	:	The lifts shall comply with BS 5655 or European Specification equivalent code EN 81 and KS 2169 -1
Structural Openings	:	The lift Contractor shall set the landing doors at 10mm from the finished floor levels so as to get a fall away from the landing to prevent water from <b>flowing down the lift shafts when washing up.</b>
Entrances	:	The lifts car shall have automatic high speed power operated 2 panel centre openings of 1000mm wide by 2100mm high
Landing door	:	Stainless steel to Engineer's approval.
Car door	:	Stainless steel to Engineer's approval.
Landing door architraves:		Architraves to be granito tiles of a client approved colour with an aluminium strip at the edge, all to the Engineer's approval.
Wall switches	:	All operating switches in the lifts shaft shall be of the totally enclosed drip proof type.
Lighting	:	Indirect Lighting shall be fitted in the car to a level of 150 lux.
Cabin walls	:	Stainless steel to Engineer's approval
Car interior fronts	:	Stainless steel to Engineer's approval.
Mirror	:	Three quarter full height at the rear car panel.
Door Operation	:	Heavy duty variable frequency driven door operators on a frame above the lift car.
	:	Fully adjustable door open and close speeds - micro-processor controlled. The goods lift has no mirror and/or hand rail.
	:	Intelligent speed adjustments to cope with traffic requirements
	:	Full curtain electronic infrared 3 dimensional detectors.
	:	An electro- mechanical type tested interlock shall be provided, fitted on the landing door and operated by the door lock cam on the lift car to prevent movement of the lift car until the landing door is both mechanically and electronically locked.
Hand rails	:	Round sectioned polished stainless steel, formed, 50mm OD x 3mm thick on the three (3) panels of the lift car.
Emergency light	:	Emergency light in the lift cars shall be 6 watts complete with a maintained back-up power supply
Signal Hall Lanterns	:	LCD displays and different tones for up and down motions.
Signal fixtures	:	Wide angle view car position indicator unit with high reliable LED technology.
Floor buttons	:	Micromotion with ring illumination brushed stainless steel plate with Braille indication.

Floor	:	3mm thick, seamless, chequered stainless steel plates secured flash and complies with local and international safety regulations. No sharp joint shall be exposed.
Car position indicators:		Car position indicators shall be digital LCD type.
Car direction indicators :		Car direction indicators shall have polycarbonate covers and 160° angle view.
Manual operation	:	Provision shall be made for manual raising and lowering by means of spokeless wheel. This wheel shall be mounted on the drive motor. This facility should be availed at the control panel.
Painting	:	All parts of the control equipment, switchgear trunking bed plates and closed sections of metal parts which will not be accessible for painting after erection shall be given three coats of paint at the manufacture's works. All bright surfaces shall be coated with lacquer or other protective coating before leaving the manufacturer's works. Metal works in the lift shaft shall be painted on site with three coats of best quality oil paint. The lifts machine and other machinery located in the lifts motor room shall be painted with three coats of best quality oil paint one coat being applied after erection.
Guarantee of Spare parts	:	The tenderer must confirm in writing and provide written commitment from manufacturer, the availability of parts for the make of lift proposed for installation, for a continuous period of at least 10 (ten) years.
Construction	:	In general, the lift car shall be constructed from pressed steel. The method of construction and strength of lift cars, doors and panels shall comply with B.S. 5655. Part 1 1970 and the amendments and in accordance with European code EN 81.
Base frame	:	The complete hoisting equipment shall be mounted on base frame of fabricated steel which when installed shall be insulated from the building structure by means of rubber or other approved sound and vibration isolated material provided and fixed in an approved manner between frame and the supporting beams.
Power factor	:	The power factor for the drive shall not be less than 0.9 lagging.



**7.0 INFORMATION TO BE SUPPLIED BY THE TENDERER**

7.1 The tenderer shall fill in the following information pertaining to the VIP lift being offered at the time of tendering:-

- (i) Type of Drive Motor .....
- (ii) Size of the Drive Motor (KW).....
- (iii) Country of Manufacture .....
- (iv) Power Factor .....
- (v) Starting Current A .....
- (vi) Running Current B. ....
- (vii) Duration of Starting Current .....
- (viii) Lift Capacity ( Kg/Persons).....
- (ix) Lift Speed .....
- (x) Landing Doors Type .....
- (xi) Landing Doors Safety Features.....
- (xii) Dimensions of Lift Car .....
- (xiii) Shaft dimensions .....

7.2 The tenderer shall fill in the following information pertaining to the passenger lifts being offered at the time of tendering:-

- i) Type of Drive Motor .....
- ii) Size of the Drive Motor (KW).....
- iii) Country of Manufacture .....
- iv) Power Factor .....
- v) Starting Current A .....
- vi) Running Current B. ....
- vii) Duration of Starting Current .....
- viii) Lift Capacity ( Kg/Persons).....
- ix) Lift Speed .....
- x) Landing Doors Type .....
- xi) Landing Doors Safety Features.....
- xi) Dimensions of Lift Car .....
- xiii) Shaft dimensions .....

**Statement of Compliance**

- 1) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.
  
- 2) I confirm I have not made and will not make any payment to any person, who can be perceived as an inducement to win this tender.

Signed: .....*for and on behalf of the Tenderer*

Date: .....

Official Rubber Stamp: .....

**SECTION G**  
**BILLS OF QUANTITIES**

## BILLS OF QUANTITIES

### A) PRICING OF PRELIMINARIES ITEMS

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

The Bills of Quantities are divided generally into three sections:

#### Preliminaries – Bill No.1

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

#### Installation Items – Other Bills

The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract drawings, conditions of contract and specifications.

The unit of measurements and observations are as per those described in clause 1.0 5 of the section C.

#### Summary

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

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

## SPECIAL NOTES TO BILLS OF QUANTITIES

- 1) The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
- 2) The prices quoted shall be deemed to include for all obligations under the Contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT and 3% withholding tax**).

In accordance with Government policy, the 16% VAT and 3% Withholding Tax **shall be deducted** from all payments made to the Tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA)**.

- 3) All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
- 4) The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the Contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

Should the Contractor install any material not specified here in before receiving **written approval** from the Project Manager, the Contractor shall remove the material in question and, **at his own cost**, install the proper material.

- 5) The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.
- 6) Tenderers must enclose, together with their submitted tenders, manufacturer's brochures detailing technical literature and specifications of the generator set that they intend to offer. Where the brochure contains different models and sizes of generators, the bidders **MUST** clearly mark out the model and size of generator they intend to offer by using a 'mark pen'.

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

LIFTS INSTALLATION WORKS

**BILL NO. 1 - CONTRACT PRELIMINARIES (Refer to Section C of this Tender Document)**

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
1	Discrepancies clause 1.02				
2	Conditions of contract Agreement clause 1.03				
3	Payments clause 1.04				
4	Site location clause 1.06				
5	Scope of Contract Works clause 1.08				
6	Extent of the Contractor's Duties clause 1.09				
7	Firm price contract clause 1.12				
8	Variation clause 1.13				
9	Prime cost and provisional sum clause 3.14 (insert profit and attendance which is a percentage of expended PC or provisional sum.)				
10	Bond clause 1.15				
11	Government Legislation and Regulations clause 1.16				
12	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only)				
13	Insurance company Fees clause 1.18				
14	Provision of services by the Main contractor clause 1.19				
15	Samples and Materials Generally clause 1.21				
16	Supplies clause 1.20				
17	Bills of Quantities clause 1.23				
<b>SUB-TOTAL CARRIED TO PAGE G/5</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
18	Contractor's Office in Kenya clause 1.24				
19	Builder's Work clause 1.25				
20	Setting to work and Regulating system clause 1.29				
21	Identification of plant components clause 1.30				
22	Working Drawings clause 1.32				
23	Record Drawings(As Installed) and Instructions clause 1.33				
24	Maintenance Manual clause 1.34				
25	Hand over clause 1.35				
26	Painting clause 1.36				
27	Testing and Inspection – manufactured plant clause 1.38				
28	Testing and Inspection – Installation clause 3.39				
29	Storage of Materials clause 1.41				
30	Initial Maintenance clause 1.42				
<b>SUB-TOTAL CARRIED TO PAGE G/5</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	KSHS
31	Local and other Authorities notices and fees clause 1.60				
32	Temporary Works clause 1.63				
33	Patent Rights clause 1.64				
34	Mobilization and Demobilization Clause 1.65				
35	Supervision by engineer and site meetings clause 1.67				
36	Allow for profit and Attendance for the above (item 35)				
37	Amendment to Scope of Contract Works Clause 1.68				
38	Contractor Obligation and Employers Obligation clause 1.69				
<b>Sub-total from above</b>					
<b>Sub-total B/F from Page G/3</b>					
<b>Sub-total B/F from Page G/4</b>					
<b>TOTAL CARRIED FORWARD TO PRICE SUMMARY PAGE G/8</b>					

**Bidders MUST either insert percentage or indicate as NIL for the following clauses:**

(1). Attendance Upon Tradesmen, etc. **(Insert percentage only)** clause 1.58  
of section C

.....%

(2). Extended Preliminaries **(Insert percentage only)** Clause 1.66  
of section C

.....% per month



**BILL NO.2: PRICE FOR 1NO. PASSENGER LIFT**

Item	Description	Amount(Kshs)
A	<p>(a) Price for all imported materials (give break-down on a separate sheet) - Lift specifications - 1No. 1000KG/13 Persons, 4No. Stops, machineroomless lift. as described in particular specifications.</p> <p>(b) State the Foreign currency, if any, on which the tender is based .....</p> <p>(c) State the exchange rate applied .....</p>	
B	<p>Price for locally purchased materials, installation, testing and commissioning costs (give breakdown on separate sheet). as described in particular specifications.</p>	
C	<p>Price for full service maintenance of the lifts during 6 months defects liability period for whole period @ Kshs. ....per month as described in particular specifications</p>	
D	<p>Price for the <b>travelling cable</b> for interfacing fire alarm system, CCTV and Audio system to be installed by others. Include high quality speakers connected to the cable and installed in the lift car to engineer's approval</p>	
E	<p>Allow for connection of a telephone extension from the premises IPBX with the telephone instrument in the lift car all wiring and accessories included</p>	
<p><b>TOTAL FOR BILL NO. 2, 1NO. PASSENGER LIFT C/F TO SUMMARY PAGE G/8</b></p>		

**BILL NO. 3: PRICE FOR 1NO. VIP LIFT**

Item	Description	Amoun(Kshs.)
A	<p>(a) Price for all imported materials - Lift specifications - 1No. 630KG/8 Persons, 4No. Stops, Machineromless lift. as desribed in particular specifications.(give break-down on a separate sheet)</p> <p>(b) State the Foreign currency, if any, on which the tender is based .....</p> <p>(c) State the exchange rate applied .....</p>	
B	<p>Price for locally purchased materials, installation, testing and commissioning costs (give breakdown on separate sheet). as desribed in particular specifications.</p>	
C	<p>Price for full service maintenance of the lifts during 6 months defects liability period for whole period @ Kshs. ....per month</p>	
D	<p>Price for the <b>travelling cable</b> for interfacing fire alarm system, CCTV and Audio system to be installed by others. Include high quality speakers connected to the cable and installed in the lift car to engineer's approval</p>	
E	<p>Allow for connection of a telephone extension from the premises IPBX with the telephone instrument in the lift car all wiring and accessories included</p>	
<p><b>TOTAL FOR BILL NO. 3, 1NO. VIP LIFT C/F TO SUMMARY PAGE G/8</b></p>		

**LIFTS INSTALLATIONS SUMMARY PAGE**

Item	Description	Amount(Kshs)
1	Total for Bill No. 1 - Preliminaries	
2	Total for Bill No. 2 - 1No. Passenger Lift	
3	Total for Bill No. 3 - 1No. VIP Lift	
4	Price for associated electrical works including provision of shaft lighting	
5	Price for 4 sets of operation and maintenance manuals as described in the specifications.	
6	Allow for 4 sets of As Installed Drawings.	
7	Price for statutory inspection of the 2No. new lifts on commissioning and thereafter two times during the 6 months defects liability period for whole period	
8	Provisional sum for an overseas factory inspection by 6No. Employer's representatives as described in clause 18.0 page no. F/5 of the specifications	3,000,000.00
<b>TOTAL OF FOR LIFT INSTALLATION WORKS C/F TO MAIN WORKS SUMMARY</b>		

Total Amount in Words (Kenya Shillings) .....

.....

.....

Bidder's Name & Official Stamp .....

P.O. Box.....

Signature.....Date.....

PIN NO.....V.A.T Certificate NO.....

Witness.....Address.....

Signature of Witness.....Date.....

APPENDIX TO BILLS OF QUANTITIES

APPENDIX 'A'

PRICE BREAKDOWN OF IMPORTED MATERIALS

Item	Description	Unit	Qty	Cost (Kshs.)

Signed By Tenderer .....

Official Stamp .....

.....

Date .....

APPENDIX TO BILLS OF QUANTITIES

APPENDIX 'B'

PRICE BREAKDOWN OF LOCALLY PURCHASED MATERIALS

Item	Description	Unit	Qty	Cost(Kshs.)

Signed By Tenderer .....

Official Stamp .....

.....

Date .....

**SECTION H**

**FULL SERVICE MAINTANANCE**

**DURING 36 MONTHS AFTER DEFECTS LIABILITY PERIOD**

## FULL SERVICE MAINTANANCE DURING 36 MONTHS AFTER DEFECTS LIABILITY PERIOD

### SPECIAL NOTES

1. The tenderer is advised to note that their price shall be used in the evaluation of the tenders.
2. The tenderer shall price for both labour and consumables( materials) during the 36 months full service period in appenix A of this section. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender.
3. The tenderer shall list and price the consumable/ spare parts/ materials to be used during the 36 months full service period in appenix B of this section. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender.
4. The tenderer shall list and price the consumable/ spare parts/ materials to be used during the 36 months full service period. This list is to be comprehensive as possible and shall inculde major spares as cards, fan motors etc. The price shall be for supply, installation, testing and commissioning including all taxes applicable at the time of tender. These are the spare parts that are not required during the normal routine maintenance. These spare parts shall only be paid for as and when repalced. The tenderer shall give the details of these spare parts in appenix C of this section.
5. The price quoted for the above lifts shall be as per the Standard Maintanance Tender Document which can be examined at the offices of the Project Manager.
6. The tenderer shall be required to sign the 36 Months after Defects Liability Maintanance Contract based on the price quoted and the Standard Maintanance Tender Document refered to in item 5 above.
7. The tenderer **MUST** fill all the prices and rates in the Appendices A, B and C of this section. Failure to do so shall lead to disqualification.

**APPENDIX 'A'**

**PRICE FOR FULL NORMAL ROUTINE MAINTANANCE DURING 36 MONTHS AFTER DEFECTS LIABILITY PERIOD**

Item	Description	Kshs	Cts
1.0	Labour costs per month		
2.0	Material costs for spare parts (consumables) per month – see Appendix C of this section		
<b>Sub-total for one (1No.) Month Maintenance after the Defects Liability Period ( Not to be carried to Form of Tender)</b>			
<b>Grand Total for 36 Months Maintenance after the Defects Liability Period ( Not to be carried to Form of Tender)</b>			

Signed by the Tenderer.....

Official Stamp .....

Date.....



**APPENDIX 'B'**

**SCHEDULE OF UNIT RATES OF SPARE PARTS THAT MAY BE REQUIRED DURING 36 MONTHS AFTER DEFECTS LIABILITY MAINTENANCE PERIOD (ATTACHMENTS ARE ALLOWED IF THE LIST IS LONG)**

Item	Description	Unit	Qty	Cost(Kshs.)
<b>Total ( Not to be carried to Form of Tender)</b>				

Signed By Tenderer .....

Official Stamp .....

.....

Date .....

**APPENDIX 'C'**

**PRICE BREAKDOWN OF SPARES / CONSUMABLES TO BE USED DURING 36 MONTHS AFTER DEFECTS LIABILITY MAINTENANCE PERIOD**

Item	Description	Unit	Qty	Cost(Kshs.)
<b>Total ( Not to be carried to Form of Tender)</b>				

**NOTE: The Price Total in this Appendix C SHOULD tally with the Grand Price Total in Appenix A of this section.**

Signed By Tenderer .....

Official Stamp .....

.....

Date .....

**SECTION I**  
**TECHNICAL SCHEDULE**  
**OF**  
**ITEMS TO BE SUPPLIED**

## TECHNICAL SCHEDULE

- 1.0 The technical schedule shall be submitted by tenderers to facilitate and enable the Project Manager to evaluate the tenders
- 2.0 The filling of this schedule forms part of Technical Evaluation of the tenders, and bidders shall therefore be required to indicate the type/make and country of origin of all the materials and equipments they intend to offer to the employer as they shall listed in the technical schedule.
- 3.0 Any bid returned with unfilled Technical Schedule shall be considered technically non-responsive, and the bidder may be disqualified.

**TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED**  
(To be Completed by the Tenderer)

ITEM	DESCRIPTION	TYPE/MAKE	COUNTRY OF ORIGIN

**PART NO. 12**

**PROVISIONAL SUMS**

**PROPOSED MODERN ASSEMBLY CHAMBERS**

NO.	DESCRIPTION			
	<p><b><u>PART NO. 12</u></b></p> <p><b><u>PROVISIONAL SUMS</u></b></p> <p><b><u>ELEMENT NO. 1</u></b></p> <p><b><u>NOTES:</u></b></p> <p>1. The following sums may be expended in whole or in part at the sole discretion and on the sole written authority of the Project Manager.</p> <p>2. The following sums <b>include</b> 16% V.A.T.</p> <p><u>Provide Provisional Sums to cover the cost of the following items to be carried out at Main Contractor's Bill rates or rates pro-rata thereto:</u></p>			
<b>A</b>	<p><b><u>Site Sign Board</u></b></p> <p>Shillings One Hundred Thousand (<b>Shs. 100,000.00</b>) only for Site Sign Board;</p>		Item	100,000.00
<b>B</b>	<p><b><u>Clerk of Works</u></b></p> <p>Shillings One Million Five Hundred Thousand (<b>Shs. 1,500,000.00</b>) only for hiring of a Clerk of Works;</p>		Item	1,500,000.00
<b>C</b>	<p><b><u>Kenya Power Line Service Upgrade &amp; Relocation of Transformer</u></b></p> <p>Shillings Two Million Five Hundred Thousand (<b>Shs. 2,500,000.00</b>) only for Kenya Power Service line upgrade and relocation of existing transformer;</p>		Item	2,500,000.00
<b>D</b>	<p><b><u>Relocation of Amoured cabling</u></b></p> <p>Shillings One Hundred Thousand (<b>Shs. 100,000.00</b>) only for relocation of existing amoured cabling;</p>		Item	100,000.00
<b>E</b>	<p><b><u>Main Entrance Façade &amp; Artistic Impressions</u></b></p> <p>Shillings Two Million (<b>Shs. 2,000,000.00</b>) only for Main entrance Façade &amp; Artistic Impressions to Architect's details;</p>		Item	2,000,000.00
<b>E</b>	<p><b><u>External Roads, Parking &amp; Connection to existing foul drainage system</u></b></p> <p>Shillings Two Million (<b>Shs. 2,000,000.00</b>) only for External Roads, Parking &amp; Connection to existing foul drainage system to Architect's details;</p>		Item	2,000,000.00
<b>F</b>	<p><b><u>Contigencies</u></b></p> <p>Shillings Twelve Million (<b>Shs. 12,000,000.00</b>) only for contingencies to cover cost of any unforeseen or minor additional works;</p>		Item	12,000,000.00
	<p align="center"><b>Total Amount of Element No. 1 Provisional Sums Carried to Part Summary</b></p>			<b>20,200,000.00</b>

**PROPOSED MODERN ASSEMBLY CHAMBERS**

NO.	DESCRIPTION	
<b><u>SUMMARY</u></b>		
<b><u>PROVISIONAL SUMS AND ON-COSTS ON P.C. SUMS</u></b>		
<b><u>ELEMENT NO.</u></b>	<b><u>ELEMENT</u></b>	
1	Provisional Sums	20,200,000.00
<b>TOTAL FOR PROVISIONAL SUMS TO MAIN SUMMARY</b>		<b>20,200,000.00</b>



## **PART NO. 13**

## **MAIN SUMMARY**

Based on stated Completion of **18 (EIGHTEEN) CALENDAR MONTHS**

**PART NO. 13**  
**SPECIFICATIONS**  
**AND**  
**BILLS OF QUANTITIES**  
**FOR**  
**PROPOSED MODERN ASSEMBLY CHAMBERS**  
**FOR**  
**COUNTY ASSEMBLY OF NAKURU**  
**MAIN SUMMARY**

PART NO.	PART	PAGE NO.	KSHS.	CTS.
	<b><u>BILLS OF QUANTITIES FOR: -</u></b>			
7	Builder's Work	7/92		
8	Electrical & Generator Set Installation Works	8/C-34		
9	Plumbing & Drainage Installation Works	9/C-33		
10	Air Conditioning & Mech. Ventillation Inst. Works	10/C-14		
11	Lift Installation Works	11/G-8		
	<b><u>Sub-Total</u></b>	<b>Shs.</b>		
5	Particular Preliminaries .. ..	5/13		
6	General Preliminaries .. ..	6/6		
12	Provisional Sums	11/3	20,200,000	
<b><u>TOTAL AMOUNT OF TENDER (V.A.T Inclusive)</u></b> <b><u>(Carried to Main Summary of Tender)</u></b>		<b>KSHS</b>		

**TOTAL AMOUNT OF TENDER IN WORDS KENYA SHILLINGS:**

**PART NO. 13**  
**SPECIFICATIONS**  
**AND**  
**BILLS OF QUANTITIES**  
**FOR**  
**PROPOSED MODERN ASSEMBLY CHAMBERS**  
**FOR**  
**COUNTY ASSEMBLY OF NAKURU**  
**MAIN SUMMARY (Ctd).**  
**(TENDER )**

Signature of Tenderer .....

Name of Tenderer .....

Address .....

.....

Date .....

Signature of Witness .....

Name of Witness .....

Address .....

.....

Date .....