

REPUBLIC OF KENYA



KISII COUNTY GOVERNMENT



ARAB BANK FOR ECONOMIC
DEVELOPMENT IN AFRICA



SAUDI FUND FOR
DEVELOPMENT



MINISTRY OF HEALTH
TENDER DOCUMENT FOR
PROPOSED CANCER CENTRE AT
THE KISII TEACHING AND REFERRAL HOSPITAL

LIFT INSTALLATIONS

INSTRUCTIONS TO BIDDERS
QUALIFICATION INFORMATION
REQUIREMENTS
SPECIFICATIONS

REF: No. MOH/NCCP/ICB/001/2021-2022

Volume II (2 of 3) (a) of VI

CLOSING DATE: WEDNESDAY, 24TH NOVEMBER 2021 AT 11.00 A.M. LOCAL TIME

SCHON ASSOCIATES



**NARCO ENGINEERING
CONSULTANTS**



**PROPOSED CANCER CENTRE AT
THE KISII TEACHING AND REFERRAL HOSPITAL
TECHNICAL SPECIFICATION FOR
LIFT INSTALLATIONS
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SECTION 1

- ◆ **Evaluation Criteria**

SUB-CONTRACTOR QUALIFICATION INFORMATION

BID ELIGIBILITY AND QUALIFICATION CRITERIA

The following criteria will be used in the evaluation of all bids. The submission of the required documents will be used in the determination of the Completeness and Suitability of the Bid. Bids that do not contain all the information required will be declared non-responsive and shall not be evaluated further.

MANDATORY EVALUATION

ITEM	MANDATORY REQUIREMENT	YES	NO
1	Copy of Certificate of Registration/Incorporation		
2	Copy of Valid Tax Compliance Certificate from Country of Residence		
3	Copy of Energy and Petroleum, Regulatory Authority (EPRA) or International Regulatory Equivalent		
4	Copy of valid business permit or International equivalent		
5	Copy of Valid Registration with National Construction Authority (NCA) for Electrical (Class 1) or equivalent International standard, include relevant licenses, registration, and certifications		
6	Attach copies of Recommendation letters from three of your major clients having undertaken similar assignment		
7	Show proof of Local/Regional presence		
8	Certified copy of valid contractor's annual NCA practicing license for Electrical works or equivalent International Standard		
9	Certified copy of Company Record showing shareholders (CR12 or Equivalent)		
10	Audited Accounts for the last three years (2018, 2019 & 2020)		
11	Prove of having completed at least one relevant project valued at Kshs 30 million and above for Lift Installation sub-contract, completed in the last 10 years. Attach award letter and completion certificate.		
12	Technical specifications of all the equipment proposed as laid out in the Specifications and Drawings. Include Brochures and Catalogues.		
13	The Bidder shall provide details of line(s) of credit available to the bidder, including amount(s) and name of bank(s) making available such line(s) of credit		
14	The Bidder shall provide letter(s) authorizing the Employer to seek references from the bidder's bankers		
	PASSED (RESPONSIVE)		
	FAILED (NON-RESPONSIVE)		

NOTE: Failure to comply with Mandatory requirements will lead to automatic disqualification.

Only bidders who are successful at this stage will proceed to the next stage of evaluation.

SECTION 2

- ◆ **Signature Page**
- ◆ **Special Notes**
- ◆ **Declaration of Availability of
Materials**

**PROPOSED CANCER CENTRE AT
THE KISII TEACHING AND REFERRAL HOSPITAL**

TECHNICAL SPECIFICATION

FOR

LIFT INSTALLATIONS

Preamble

Supplied as part of the Main Tender for the lifts Installations at the:

PROPOSED CANCER CENTRE AT THE KISII TEACHING AND REFERRAL HOSPITAL

ISSUED BY:

The Principal Secretary,
Ministry of Health,
P.O. Box 30016-00100,
Nairobi

PREPARED BY:

Schon & Associates
P.O. Box 38601-00100
Nairobi

The Tender for the above-mentioned works dated this _____ day of _____ 2021 by the undersigned parties refers to the Bills of Quantities consisting of the pages numbered on contents page.

.....

SUB-CONTRACTOR

Date2021

.....

MAIN CONTRACTOR

Date2021

SIGNATURE PAGE

PROPOSED CANCER CENTRE AT THE KISII TEACHING AND REFERRAL HOSPITAL

LIFT INSTALLATIONS

SPECIAL NOTES

1. The Tenderer shall tender for the above Works in accordance with the appended drawings, Technical Specification and Bills of Quantities.
2. The Tenderer is required to check the numbers of the pages of these Bills of Quantities against the contents stated on Page 2/1 and should he find any missing, in duplicate or illegible he must inform the Engineer at once and have the same rectified.
3. Should the Tenderer be in doubt about the precise meaning of any item or figure, for any reason whatsoever, he must inform the Engineer in order that the correct meaning may be decided before the date for submission of the tenders.
4. No liability will be admitted or claim allowed in respect of errors in the Tenderer's tender due to mistakes in the Bills of Quantities that should have been rectified in the manner described above.
5. The annexed Bills of Quantities must be fully priced in ink. The Tenderer shall not alter or otherwise qualify the text of these Bills of Quantities. Any alteration or qualification made without authority will be ignored and the text of the Bills of Quantities as printed will be adhered to.
6. **Fully priced Bills of Quantities must be accompanied by brochures and technical literature for the items tendered for.**
7. The Tenderer shall be deemed to have made allowance in his prices generally to cover items of Preliminaries or additions to Prime Cost Sums or other items, if the Tenderer has not priced these where appropriate.
8. All items of measured work shall be priced in detail and tenders containing lump sums to cover trades or groups of work must be broken down to show prices of each item before they will be accepted. Lump sums to cover items of Preliminaries shall be likewise broken down if so required.
9. All items of measured work shown on the drawings, bills of quantities or set out in the schedules are to be supplied and installed complete under this tender. However, the employer reserves the right to supply or purchase any of the items at any moment pre-award or post award of the contract without being bound to give any reasons, in which case the contractor will be paid for handling and installation component as detailed in the bills of quantities. Should the employer decide to purchase any of the tendered items, then the contractor shall be responsible to take delivery of the items on or off site, store, insure and install the items at an appropriate time. The contractor shall be responsible to advise, inspect and confirm to the employer the correct technical specification, quantities and timelines of the items to be supplied to avoid any discrepancies, shortages, excesses or delays.
10. Under no circumstances will any expense incurred by Tenderers in preparation of this tender be allowed.
11. The copyright of these Bills of Quantities is vested in the Engineer and no part thereof may be reproduced without express permission given in writing by the Engineer.
12. The Tenderer is solely responsible for the accurate ordering of materials in accordance with the Drawings and Engineer's instructions and no claim for any loss or expense will be entertained for orders for materials based upon the Bills of Quantities.

PROPOSED CANCER CENTRE AT THE KISII TEACHING AND REFERRAL HOSPITAL

CONDITIONS OF TENDERING

- 1.01 Each Tenderer must submit two plain sealed envelopes one clearly marked "TENDER FOR LIFTS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY (TECHNICAL PROPOSAL)" and the other clearly marked "TENDER FOR LIFTS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY (BILLS OF QUANTITIES).
- 1.02 The Technical Proposal and Bills of quantities as in 1.01 above shall be placed in a sealed outer envelope labelled "TECHNICAL AND FINANCIAL PROPOSAL FOR LIFTS INSTALLATIONS FOR THE PROPOSED KISII CANCER CENTRE – KISII COUNTY" and be submitted together with the Main Contractor's tender in accordance with the instructions in the Letter of Invitation.
- 2.01 Tenders and all the Documents in connection therewith as specified above must reach the Address as advised and, on the date, stated in the covering letter accompanying these documents.
- 2.02 In the case of a tender not being delivered by hand, the Tenderer must arrange for his tender and other documents to be posted in time to reach the above office not later than the stipulated time.
- 2.03 Any tender delivered after the stipulated time, from whatever cause arising, will be disqualified.
- 2.04 In no case will any expense incurred by the Tenderer in the preparation of his tender be allowed.
- 3.01 Tenders shall remain valid for ninety (120) days from the final date of submission of tenders stipulated in Paragraph 2.01 above, and no Tenderer may withdraw his tender after that period.
- 4.01 The Employer shall not be bound to accept the lowest or any tender and shall not be bound to give reasons for his decision.
- 5.01 The Engineer shall notify the accepted approved Tenderer (if any) of such acceptance by letter within ninety (120) days during which, by Paragraph 3.01 thereof, the tender is to remain valid and the said Tenderer shall then within the time stated in the Form of Tender first execute the formal Contract Agreement and then on the same day his approved Surety shall sign the Bond. The Engineer however, reserves the right to extend the period for executing the formal Contract Agreement if satisfied that adequate reasons exist for so doing.
- 6.01 Every notice to be given to a Tenderer may be posted to the Tenderer's address as given in his tender and such posting shall be deemed to be good service of such notice.
- 7.01 The term "Electrical and Mechanical Engineer" wherever used in these Conditions and in all Contract, Documents shall be such person or persons as may be duly authorised to represent M/s Greentec Engineering Consultants.
- 7.02 The words "Approved Tenderer" in these Conditions shall mean that the Tenderer shall be approved by the Employer as having complied with these Conditions in every respect.
- 7.03 The word "Tenderer" in these Conditions shall be deemed where applicable to include two or more persons. The word "his" may also mean "their" and the word "he" may also mean "they".
- 8.01 If it is found on the examination of a tender that there is a discrepancy between the Total Amount of the tender and the amount arrived at by valuing the quantities set out in the Bills of Quantities at the rates or prices set against them by the Tenderer, then the figures shall be corrected arithmetically and the differences between the tender and the corrected total shall be applied as a percentage adjustment or addition or omission on all the rates, so that the original tender amount remains unaltered. When calculating the percentage adjustment, the total cost of the Preliminaries, Provisional and P.C. Sums, Contingencies and any other items of a similar nature shall be excluded.
- 9.01 Non-compliance with the above Conditions in any respect shall render the tender liable to rejection.

DECLARATION ON AVAILABILITY OF MATERIALS, PLANT, SUPERVISION AND SKILLED LABOUR

To,

The Principal Secretary,
Ministry of Health,
P.O. Box 30016-00100,
Nairobi

Sirs,

PROPOSED CANCER CENTRE AT THE KISII TEACHING AND REFERRAL HOSPITAL LIFT

INSTALLATIONS

In connection with the attached tender for the above Sub-Contract, I/We have made full enquiries with manufacturers and/or distributors of the relevant materials and plant required to be incorporated or used in the Works and I/We hereby declare that I/We will have available: -

*(a) all the necessary

or *(b) a proportion of the necessary

Materials, plant, tools and equipment, supervision and skilled labour

*(a) from stocks in hand

or *(b) from sources of supply available to me/us
for use as and when they are required for the Works.

Signature of Tenderer.....

Name of Tenderer

Address

Date.....

NOTES: -

1. *Delete whichever is not applicable.
 2. *The Tenderer may be required before approval
- (a) To disclose the (i) actual quantities of the various materials and (ii) plant available for immediate use and, (iii) To submit names and CV's and academic certificates of available supervision personnel and team leader being an electrical engineer with over 10 years experience, (iv) Skilled labour.
- b) To give details of the arrangements which have been made by the Tenderer for the obtaining and delivery to the site of the further materials and plant and employment of supervision and skilled labour required to complete the works.
3. Failure to satisfy the Engineer that adequate arrangements have been made to provide or obtain the whole of the materials, plant, tools and equipment necessary to complete the Works within the contract period or such extended period as may be authorised, may render the Tenderer liable to be considered in default.

◆ **SECTION 3**

◆ **General Specification**

PROPOSED CANCER CENTRE AT THE KISII TEACHING AND REFERRAL HOSPITAL

LIFT INSTALLATIONS

PART I

GENERAL SPECIFICATION

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3 PART I - GENERAL SPECIFICATION

3.1 Extent of Lift Installations

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

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

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

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

3.2 Programme for Lift Engineering Installations

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

- (i) Submission of working drawings for approval;
- (ii) Placing of orders with other specialists for plant and equipment to be incorporated in the works;
- (iii) Receipt by the Contractor from other specialists of plant to be incorporated in the works;
- (iv) Manufacture by the Contractor of plant to be incorporated in the works;
- (v) Inspection and testing by the Engineer;
- (vi) Shipment of the plant from country of manufacture;
- (vii) Delivery of the plant and equipment to site;
- (viii) Erection on site, details for all activities;
- (ix) Testing and commissioning;
- (x) Handover documentation and training of client's team on operation and maintenance;
- (xi) Defect liability period;
- (xii) Post contract maintenance proposal.

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

3.3 Drawings accompanying the Tender Documents

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

The Contractor shall satisfy himself as to the correctness of all Drawings and measurements particularly the dimensions of the lift installations. If the Contractor finds any discrepancy in the Drawings or between the Drawings and the Technical Specifications or between the lift installations and the Drawings, he shall immediately refer the same to the Engineer who will make a ruling on the discrepancy. Figured dimensions shall be taken in preference to the scale mentioned on or attached to any Drawings. Details shown on Drawings shall be read in conjunction with items included in the Technical Specifications.

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

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

3.4 Contract Working Drawings

The Contractor shall prepare fully detailed Working Drawings for all items of plant, equipment and accessories required for installation under this section of the Contract. Two copies of each Drawing shall be forwarded to the Engineer for approval and or comments. One copy will be returned stamped "approved" or "not-approved". Where Drawings require further information and/or modifications to meet the comments made by the Engineer they shall be re-submitted, again in duplicate, for approval.

When Drawings have been approved two further copies shall be forwarded to the Engineer, together with copies to the Architect, Site and the Employer.

Drawings, and, where relevant, calculations in respect of the following shall be prepared by the Contractor and submitted to the Engineer for his approval commencing within ten (10) days from acceptance of the tender.

- (a) Cabling and external cable routes;
- (b) Details of all conduit and trunking runs in respect of different service;
- (c) Details of lighting and power circuits, routes etc;
- (d) Details of sub-main switchgear and distribution boards;
- (e) Fire alarm layouts and all circuit diagrams;

- (f) Lightning and surge protection details;
- (g) Technical literature for all the services;
- (h) Layouts of all ducts, chases, holes, trenches and all other services throughout the whole of the building and associated external work.

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

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

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

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

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

3.5 Record Drawings

As soon as the works are complete and all tests satisfactorily carried out, the Contractor shall hand to the Engineer two sets of Record Drawings, AUTOCAD soft copy drawings in CD, together with one set of negatives of the same, showing the works as finally installed. These Drawings shall be prepared on approved transparent plastic material in black ink or as approved by the Engineer. The certificate, of making good defects, will not be issued until this condition has been complied with. Record Drawings are in addition to detailed Working Drawings and shall show all cable routes, circuits, trunking, conduits, plant, trenches, ductwork and ducts etc., together with the entire plumbing, drainage and fire fighting installation, as finally installed.

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

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

3.6 Maintenance Manuals

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

3.7 Builder's Work and Civil Works

Builder's Work and Civil Works that are incidental to this section of the Contract such as cutting of holes in walls and floors, provisions of foundations for the plant and machinery, shall be the responsibility of the Main Contractor. The Contractor shall be fully responsible for the preparation of all such details that relate to such works, the details being subject to approval by the Architect and Engineer prior to submission to the Main Contractor for action. Other items such as fixing of brackets, cables and ductwork and trenching, making good etc. shall be carried out by the Contractor to suit the installation of all these services.

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

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

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

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

The Contractor shall pay particular attention to the fixing and alignment of items. All items shall be installed square, true and perpendicular to floors i.e. as shown on Drawings and as may be required at site to the Engineer's approval.

3.8 Commissioning of the Lift Installation

The Contractor shall instruct the Employer's Maintenance Engineer or his representative on the operation and maintenance of the various components forming the lift installation and shall provide drawings, diagrams and manuals to ensure the Maintenance Engineer or his representative is completely conversant with such installations.

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

3.9 Regulations and Standards

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

Lift Services

- (i) The current edition of the IEE Wiring Regulations, BS 7671;
- (ii) Relevant International Standards;
- (iii) Current Regulations and by-laws of KPLC;
- (iv) European Committee for Standardisation CEN, 1986 Part: 1, 5, 6, 7, 8, 9 and 10 and European Norm EN 81 - 1, 1985.

- (v) British Standard Practice 5655: 1986 BS 5810 & 5619 for the lifts and BS 5656 for the escalators issued by the British Standards Institution.
- (vi) ISO 8383.
- (vii) The requirements of the Chief Inspector of Factories for the Government of Republic of Kenya.
- (viii) Kenya Bureau of Standards and Local By-Laws.
- (ix) The Kenya Factories Ordinance, Cap. 514.
- (x) Kenya Health & Safety ACT
- (xi) Regulations and by-laws of the Ministry of Energy;
- (xii) Nairobi City Council By-Laws;
- (xiii) Current Regulations of Telkom Kenya;
- (xiv) By-laws of the Electricity Regulatory Commission (ERC);
- (xv) Current Regulations of Kenya Airports Authority;
- (xvi) Any other duly constituted authorities' regulations having jurisdiction over the Works;
- (xvii) Water Supply and Sewerage Authority's Regulations;
- (xviii) The Specification and accompanying documentation and Drawings;
- (xix) The Working Drawings produced by the Contractor and approved by the Engineer.

The Contractor shall undertake all modifications demanded by the authorities in order to comply with the regulations, and produce all certificates, if any, for the authorities at no extra charge.

3.10 Quality of Materials

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

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

Wherever the term 'similar to' is used in these Technical Specifications in reference to any item, the word will be understood to mean type and quality of the equipment and not preference.

Where particular manufacturers only are specified herein no alternative makes will be considered without good reasons.

All materials shall be of good quality, suitable for the purpose specified, and to the approval of the Engineer.

3.11 Workmanship

The Tenderer shall take into consideration, when pricing his tender, that there will be other specialists working alongside him. Any disruptions to the existing services must therefore be kept to a minimum, and in this respect the Contractor shall include in his prices for carrying out Works outside normal working hours as may be directed by the Engineer. No claim will be entertained where abnormal working hours are required to meet this requirement and completion of the works within the specified Contract period.

The Contractor shall be fully responsible for co-ordination of installation of all services. For all services involving ducted wiring, such wiring shall be capable of future addition or maintenance.

The Contractor shall be deemed to have included in his tender prices for relocating switches, terminal points, ductwork, outlets and fixtures in positions and/or locations at least one metre in any direction from the positions indicated on the Drawings. Within these limits no variations in the Contract sum will be made unless the work has already been executed in accordance with previously approved Working Drawings.

Only qualified and certified persons shall be allowed to carry out installation work. The Works shall be performed in a neat and workmanlike manner.

The Contractor shall take every precaution to avoid damage to the existing property including roads, paved walkways, grassed areas, landscaping, cables, drains and other services, and he will be held responsible for and shall make good all such damage at his own expense to the satisfaction of the Engineer.

The Contractor will be responsible for the exact runs and placing of pipework, conduit, boxes, ductwork and accessories that are to be cast in concrete, ceilings, floors, walls, columns and beams, and for the proper fixing of the pipework and accessories to the shuttering and the steel reinforcement work.

Where ductwork is to be concealed, the pipes etc shall be in an exact position relative to the finished plaster or such other finishes as may be applied to enable adequate cover to be applied.

Where services are run above the false ceilings the Contractor shall ensure that access to all services is readily available such that future maintenance can be carried out without difficulty. Full details shall be included on the Working Drawings such that the Engineer can give consideration to the Contractor's proposals.

3.12 Setting out of work

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

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

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

3.13 Erection and checking of work

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

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

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

The Contractor shall supply and install all supports, fixings, brackets and similar items as may be necessary for the completion of the installation of the services as specified and as shown on the Drawings.

3.14 Site performance and acceptance tests

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

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

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

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

3.15 Test records

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

3.16 Dust, insect and vermin proofing

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

3.17 Painting and finishing

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

Paintwork will be measured in the builder's work in connection with the Engineering Element. Any additional work will be measured in accordance with the conditions of the Contract.

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

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

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

3.18 Labels

All items of electrical plant, Sub-main distribution boards, etc. shall be neatly and clearly labelled externally with identification marks corresponding with those on Drawings or in Technical Specifications. Final details shall be agreed upon by the Contractor and the Engineer.

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

All main switches, circuit breakers, isolators, valves, motors, switch-fuse, consumer service units, and distribution boards etc. shall be neatly and clearly labelled externally with identification marks corresponding with those on the Drawings or Technical Specifications. Final details shall be agreed upon by the Contractor and the Engineer.

All labels/plates shall be in English.

3.19 Specialist manufacturers

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

The Tenderer shall, on submission of his tender, indicate the names of all proposed specialist manufacturers and specialists, together with the precise sections of the Works for which each will be responsible. The Contractor may be required to seek alternative manufacturers or Contractors or to accept specialists nominated by the Employer; it shall be deemed that the prices entered in the tender include for this requirement. For plant and equipment supplied by suppliers other than the Contractor, the Contractor will be required to furnish an agreement between himself and the supplier stating that he is authorised by the supplier to deal in the plant and equipment and that he is authorised to stock the necessary spare parts or that the Employer will be authorised to revert to the supplier in the event of breakdown of the plant or equipment.

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

3.20 Interference with the existing Works

The Contractor shall not interfere in any way with any existing works whether the property of the Employer or of a third party and whether the position of such works is indicated to the Contractor by the Engineer or not. The exception being where such interference is specifically described as part of the Works either in the Contract or in any instruction from the Engineer.

3.21 Protection of Works

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

3.22 Sundries

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

3.23 Schedules of technical data

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

3.24 Copies of orders

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

3.25 Inspection and tests at Manufacturer's Works

The Engineer, and his duly authorised representative, shall have at all reasonable times access to the Contractor's premises to inspect and examine the materials and workmanship of the mechanical and electrical plant and equipment during its manufacture there. If part of the plant and equipment is being manufactured on other premises, the Contractor shall obtain for the Engineer and for his duly authorised representative permission to inspect as if the plant and equipment was manufactured on the Contractor's own premises. Such inspection, examination or testing, if made, shall not relieve the Contractor from any obligation under the Contract.

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

SECTION 4

- ◆ **Particular Specification**

**PROPOSED CANCER CENTRE AT
THE KISII TEACHING AND REFERRAL HOSPITAL**

2 No. PASSENGER/ BED AND 1 No. SERVICE LIFT INSTALLATIONS

PARTICULAR TECHNICAL SPECIFICATIONS

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SECTION 4

4 TECHNICAL SPECIFICATION FOR THE PASSENGER/ BED & SERVICE LIFT

4.1 Extent of work

This sub-contract shall include for the supply of 2 No. passenger/ bed lifts and 1 No service lift equipment, transport to site, off loading, labour installation, fixing, connecting, commissioning and delivering up clean and in working order in every detail for the following passenger/ bed and service lift installation.

Passenger/ bed and service Lift shall be provided where shown on the drawings, and shall be supplied and installed as described herein and shown on the drawings, and in accordance with BS 2655 and BS EN 81-1 or other equal and approved standards and in conformity with current good practice.

Installation shall include all fixings, machinery and car supports, guides and counter weights, wire ropes, motors and drives, controls and safety devices, hydraulic buffers, openings, trims, and handrails, doors, jambs and tread plates, internal shaft safety fascia plates and other items, necessary for the erection and setting to work of the equipment, all in accordance with this Specification and the Drawings herewith, and rendering the passenger and service lift fully operational to the complete satisfaction of the Engineer.

4.2 Drawings

The work carried out under this contract shall be in accordance with all Drawings issued herewith.

The contractor shall provide two copies of his own working drawings for approval prior to commencing installation of the equipment. The drawings shall show the builders' work required.

3.3 Traffic Analysis

The contractor shall provide together with his tender a traffic analysis for the Proposed Cancer Centre Hospital with an approximate population of 500 members of staff and 2000 visitors per day.

4.1 Passenger/ bed and service lift general requirements

4.1.1 Passenger/ bed and service lift

The passenger/ bed and service lift shall be electrically operated and shall serve the floors as stated below. The building shall not necessarily be provided with an emergency generator power. In the event of mains failure, all passenger and service lift stop, cancel all calls and then using the stored battery power supply, the cars proceed, one at a time, to the next landing, stop and the doors remain open. Thereafter no passenger and service lift would be in service alone until power is restored.

The finished appearance of all equipment and components exposed to public view is required to be of a high architectural standard, **and all panels, covers, trims, materials and finishes shall be included and provided aesthetically appealing stainless steel cladding covers to the full glass back lift car drive pulleys and equipment below and above the car** accordingly, to the satisfaction of the Engineer and with prior approval of the architect. In particular, screw fixings to cover panels and the like shall be avoided unless specifically approved in each case.

Basic Data for Passenger/ Bed and Service Lift	
No of passenger and service lifts	2
Passenger lift Type	1 No. Standard Passenger/ goods Lifts; 2 No. passenger/ bed lifts – Duplex operation
Nominal Capacity	1 No. 1000kg (13 passenger) lifts 2 No. 2000kg (26 passenger) lifts
Speed	1.0 m/s metre per second passenger lifts
Number of stops	Lift No.1 & 2 - 2000kg – Duplex operation – 5 stops; Lift No. 3 - 1000kg - Simplex– 5 stops See details in architectural sections
Floors served	See details in architectural sections
Travel distance	See details in architectural sections
Motor Room Position	Machine Room Less
Power Supply	415V, 3-phase, 50Hz
Number of openings	Same as No. of stops, openings in line
Operation	Lift No.1 & 2- Duplex; Lift No.3 - Simplex;
Special operation	Automatic operated for passenger lifts Intercom communication for emergency, use automatic re-levelling of passenger lift car, independent service, fireman service and stand-by power operation.
Control system	Fully software-based Microprocessor programmable control system

Drive	Gear less with AC Variable voltage, variable frequency drive (VVVF) system
Platform size	See details in Data Sheet Appendix A
Buffers	Hydraulic
Landing Doors	<p>Double panel automatic centre openings, 2No. 26 passenger lifts - 1200mm x 2100mm - stainless steel: or as per manufacturer details;</p> <p>Double panel automatic centre openings, 1No. 13 passenger/ service lifts - 1000mm x 2100mm - stainless steel: or as per manufacturer details;</p>
Car Doors	<p>Double panel automatic centre openings, 12No. 26 passenger lifts - 1200mm x 2100mm - stainless steel: or as per manufacturer details;</p> <p>Double panel automatic centre openings, 1No. 13 passenger/ service lifts - 1000m x 2100mm - stainless steel: or as per manufacturer details;</p>
Door Operation	High speed, heavy duty variable frequency driven door operator, intensive traffic
Signals	Call acknowledging lights and gong, waiting passenger lanterns, at all openings
Car Operating Panel	One passenger lift digital LED display control panel per passenger lift cab

a. Passenger and Service lift wells and openings

Details of passenger lift wells, machine rooms, and openings are provisional as shown on the drawings. However, the final sizes as per manufacturer requirement for all the passenger lifts as follows - See details in Data Sheet Appendix A -:

Lift No. 1 & 2:

Shaft Size: 2950mm Width x 3000mm Depth: or as per manufacturer requirement for the passenger lift

Height above the highest level served (headroom): 4700 mm or as per manufacturer requirement for the passenger lift

Pit Depth: 1500mm or as per manufacturer requirement for the passenger lift

Lift No. 3:

Shaft Size: 2500mm Width x 1900mm Depth: or as per manufacturer requirement for the passenger lift

Height above the highest level served (headroom): 4700 mm or as per manufacturer requirement for the passenger lift

Pit Depth: 1500mm or as per manufacturer requirement for the passenger lift

The Contractor shall ensure that his equipment will fit the spaces provided, or in the event that he is unable to meet this requirement, shall clearly indicate what alterations are necessary, the cost of which is to be included in his Tender Price.

The Contractor shall ensure that all rough openings in the passenger lift well are constructed of dimensions suitable to accept his plant and equipment, and shall provide and fit all trims, doors, jambs and other items accordingly. Additionally, he shall supply and install all guide rails, clamps, structural supports, spacers, guards, tread plates, sight guards, internal shaft safety fascia plates and other items necessary for the complete installation and setting to work of his equipment. In particular, screw fixings to cover panels and the like shall be avoided unless specifically approved by the engineer and architect in each case.

The Contractor shall ensure that his equipment will fit the spaces provided and indicated on the drawings, or in the event that he is unable to meet this requirement, shall clearly indicate what alterations are necessary, the cost of which is to be included in his Tender Price.

The lifts Contractor shall ensure that all rough openings in the escalator well are constructed of dimensions suitable to accept his plant and equipment, and shall provide and fit all trims, jambs and other items accordingly. Additionally, he shall supply and install all guide rails, clamps, structural supports, spacers, guards, tread plates, sight guards, internal shaft safety fascia plates and other items necessary for the complete installation and setting to work of his equipment all to the approval of the engineer and architect. In particular, the lifts sub-contractor shall ensure that all escalator drive equipment are aesthetically clad with stainless steel sheet covers to the satisfaction and approval of the architect. In particular, screw fixings to cover panels and the like shall be avoided unless specifically approved in each case.

b. Machinery space

Spaces for the passenger lift machinery is as shown on the Drawings. The Contractor shall layout and install his equipment in the spaces provided, having proper regard for ease of access for maintenance and inspection, and for the safety of maintenance staff. He shall

ensure that adequate ventilation is provided to his plant, and shall co-ordinate with work being carried out by the electrical sub-contractor in terms of location of lighting fittings in relation to his equipment, and any other such items.

All doors or panels provided to give access to machinery and equipment spaces for normal maintenance purposes shall be secured against unauthorised access. Opening, or removal, of such doors or panels shall expose a permanent notice reading:

DANGER, UNAUTHORISED ACCESS PROHIBITED / DANGER, ACCESS NON AUTORIS'E INTERDIT.

The characters shall not be less than 13mm high. The notice shall not be affixed to the back of the door or panel.

The following information with respect to the machinery must accompany the tender: -

Make: _____ KW Rating: _____
Size : _____
Voltage: _____
Power consumption at full load, KW : _____
Revolutions per minute, r.p.m: _____
Full load current: _____
Starting Current: _____
Duration of Starting Current: _____
Power Factor, cos - ϕ : _____
Acceleration time, sec: _____
Retardation time, sec: _____

The motors must be provided with overload and phase failure cut out devices. The machine shall be provided with a manually operate turning device for lowering the car to the nearest landing in case of power failure. The system must prevent engaging of the turning devices, until the power supply for the motor is switched off.

The motor, when not in operation, has to start automatically by the registration of a call. The machinery and controllers shall be placed on vibration dampers in the passenger lift shaft. Any steel structures or supporting beams for machinery are to be included in this contract.

If the sub-contractor finds it necessary to place the machinery on special concrete foundations, the main contractor must be advised by the sub-contractor before casting of the relevant slabs

The total passenger lift motor and drive mechanism must be dimensioned for the full load in continuous operation and for a temporary overload of 10%. The sub-contractor must provide information on the highest permissible temperature in the passenger lift shaft, and provide information about the heat produced by the entire installation.

A danger notice with the words "DANGER, PASSENGER LIFT MACHINERY, UNAUTHORISED ACCESS PROHIBITED" / "DANGER, MACHINES D'ASCENSEUR, ACCESS NON AUTORIS'E INTERDIT", shall be fitted on the passenger lift drive by the sub-contractor.

c. Belts / ropes

The passenger lift shall be provided with NEW car and counterweight flat belts or ropes, which shall be of suitable size; construction and number to ensure proper operation of the passenger lift and give satisfactory wearing qualities.

Sheaves to be made of best stainless steel, turned true and grooved for the belts or ropes.

The sheaves shall be of ample diameter for the belts used, and should have a ratio of sheave /belt or rope diameter of not less than 40:1. Sheaves shall be fixed by means of iron beams, which are supplied and installed by the sub-contractor.

Beams must be sound insulated from structural parts.

d. Shaft installations

New guide rails for cars and counterweights shall be provided. The Contractor shall ensure that the rails are placed accurately and fixed firmly to the shaft walls with sufficient spacing between brackets.

The fixing of rails and connection between two or more sections of rail must be in such a manner that the straight and vertical position is not influenced by changes in temperature or ordinary settlement of the structure.

The rubber buffers shall be installed to bring the car and counterweight to rest at the extreme limits of travel, should the car for any reason pass the limit switches.

e. Passenger lift machinery and associated equipment

These shall be completely NEW and shall be of the variable frequency, variable voltage (VVVF), either simplex or duplex selective operation as indicated under section 4.4.1 of this specification.

Lift machines shall be entirely suitable for the application and designed to operate on the electricity supply provided, i.e. 415/240 volt 50 Hz, AC

Various parts of EN81-1 shall be strictly adhered to. In particular attention shall be applied to motors, gear reduction units (if any), brakes, emergency lowering, passenger lift guides, counterweights, buffers, safety gear, passenger lifting ropes, levelling and clearances, limit switches and all safety considerations.

The passenger lift Sub-contractor is to supply and install all necessary safety equipment for the safe operation of the passenger lift, including all passenger lift shaft internal safety fascia plates, fixed so that a passenger cannot trap any part of his body should the passenger lift doors be opened between floors.

f. Passenger/ bed and Service lift drive system

The NEW passenger/ bed lift drive system shall be of the gearless type designed to operate at 1.0 metre/sec with a duty load of 2000Kg and 1000Kg for the 26 and 13 passenger lifts respectively. The passenger lifts shall have the variable voltage, variable frequency, and microprocessor motor control.

The main motors shall be rated for 250 starts / hour and shall operate without vibration, overheating or noise.

Control of the motors shall be provided by a fully closed loop microprocessor system that shall include the following: -

1. A high resolution optical speed encoder, mounted directly onto the motor with a resolution of one pulse/mm of car travel;
2. An electronic load transducer located under the car capable of detecting load changes of 20 kg;

3. An optical position encoder connected directly to the car and capable of measuring 0.4mm movement;
4. A solid state car mounted transducer to verify final floor level position to within 6mm;
5. An alternating current, variable voltage, variable frequency gearless drive system.

The system shall continually monitor car speed, and position and compare its results with a software based flight reference. Any error between reference and actual speed shall be corrected, within 2 milliseconds. Flight reference shall be fully programmable.

The subcontractor will indicate the acceleration rates which shall be adjustable but shall provide the following minimum performance;

Jerk, to be less than 2.5 metre/sec/sec;
Levelling ± 3 mm;

3 metre flight time brake to brake 4 secs;

The following features must also be provided within the lift control panel:

1. Main motor over speed and current protection;
2. Drive over-current protection;
3. Drive over temperature protection;
4. Self Diagnostics;
5. Ability to know car position at all times even during temporary loss OF MAINS POWER.

g. Controllers

NEW passenger lift controllers shall be of the totally enclosed, heavy duty sheet steel cubicle type so mounted in the passenger lift car to give free access to front and rear wiring connections.

An earthing terminal shall be provided on each controller, fitted with a removable link or other easy means of disconnecting. This terminal shall be clearly labelled EARTH.

Provision shall be made for operating the passenger lift from the passenger lift but such provisions shall be inoperative unless all landing and car doors are closed. Push buttons shall be provided on each controller for this purpose and a changeover switch incorporated to render the car interior and landing buttons inoperative when a passenger lift is being operated from the motor room.

An overriding SAFETY control switch shall be provided on the top of each passenger lift car, and with provision for operating the passenger lift car from on top of the car.

The controller shall be fitted with a phase failure and phase reversal relay control. Each controller shall be complete with all equipment and protective devices necessary for the control and operation of the passenger lift as specified herein.

Each passenger lift shall have its Alarm System. An alarm siren will be fitted within 2 metres of the passenger lift shaft main landing. The system shall be complete with batteries and fed by a trickle charger.

h. Control system

The Sub-Contractor shall provide a NEW fully micro-processor-based passenger lift control system capable of simplex or duplex collective operation as is indicated for each lift under section 4.4.1 of the is specification.

Each passenger lift shall have its own controller housed within a sheet steel purpose made cabinet.

The cabinet shall be designed for front access only via lockable doors.

The cabinets shall be ventilated via louvres in the doors. These shall have dust filters provided to ensure only clean air enters. Within the cabinet a fan shall be fitted to ensure good air circulation.

Cabinets shall be spray finished in the manufacturer's standard colours but with the prior approval of the architect.

All fuses shall be of the cartridge type. Transformers shall be floor mounted and earthed. Relays and contactors shall be AC3 or AC4 category as applicable and adequately rated for this purpose. Wire terminations shall be of the plug in or screw type with easy access for testing.

Micro-processor and input-output cards shall be rack mounted and self locking through insertion.

Short circuit, over temperature, phase failure and rope slippage detection shall all be included.

The controller shall have the following operation control modes in its basic form. Full operation and independent service.

Each controller shall have full calculation capabilities so that operation relies upon single controller.

During operation calls placed in the system shall be allocated to the car capable of answering them in the shortest time. To do this each passenger lift controller shall consider the following each time a call is entered. It's car position, car calls registered, car calls allocated, distance from call, and drive status (stopped or running) coincident calls and load in the car.

The system shall be capable of learning building traffic patterns throughout the day and use this information within the call allocation program to ensure optimum service at all times.

Communications between controllers, control to car and hoist way equipment shall be by serial link, with the exception of the safety items. The control system shall be fully re-programmable via a plug in test tool. It shall be possible by use of the tool to check all passenger lift operations including group and safety circuits.

The system shall also have a self-diagnostic facility to speed fault location.

An RS 422A or RS 232 communications port shall be provided for future connection to a passenger lift management system linked to a remote elevator monitoring system for remote monitoring of the operations of all the passenger lift by the Mall Building management and or by the manufacturers by automatic sending of alarm to the Mall building management / manufacturers in the event of a failure.

The control system shall be designed to EN81, BS 5655, and be fully tested before delivery and during commissioning.

i. Passenger/ bed lift car and landing doors

The car and landing doors shall be new to meet the following specifications. The entrance to the passenger lift cars to be provided with two panel automatic centre opening metal sliding doors guided at the bottom by non-metallic shoes sliding in suitable grooves. Passengerlift doors shall be installed both in the car and floor landings.

The passenger lift car must be stopped and prevented from moving should a door be forced open. The car doors and the landing doors must open automatically when levelling; the opening to start as the car is approximately 250mm from the landing.

All doors to the passenger lift shall be solid type of stainless-steel metal construction. The landing and car doors to the passenger lift shall be similar and of approved design, and shall be hung on overhead runner bars and guided by self cleaning tracks in cast or fabricated metal landing and car sills, all arranged to ensure easy running for automatic power operation. The design should have been fire tested in accordance with EN 81.

A safety shoe is to be fixed to each door, the operation of which will reverse the movement of the car and landing doors to the fully open position. In the event of failure of the power operating mechanism, it shall be possible to manually open the car and landing doors at any landing at which the car is standing, by the use of an emergency opening key.

Passenger protection shall be provided by the use of an electronic proximity detector mounted on the leading edge of the car doors. This shall provide a three-dimensional zone of detection in advance of the car doors and detection of an object within the zone shall cause the doors to immediately re-open.

Car and landing doors for passenger lift shall be power operated for automatic opening and closing by means of an approved motorised operating gear fixed to the top of the car. It shall provide high speed operation of the doors and shall have variable speed control. The door operating gear should be capable of opening the passenger lift doors in 1.20 seconds and closing the doors in 2.50 seconds, totally 3.70 seconds for both operations. Smooth operation of the doors shall be achieved.

The controls shall be so arranged that the car and landing doors work in unison, and all doors must be closed before the passenger lift can move. The parking condition shall be with the doors closed.

Electrical and pre-locking mechanical door locks shall be fitted to the landing doors, such that it is impossible for the passenger lift to start until the lock lever has fallen into the mechanically locked position. The car doors, or car gate, shall be fitted with an electrical interlock such that it is impossible to operate the passenger lift until the door or gate is closed. A bilingual notice shall be affixed to the car gates to this effect.

All Electro-mechanical switches and locks shall be arranged for gravity release of switch arms in the event of breakage of any release springs.

It shall also be impossible under normal conditions to open any of the landing doors, other than that at the landing where the car is stationary. For the purposes of maintenance, however, facilities shall be provided for authorised persons to open any of the landing doors or car doors irrespective of the position of the car in the passenger lift shaft, and such facilities shall be concealed and or locked.

An emergency release mechanism should be included with the interlock. In the event of an emergency (or for maintenance) the landing door should be capable of being opened from the landing with an emergency release key. The landing doors should also be capable of being opened manually from inside the passenger lift car, when within the door zone area.

Noise levels produced by the operation of the doors when measured one metre from the landing side shall not exceed 48 dBA.

The complete entrance and operator should comply with the recommendations of BS 5655.

The Contractor shall provide new car doors complete with operators, interlocks, safety devices and sight guards, and all landing doors similarly and including frames, architraves, jambs and other items complete. Door joints shall be heavy gauge pressed type of approved section and material.

Car and door designs are described separately herein-

Landing Doors	Power Operated 2-panel centre opening 1200mm wide by 2100mm high for each passenger lift and 1000mm wide by 2100mm high for each service lift All stainless steel to meet the Architects requirements and prior approval before manufacture
Door Surround	Box section architraves at all levels constructed of stainless Steel, to Architects requirements and prior approval before manufacture
Landing Sills	Stainless Steel together with supports and toe guards at each entrance to Architects requirements and prior approval before manufacture
Landing Indicators	Directional micro-movement buttons at each landing in two risers. The buttons when pressed will indicate by Light Emitting Diode (LED) that the call is accepted Illuminating up and down direction arrows with gong will pre-announce the arrival of each car and be fitted above each entrance at all levels.

j. Standard Passenger/ service Lift Cars

The Sub-Contractor shall supply and install a standard passenger/ service lift car complete. The car frame, which supports the car platform and enclosure, shall be made of solid structural steel with welded, bolted or riveted joints. Bolts used must be positioned for easy adjustment. Where practicable, car dimensions should conform to the recommended standards set out in BS 5655. The cars shall be rigidly constructed and affixed to the car frame.

Car body shall be constructed of solid 25mm seasoned timber or other approved material, and the car body work of not less than 15mm waterproof ply. The whole car shall be sustained by a rigid metal framework. The car roof shall be provided with the necessary working platforms, complete with light and switch, isolating switch for passenger lift power, and electrically interlocked access hatch from within the car.

Ventilation shall be provided to each car, by means of a silently operating fan in the car roof of not less than 250mm diameter, with on-off key switch control on the car panel, and arranged to operate continually except when the car is parked.

A 3 way intercom shall be provided, complete with fixed and trailing cabling from the access point to be provided in the passenger lift motor room, to the maintenance panel and lift car.

Low power consumption LED car lighting shall be key switch controlled, and in addition an emergency battery light shall be provided, and fitted to approval in a position above the car control panel.

k. Standard Lift Car and door finishes

Internal Dimensions (1300 kg)	Width: 1400mm Depth: 1600mm Height: 2300mm or as per manufacturer recommendation
Ceiling	Sheet Steel finished in high grade textured short velvet. Colour to be approved by Architect from standard range;
Lighting	Recessed LED lighting and fluorescent lighting shall be provided.
Handrail	A Polished Stainless Steel circular handrail shall be furnished and installed on two side panels and on the rear panel to be approved by Architect. It shall be at a height of 900mm from car floor to be approved by Architect.
Side walls	Stainless Steel panels to be approved by Architect.
Front return and transom	Clad in satin finished stainless steel.
Car doors, material and finish	Power operated by a quality variable speed D.C. motor and shall have positive-control over the door movement for smooth operation. Doors to be two panel centre opening: 1000mm wide by 2100mm 13 passenger lift. Stainless steel interior surface and visible edge, with good quality finish to be approved by Architect.
Landing doors, material & finish	Stainless steel to match car doors, exterior surface and visible edge, to be good standard of finish to meet Architect's approval.
Floor finish	Resimix granite tiles to approval of the Architect. The floor shall be fitted with a 150mm high skirting of stainless steel.

All details of colour and type of finishing shall be approved by the Architect before commencing refurbishment. Fan is required supplying fresh air to car.

l. Car operating panels

Each car shall be provided with one NEW flush control panel of approved design and Construction, located adjacent to the side of the car door.

The panel shall accommodate a press-button for every floor served, an alarm button, and key switches for car lights and fan.

A suitable matching car position and direction of travel indicator of the illuminated type shall be flush mounted at each landing above the landing door.

The car-operating panel shall be flush mounted on the outside side of the car.

Enclosure: The individual modular units to be mounted within a satin finished Stainless steel panel and suitable for ease of operation by handicapped persons.

The car operating panel shall contain the following:-

- i. Full set of micro movement buttons to correspond to the number of landing levels served, with RED indication of call;
- ii. Emergency Stop Switch;
- iii. Alarm Button;
- iv. Door Open Button;
- v. Door Close Button;
- vi. Switch for Fan;
- vii. Emergency Lighting Unit;
- viii. Digital car position indicator;
- ix. Key-Operated switch for independent service;
- x. Car direction indicator;
- xi. Overload display;
- xii. Interphone Unit;

All details shall be agreed with the Engineer/Architect prior to manufacture of equipment.

m. Operation and control of passenger/ bed and service lift

The passenger lift shall be automatic push button controlled from outside of the car. The operation of a button shall initiate door closing, travel of the passenger lift to the floor selected, and the automatic door opening.

Landing call panels shall be provided accordingly, with up and down buttons and out of service notice of the type, which is visible when illuminated. Panels shall be of approved layout and design.

Appropriate time delays shall be fitted to these functions as necessary, and the empty car, after standing for a selected waiting period, shall assume the parked position with the door closed.

n. Buttons

The car and landing call buttons shall be of the touch/micro-motion mechanical type and utilise solid state electronics with Light Emitting Diode (LED) illumination arranged as a halo around the button. The halo should illuminate in red/green.

Service buttons shall be of the micro-motion type and be identical in appearance to the car and landing call buttons.

o. Car button indicators

The car position indicators shall be red, 16 segment LED's 50mm high and capable of a full alphanumeric display. The LED's shall be protected by a high impact resistant polycarbonate lens.

p. Hall position indicator

Hall position indicators shall be provided at ground floor only and consist of 16 segment LED's protected by an impact resistant polycarbonate lens.

q. Hall lanterns

Hall lanterns shall be provided at all floors above the lobby to advise waiting passengers of the travelling direction of the approaching passenger lift.

The lanterns shall be red on the first floor, green at the ground floor.

The light source shall be a matrix of high intensity LED's which illuminate sequentially to give the illusion of motion in the direction of travel.

The lanterns shall have a wide field of view and have an illumination test facility.

A digitally recorded chime facility shall be provided within the lantern and shall have an adjustable volume control.

The hall lantern shall be framed with a satin finish stainless steel and protected with a high impact resistant polycarbonate lens.

r. Mains and standby power supply and electrical installations

Three phase 415/240 volt 50 Hz mains and standby electricity supply Isolator is to be provided to the passenger lift switchboard position in each case by the electrical sub-contractor.

In the event of a break from the mains power supply, the designated elevator(s) will pick power from the standby generator supply and resume normal service. The other elevators will be out of service. The number of designated elevators to be put back to services will be dependent of the availability of adequate power standby supply and will be discussed and agreed with the Engineer prior to ordering of lift equipment.

The Passenger lift Contractor shall supply and install the NEW passenger lift control panels complete with main isolators, circuit protection, and other items as necessary, carry out all further wiring in connection with the passenger lift installations, and set to work.

All motors and switchgear shall be rated for operation at 240V/415V 50Hz. Relays and components must be tropicalised.

The installation must comply with the IEE wiring Regulations. All wiring shall be carried out in a neat and orderly manner. Cables run on walls or ceilings to be in a straight line and right angle bends enclosed in steel ducting.

Connections to equipment more than 400mm from walls shall be run from the wall in conduit cast in the floor to a connector box fixed upright adjacent to the equipment and through flexible conduit to the equipment.

All electrical switchgear must be clearly labelled.

All fixed wiring shall be installed in screwed steel conduit, and all equipment, main isolators, controls, and other items provided as specified herein. All trailing cables shall be to BS EN 50214 (1998) and properly supported, fixed and terminated.

Contactors and their components shall be rated for frequent duty, and shall be amply sized in terms of current rating.

All electrical apparatus must be adequately suppressed in order to prevent interference with radio, television, radar and other similar equipment to the satisfaction of the Engineer.

The entire installation shall in each case be effectively bonded and earthed.

s. Silence of operation

The Contractor shall guarantee the passenger lift installation, gear and moving parts to operate in a smooth and silent manner without vibration or jerks to the satisfaction of the Engineer. All passenger lift supports shall be of suitable dimensions to carry passenger lift gear and shall be of sufficient strength to withstand rigidly the operational stresses. All supports and gear shall be fixed with suitable anti-vibration and sound insulation material.

The Contractor shall include in his tender for the supply and installation of all necessary anti-vibration material, which shall be of an approved make.

t. Tests

The passenger lift will be subject to tests during erection and on completion by the Engineer, and will not be accepted unless they comply with all the conditions and specifications.

The whole or part of the equipment may be inspected by the Engineer at the maker's Works before delivery and the passenger lift manufacturer shall provide all facilities to facilitate for such an inspection. It shall be deemed that the sub-contractor has included in his prices all costs associated with the Engineer's inspection.

After erection the following tests shall be included in the series of tests which shall be carried out in the presence of the Engineer or his duly appointed representative: -

- a) that speeds comply with the specification;
- b) the cars to be loaded to 10% over specified full load and each passenger lift operated for complete travel;
- c) both up and down directions;
- d) determine that all safety devices comply with conditions and specifications, and that all electrical and mechanical braking equipment complies with the specifications;
- e) determine suitability of switch gear and wiring;
- f) determine that current consumption complies with that quoted in the Tender.

The contractor will be required to provide all necessary instruments for carrying out tests including insulation resistance of the wiring.

u. Schedules

The Tenderer shall complete the schedules provided herewith, and shall submit such further information as is required or as may be necessary in order to fully describe his equipment and installations.

v. Certificates upon completion

Upon completion of the passenger lift and after commissioning to the Engineer's satisfaction it is the responsibility of the passenger lift contractor to provide a full set of passenger lift test and inspection certificates in accordance with BS 5655 (EN 81-2).

In addition, a full set of certificates completed in full and signed and approved by the Kenya Government Factory Safety Inspector is to be provided. It will be Sub-contractor's responsibility to get the passenger lift approved by the Factory Safety Inspector. It shall be deemed that the Sub-Contractor has included in his prices all costs associated with the statutory approvals.

w. Spare parts

The Lift Sub-Contractor shall guarantee to hold complete stock of spare parts at all times and provide qualified staff trained in maintenance of the type of passenger lift used, to maintain the passenger lift equipment in good working order. Should any spare part not be available locally or local technicians not be able to rectify faults, the Sub-Contractor shall provide an undertaking from their principals to supply the necessary spare parts and send technicians within seven days of such occurrence, at their own cost. A written undertaking by the principals shall be included as Appendix A to this Contract, and shall form part of this Contract.

x. Maintenance agreement

The Sub-Contractor shall submit a detailed proposal for a five-year maintenance contract after expiry of the initial 12-month maintenance period, which, after agreement with the Employer, shall constitute a part of this Contract.

y. Passenger lift not in immediate use

When conditions do not permit a passenger lift to be taken into normal service immediately following completion and acceptance, it should be immobilised. The Main Contractor should take effective precautions against damage, especially damage to equipment from dampness and builders' debris, until such time as the passenger lift is made operational.

A separate service contract shall be made with the passenger lift contractor to make regular visits during this period, to inspect, lubricate and report on the condition of the passenger lift. As this is a sub-contract, such necessary service contract shall be made with the Main Contractor. During the inspection it is desirable that the passenger lift shall be moved under power. A date should be agreed with the passenger lift Sub-Contractor from which the guarantee period will commence.

z. Temporary use of passenger lift

If the Sub-Contractor intends to permit temporary use of a passenger lift by some other party such as the Main Contractor, before taking it into normal service, so that it is not immobilized, then the responsibilities of those concerned should be clearly defined and agreed. In addition to the precautions noted in Clause y above, it may be necessary to arrange temporary insurance cover.

SECTION 5

- **Data Schedules**

DATA SCHEDULES

PART I

GENERAL NOTES

The Tenderer shall complete all Schedules. Schedules shall be read in conjunction with the Specification as defined herein.

Completion of the technical schedules shall not relieve the Sub-contractor from complying with the requirements of the Specification except as may be approved by the Engineer

The total prices in the Main Summary of Price Schedule shall be deemed to include for the whole of the Sub-contract works in accordance with the Specification.

PART II

TECHNICAL DATA FOR TENDERED EQUIPMENT

(To be completed by the Tenderer)

1 HOSPITAL BED-STRETCHER ELEVATOR PASSENGER LIFT

- a) Make/Manufacturer: _____
- b) Place of manufacture: _____
- c) Motor Size h.p. (single or 3-phase) : _____
- d) Power consumption at full load, kW: _____
- e) Revolutions per minute r.p.m. : _____
- f) Full load current, A: _____
- g) Starting current, A: _____
- h) Duration of starting current, sec. : _____
- i) Power factor, cos phi: _____
- j) Acceleration time, sec: _____
- k) Retardation time, sec: _____
- l) Control system: _____
- m) Speed (m/s) : _____
- n) Capacity (kg) : _____

I. DEVIATION FROM THE SPECIFICATION

The Tenderer shall give below details of any Specification, or any other deviations, omissions, additions or alternatives in respect of sets which he is offering.

If any detail is not available, write "None" against the item.

PART III

DATA SCHEDULE A – SPECIAL TOOLS

The Tenderer shall list hereunder and price all tools which he considers necessary and which he will provide in accordance with the Specification.

Item	Description	Price (USD)
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TOTAL FOR SPECIAL TOOLS Carried forward to Main summary (USD.).....

PART IV

DATA SCHEDULE B – SPARE PARTS

The Tenderer shall list hereunder and price all tools which he considers necessary and which he will provide in accordance with the Specification.

Item	Description	Price (USD)
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TOTAL FOR SPARE PARTS Carried forward to Main summary (USD).....

PART V

DATA SCHEDULE C – SUB-CONTRACTORS

The Tenderer shall list hereunder and price all tools which he considers necessary and which he will provide in accordance with the Specification.

Item	Name and Address of Contractor
1.	
2.	
3.	
4.	
5.	
6.	
7.	

PART VI

DATA SCHEDULE D – LAND ON SITE REQUIRED

The Tenderer give hereunder details of the area of land that he requires at site for his offices, workshops and storage

◆ **SECTION 6**

◆ **Standards**

SCHEDULE OF APPLICABLE ELECTRICAL SERVICES STANDARDS

The following BS standards are the general specifications used for the electrical services. The latest revised or superseding versions shall apply.

BS 88	Part 1	1988	Cartridge fuses for voltages upto and including 1000V a.c. and 1500 d.c Specification for general requirements
BS 89	Part 3	1990	Direct-Action Indicating Electrical Measuring Instruments and their Accessories Specification for special requirements for ammeters and voltmeters
BS 90		1975 (1999)	Specification for direct acting electrical recording instruments and their accessories
BS 731	Part 1	1952	Flexible steel conduit for cable protection and flexible steel tubing to enclose flexible drives. Flexible steel conduit and adaptors for the protection of electric cable
BS 1363	Part 3	1989	13 A Plugs, socket outlets and adaptors Specification for adaptors
BS 1376		1974 (1985)	Specification for colour of light signals
BS 2692	Part 1	1986	Fuses for voltages exceeding 1000V a.c. Specification for current-limiting fuses
	Part 2	1956	Expulsion Fuses
BS 3676	Part 1	1989	Switches for household and similar fixed electrical installations Specification for general requirements
BS 4533	Part 102		Luminaries Specification for fixed general purpose luminaries
BS 4568	Part 1	1970 (1993)	Specification for steel conduit and fittings with metric threads of ISO form for electrical installations Steel conduit, bends and couplers
BS 4607	Part 1	1984	Non-metallic conduits and fittings for electrical installations Specification for fittings and components of insulating material
	Part 2	1970	Rigid PVC conduits and conduit fittings. Imperial units
BS 4999	Part 0	1987	General requirements for electrical rotating machines Specification introduction and information on other parts
	Part 111	1987	Specification for built in thermal protection for electric motors rated at 660V a.c. and below
	Part 143	1987	Specification for tests
BS 4778	Part 3.1	1991	Quality vocabulary Guide to concepts and related definitions
	Part 3.2	1991	Glossary of international terms
BS 5000			Rotating electrical machines of particular types or for particular applications
BS 5308	Part 1	1986	Instrumentation Cables Specification for polyethylene insulated cables
	Part 2	1986	Specification for PVC insulated cables
BS 5311		1996	Specification for high-voltage alternating current circuit breakers
BS 5424	Part 2	1987	Low-voltage controlgear. Specification for semiconductor contactors (solid state contactors)

	Part 3	1985	Specification for controlgear for voltages up to and including 1000 V a.c. and 1200 V d.c. Additional requirements for contactors subject to certification
BS 5467		1997	Specification for 600/100V and 1900/3300V armoured electric cables having thermosetting insulation
BS 5486			Low-voltage switchgear and control gear assemblies
BS 5733		1979	Specification for general requirements for electrical accessories
BS 5953	Part 1	1980	Guide on power transformers Application of power transformers
BS 6004		1991	Specification for PVC insulated cables (non-armoured) for electric power and lighting
BS 6007		1991	Specification for rubber insulated cables for electric power and lighting
BS 6207		1991	Mineral insulated copper sheathed cables with copper conductors
BS 6231		1990	Specification for PVC-insulated cables for switchgear and control gear wiring
BS 6346		1997	Specification for 600/1000 V and 1900/3300 V armoured electric cables having PVC insulation
BS 6480		1988	Specification for impregnated paper-insulated lead or lead alloy sheathed electric cables of rated voltages up to and including 33000 V
BS 6500		2000	Electric cables. Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments
BS EN ISO 6817		1997	Measurement of conductive liquid flow in closed conduits. Method using electromagnetic flowmeters
BS 7365		1990	Specification for hard drawn aluminium wire overhead line conductors
BS 7430		1998	Code of practice earthing
BS 7655	Part 0 Part 1.3	1997	Specification for insulating and sheathing materials for cables . General introduction Elastomeric insulating compounds. XLPE
BS 7671		2001	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition
BS 7718		1996	Code for practice for installation of fibre optic cabling
PD 6399			Guide to insulation co-ordination within low voltage systems including clearances and creepage distances for equipment
BS CP 1016			Code of practice for the use of Semiconductors Devices
PO D2155 C			Solderless connections made by Wire-Wrapping Method (or equivalent standard)
PO D2237			Terminal tags for solderless wrapped connectors
BS EN 60076	Part 1	1997	Power Transformers General
BS EN 60470		2001	High voltage alternating current contactors and contactor-based motor starters

BS EN 60871	Part 1	1998	Shunt Capacitors for a.c. power systems having a rated voltage above 1 KV General testing and rating. Safety requirements. Guide for installation and operation
BS EN 60081		1998	Double capped fluorescent lamps. Performance specification.
BS EN 60099	Part 1	1994	Surge arresters Non-linear resistor type gapped surge arresters for a.c. systems
BS EN 60265-2		1994	Specification for high-voltage switches. Specification for high-voltage switches. High-voltage switches for rated voltages of 52 kV and above
BS EN 60898		1991	Specification for circuit breakers for overcurrent protection for household and similar installations
BS EN 60617:2	Part 2	1996	Graphical symbols for diagrams Symbol elements, qualifying symbols and other symbols having general application
BS EN 60309	Part 1	1998	Plugs, socket outlets and couples for industrial purposes General requirements
BS EN 50086	Part 1	1994	Specification for conduit systems for electrical installations General requirements
BS EN 50173		1996	Information technology - generic cabling systems
BS EN 50174	Part 1	2001	Information technology. Cabling installation. Specification and quality assurance
	Part 2	2001	Information technology. Cabling installation. Installation planning and practices inside buildings
BS EN 60947	Part 4.1	1992	Contactors and motor starters Electromechanical contactors and motor starters
BS EN 60298		1996	A.C. metal enclosed switchgear and control gear for rated voltage above 1 kV and up to and including 52 kV
BS EN 60129		1994	Specification for alternating current disconnectors and earthing switches
BS EN 60947	Part 1	1998	Specification for low-voltage switchgear and control gear General Rules
	Part 3	1999	Switches, disconnector, switch disconnectors and fuse combination units
BS EN 60265	Part 1	1998	Specification for high voltage Switches for rated voltage above 1 kV and less than 52 kV
BS EN 60439	Part 1	1999	Specification for low-voltage switchgear and control gear assemblies Type-tested and partially type-tested assemblies
BS EN 60529		1992	Specification for degrees of protection provided by enclosures (IP Code)
BS 60889		1997	Hard drawn aluminium wire for overhead line conductors

SECTION 7

- ◆ **Drawings**