PROPOSED UMMA UNIVERSITY STUDENTS' ACCOMMODATION

FOR

UMMA UNIVERSITY

CONTRACT CONDITIONS, SPECIFICATIONS AND BILLS OF QUANTITIES

FOR

ICT STRUCTURED CABLING AND SECURITY INSTALLATION

TENDER NO. UUT/04/2026

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PROPOSED UMMA UNIVERSITY STUDENTS' ACCOMMODATION

Contract Conditions, Specifications and Bills of Quantities

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INVITATION TO TENDER

TENDER NAME AND DESCRIPTION OF WORKS: PROPOSED ELECTRICAL INSTALLATIONS – ICT AND SECURITY WORKS

1. Umma University invites sealed tenders for the Proposed Electrical Installations – ICT and Security works
2. Tendering will be conducted under appropriate procurement method selected by the procuring entity using a standardized tender document. Tendering is open to eligible, qualified and interested tenderers.
3. A complete set of tender documents may be downloaded at the university website umma.ac.ke at a cost of 5,000/= payable to KCB Bank account number 1198 158468. Payment receipt to be attached to the tender document.
4. Tenders shall be quoted be in Kenya Shillings and shall include all taxes. Tenders shall remain valid for (120) days from the date of opening of tenders.
5. All Tenders must be accompanied by a Tender Security (2% of Contract Value)
6. The Tenderer shall chronologically serialize all pages of the tender documents submitted.
7. Completed tender documents **MUST** be submitted to the University tender box at the reception main campus in Kajiado so as to be received by **23rd July 2026 at 11.00 am.**
8. Tenders will be opened immediately after the deadline date and time specified above or any deadline date and time Specified later. Tenders will be publicly opened in the presence of the Tenderers' designated representatives who choose to attend at the address below.
9. Late tenders will be rejected.
10. Mandatory pre-tender site visit: **17th June 2026 at umma university - kajiado main campus starting from 10.00 am**
11. Every bidder shall be physically represented by one technical person. The representative should produce a copy of National ID and an original letter (signed and stamped) from the company authorizing them to represent the company in the pretender site visit.
12. NOTE: Tenderer's name MUST be in the pre tender site visit attendance register otherwise, the site visit certificate will be disregarded.
13. The addresses referred to above are:

A. *Address for obtaining further information and for purchasing tender documents*

(1) Name of Procuring Entity. **Umma University**

(2) Physical address for hand Courier Delivery to an office or Tender Box (City, Street Name, Building, Floor Number and Room). Kajiado along Namanga Road.

(3) Postal Address 713-01100 Kajiado

B. Name, telephone number and e-mail address of the officer to be contacted.

procurement @umma.ac.ke, Tel.0746790207

C. Address for Submission and Opening of Tenders.

1) Name of Procuring Entity. Umma University

2) Postal Address: Vice Chancellor P.O. Box 713-01100 KAJIADO

3) Physical address for hand Courier Delivery to an office or Tender Box (City, Street Name, Building, Floor Number and Room). Kajiado Main Campus, A long Nairobi Namanga Road.

UMMA UNIVERSITY,
P.O. BOX 713 – 01100,
KAJIADO, KENYA

1a. FORM OF TENDER

Dear Sirs,

PROPOSED UMMA UNIVERSITY STUDENTS' ACCOMMODATION, KAJIADO

I/We understand that the works, the subject of this tender include

ICT STRUCTURED CABLING AND SECURITY INSTALLATION

.....

I/We undertake in accordance with the particulars set out in the preliminaries and to the satisfaction of the Engineer, to execute and complete the Contract works within……..……weeks and as per the specifications and drawings for the sum of Kenya Shillings.

(KShs.) ……..

I/We confirm that this Tender is subject to adjustments by any variation ordered by the Engineer.

I/We undertake to commence the works within 7 days from the date of official confirmation of acceptance of the tender.

I/We understand that you are not bound to accept the lowest or any tender and that no expenses incurred by us in the preparation of this tender will be allowed.

I/We agree that this tender shall remain valid for, and shall not be withdrawn within Ninety (90) days from the final date of submission of tenders and in the event of your acceptance to execute formal contract agreement with the client.

For and on behalf of.....

.....

Official stamp: .....

Signed by: ..... Date: .....

1b. FORM OF UNDERTAKING

We _____

Of _____

are willing to act as Surety and to be bound to the Client in the sum equal to Ten percent (10%) of the contract sum, for the due performance by

_____ (Tenderer)

Of P.O. Box

_____

of a Contract which he/ they contemplate(s) entering into with the Client for the supply, installation, testing and commissioning of the ICT Structured Cabling Installation as described in this document and the accompanying relevant drawings **Proposed Umma University Students' Accommodation, Kajiado.** According to the terms of the Form of Bond, a copy of which has been inspected by us without addition of any limitations

We agree to enter into a Bond under the above-mentioned terms when and if called upon to do so.

Signature:_____

Official Rubber Stamp & Date: _____

Witness: _____

To be completed by the proposed surety
And returned with Tender Documents

1c. **FORM OF BOND** (TO BE SUBMITTED BY NOMINATED BIDDER)

(To be used with agreement and Schedule of Conditions of Building Contract.)

KNOW ALL MEN BY THESE PRESENTS that we _____

_____ (SURETY)

Of_____

ARE BOUND to_____ (MAIN CONTRACTOR / CLIENT)

Of _____

In the sum of KENYA SHILLINGS _____

_____

To be paid by us to the said _____ (MAIN CONTRACTOR / CLIENT)

WHEREAS by an agreement in writing dated _____

between _____

(CONTRACTOR) of _____

contracted with the said _____ (MAIN CONTRACTOR / CLIENT)

to (description of works)_____in the said agreement particularly described and conformable thereto. NOW THE condition of the above written bond is such that if the said _____(CONTRACTOR) is / their executors, administrators or assignees shall conform to the said agreement then the above written bond to be void otherwise to remain in full force. Provided always and it is hereby agreed and declared that the liability of us to the said

_____ (SURETY) under the above written bond shall not in any way be discharged or impaired by reason of or any breach or breaches (willful or otherwise) of the said agreement committed with or without the knowledge or consent to the said _____ (CONTRACTOR) by or on behalf of, with the knowledge or consent of the said _____ (MAIN CONTRACTOR / CLIENT)

In witness whereof we have hereunto set our hands this _____day of _____In the Year_____

_____ _____

Witness Surety, Authorized by power of Attorney

SECTION 02:

2a. PRELIMINARIES AND GENERAL CONDITIONS

1. NAMES OF PARTIES

The following will be inserted in the Articles of Agreement: -

Client:	M/S Umma University
Architects:	M/S Tectura International Ltd.
Quantity Surveyors:	M/S Makon Consultants
Services Engineers	M/S Norkun Intakes Ltd

2. DESCRIPTION OF SITE

The site of the works is in Umma University, Kajiado. The works will be carried out adjacent to occupied premises. Due care will be required during construction so that the occupants and facilities in the adjacent premises and the premises themselves are not interfered with in any way.

The tenderer is recommended to visit the site and will be deemed to have satisfied themselves with regard to the relevant details of preliminary. If the tenderer, for whatever reason, feels specialized attendance will be required, with significant financial implications or requires specialized mobilization to start the works, he should spread the cost of such works in his unit rates.

No claims whatsoever by the Contractor for additional payment will be allowed on the grounds of any misunderstanding or misapprehension in respect of any such matters or otherwise, should the Contractor be required to offer specialized attendance prior to, or during, the performance of the contract.

3. DEFINITIONS & INTEPRATION OF TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

Engineer: Shall in the case of Electrical/Mechanical works mean 'Norkun Intakes Ltd' Nairobi and, or in the event of any of their deaths, or ceasing to be the Engineers for the purposes of this Contract, such other person as the client shall nominate for that purpose. For the purpose of Mechanical and Electrical engineering works the Engineer shall be deemed vested with the duties of, and be the representative of the Client, except on respect of variations which involve the Contract sum.
Client: Shall mean the client whose name is indicated in item 1 above and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives. For the purposes of this work, the terms "Client" and "Contract" shall have the same meaning.

Contractor: Shall mean the person or persons, partnership, firm or company, whose tender for the Contract for

the works has been accepted, and who has or have, signed the Contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Main Contractor: Shall mean the person or persons, partnership, firm or company, whose tender for the main building contract for the development will be accepted, and who has or have, signed the contract and shall include his or their heirs, executors, administrators, assigned successors and duly appointed representatives.

Works: Shall mean all or part of the works, material and articles, wherever the same are being manufactured or prepared, which are to be used in the execution of this Contract and whether the same may be on the site or not.

Approved: Shall mean approved by the Engineer at his absolute discretion.

Directed: Shall mean directed by the Engineer at; his absolute discretion.

Selected: Shall mean selected by the Engineer at his absolute discretion.

M^3: Shall mean cubic meter

M^2: Shall mean square meter

M: Shall mean meter

LM: Shall mean Linear Meter

Kg: Shall mean Kilogram

No.: Shall mean Number

Item / Lot: Shall mean total sum of all items combined

Prs: Shall mean Pairs

B.S.: Shall mean the current British Standard Specification published by the British Standards institution, 2 Park Street, London, W.I. England

K.S.: Shall mean the current Kenya standards specification published by the Kenya Bureau of standards

As before: Shall mean in all respects as earlier described in the same or previous bill

Ditto: Shall mean the whole of the preceding description except as qualified in the description. Where it occurs in descriptions of succeeding terms it shall mean the whole of the preceding description which is contained within the appropriate brackets.

Fix Only: Shall mean take delivery on site (unless otherwise stated), unload where necessary, transport within site compound, store, unpack, check contents against orders and packing lists, assemble as necessary, distribute and hoist or install to position, test and commission.

Supply Only: Shall mean procure, deliver to site (unless otherwise advised), unload where necessary, transport within site compound, store, unpack, check contents against orders & parking lists, repack, assemble as necessary and store neatly in the storage space provided by others as directed.

Supply and Install: Shall mean undertaking both supply only and fix only.
Agreement: Shall means this Agreement, its Schedules, the Contract Drawings, the accepted Bills of

Quantities, the specifications, the letter of acceptance, the Purchase Order, and such other documents as may be expressly incorporated in the letter of acceptance or contract agreement (save as may otherwise be varied by this Agreement)

Bills of Quantities, Contract Bills or BOQ: Shall mean the document drawn up by the Engineer and priced by the Contractor to arrive at a contract price.

Certificate of Practical Completion: Shall mean a certificate issued by the Engineer / Architect to the Contractor to signify a state of completion where, in the opinion of the Engineer / Architect, the Works are substantially complete and can effectively and conveniently be used for the intended purposes

Code of Conduct: Shall mean the Contractor Code of Conduct as set out in Schedule 9 to this Agreement

Practical Completion: Shall mean that the Works have been substantially completed in all material respects such that the Site is capable of being taken over and used by the client for the purpose for which it was intended without prejudicing the safe and convenient use of the Site and there are no Defects other than those identified in the Defect List

Contract Drawings: Shall mean drawings showing and describing the Works to be done or to be prepared by the Contractor and includes any modifications to such drawings and where the context requires includes drawings prepared by the Contractor and approved by the client

Contract Period: Shall mean the period agreed for the construction of the Works and stated in the appendix to these conditions or extended in accordance therewith

Contract Price: Shall mean the price for the Works as stated the agreement or as adjusted in accordance with the contract.

Defect: Shall mean any aspect of the Works which is not in accordance with the contract or to the reasonable satisfaction of the Engineer / Architect

Final Acceptance: Shall mean that the Services have been carried out and completed within the terms of this Agreement and all the Defects List items completed

Final Certificate: Shall mean a certificate issued by the Engineer / Architect to the Contractor signifying that the Works have been carried out and completed in accordance with the terms of contract and that all adjustments to the contract price have been made in accordance herewith.

Final Account: Shall mean the document prepared by the Engineer containing all the adjustments to the contract price in accordance with the conditions of contract and which in his opinion is the total value of the Works at final completion.

Interim Payment Certificate: Shall mean any certificate of payment issued periodically as the Works progress by the Engineer / Architect

Prime Cost Sum: Shall mean a sum included in the contract bills for works or services to be executed by a nominated sub-contractor, statutory or other authority or for materials or goods to be obtained from a nominated supplier.

Provisional Sum: Shall mean a sum included in the contract bills for the execution of work which cannot be entirely foreseen, defined or detailed at the time the tender documents are issued.

4. EXTENT OF INSTALLATIONS

The Tenderer shall include in his tender, prices, 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 installed 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 shop of the entire installation together with layouts of all proposed 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 (3) weeks of the award of the Contract such that 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

5. PROGRAMME OF WORKS.

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

(a) Submission of working drawings for approval
(b) Placing of orders with other specialists for plant and equipment to be incorporated in the works
(c) Receipt by the Contractor from other specialists of plant to be incorporated in the works.
(d) Manufacture by the Contractor of plant to be incorporated in the works
(e) Inspection and testing by the Engineer
(f) Shipment of the plant from country of manufacture
(g) Delivery of the plant and equipment to site
(h) Erection on site, details for all activities
(i) Kenya Power & Lighting Company installations, ICT installations, National, County or any other statutory body installations as desired by contract
(j) Tests on Completion.
(k) Training to management team

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

6. TENDER CONDITIONS

Any act of collusion that may distort normal competitive conditions may cause the rejection of the tenders concerned. By participating in the tendering, tenderers certify not to be involved in such acts of collusion.

Tenders containing abnormally high or low unit prices and /or lump sums may be rejected. Before such rejection, however the tenderer may be given the opportunity of giving a detailed explanation in writing.

Tenders must be returned complete and tenderers or their assigned representatives are at liberty to witness the tender opening at the time and venue stated in the letter of invitation to tender. Tenders received after the stated time will be returned unopened and incomplete tenders will be rejected.

Tenders are invited in strict accordance with the documents issued, counter offers submitted with tenders will not be considered, letters of qualifications with tenders may be ignored if they have the effect of modifying either the terms of a tender or the compatibility of a tender with the other tenders. However, should a tenderer, in good faith wish to propose modifications to the tender terms, conditions and contents for the purposes of reducing the tender amount then he shall contact the Engineer in writing well before the date of tender opening. Should the Engineer approve the proposed modification, all tenderers will be advised in due time for the modification of their tenders. No proposed modification will be considered unless this procedure has been followed.

The client is not bound to accept the lowest or any tender, nor is the client bound to divulge reasons for the acceptance or non-acceptance of any tender. Any tender may be accepted by the client within the stated period unless previously withdrawn by the tenderer.

All deletions, additions and corrections to figures inserted in the tender document are to be counter signed by the tenderer.
In the event of two or more tenders being in the same sum, tenderers may be given seven (7) days within which to revise their tender prices. Should there again be two or more tenders in the same sum, and in the absence of any qualities to give one tenderer preference over the other(s), then, the Contract may be awarded by drawing lots in the presence of the tenderers concerned.

7. TENDER 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.

8. TENDER EVALUATION PROCEDURES

Following the return of the tenders for the works measured in these bills of quantities, arithmetical and other analysis will be carried out in order to select the lowest acceptable tender in terms of responsive and realistic pricing, etc. This section will be at the sole discretion of the client.

The unit rates offered by the selected tenderer will then be applied to new quantities measured by the Engineer for the revised scope of works.

The resultant total, together with the priced preliminaries and any modified prime cost and provisional sums will be consolidated into a sum for which the Contract will be signed.

This procedure will be applied only to the selected tender. Neither the Client nor the Consultants will enter into discussion or any correspondence with the other tenderers after the selection process has been carried out and no reasons will be given for selection or non-selection.

Any tenderer unable to comply with these procedures will be disqualified from the selection process

9. ACCESS TO SITE AND SECURITY

Means of access to the site will be as directed by the Engineer. No other access will be permitted in any circumstances.

10. AREA TO BE OCCUPIED BY THE CONTRACTOR

Areas to be occupied by the Contractor for use as storage shall be as directed by the Project Engineer.

11. DRAWING(S)

11.1 Tender Drawings:

The Contractor will be deemed to have examined the drawings before tendering and to have satisfied himself regarding their details and regarding the nature and extent of the works and the method of installation involved. No claims arising out of misapprehension in these respects will be allowed.

The 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 Client 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 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 shall be made only within a reasonable time prior to the execution of such work in order to fulfill 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.

11.2 Award / Contract Drawings:

Two (2) copies of all drawings and a copy (1) of the specifications will be furnished free of cost to the Contractor (whose tender has been accepted) for his own use. Any extra copies will be paid for.

The Contractor shall at his own risk and cost execute and perform the works described in the conditions of contract and bills of quantities and detailed in the drawings provided and supplied to the Contractor for the purpose of works and completely finish the said works in a good workmanship and with the utmost expedition.

The Contractor shall satisfy himself as to the correctness of all drawings and measurements as per site conditions. If the Contractor finds any discrepancy in the drawing or between the drawing and the specifications he shall immediately refer the same to the Engineer who will decide which shall be followed.

Figured dimensions shall be taken in preference to the scale mentioned on or attached to any drawing. Details shown on drawings shall be taken in preference to items and quantities in the specification.

11.3 Shop / Working Drawings:

The Contractor shall prepare fully detailed Shop / Working Drawings for all items of plant, equipment and accessories required for installation under this section of the Contract. Two (2) copies of each Drawing shall be forwarded to the Engineer for approval and or comments and one (1) soft copy in PDF and CAD formats. One (1) 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 as above, for approval.

When Drawings have been approved two (2) further copies as above shall be forwarded to the Engineer, together with copies to the Architect, Site and the Client.

Shop / Working 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. These are (As Applicable to the specific service):

(a) Cabling and external cable routes
(b) Details of all conduit and trunking runs in respect of different services
(c) Details of lighting and power circuits, routes etc.
(d) Details of sub-main switchgear and distribution boards
(e) Details of Lightning and surge protection
(f) Details & Layouts of all ducts, chases, holes, trenches and all other services throughout the whole of the building and associated external works
(g) Details & Layouts of Fire alarm system and all circuit diagrams
(h) Details & Layouts of all Security Installations
(i) Details & Layouts of all Structured cabling & ICT Installations
(j) Details & Layouts of all Audio Visual & Voice Evacuation Installations
(k) Details & Layouts of all BMS Installations
(l) Details & Layouts of all Generator Installations
(m) Details & Layouts of all Lift Installations
(n) Details & Layouts of all UPS Installations

(o) Details & Layouts of all Automatic Voltage Stabilizer Installations
(p) Details & Layouts of all Rectifiers & Inverter Installations
(q) Details & Layouts of all Plumbing & Drainage Installations
(r) Details & Layouts of all Air Conditioning Installations
(s) Details & Layouts of all Solar water heating Installations
(t) Details & Layouts of all Fire Fighting Installations
(u) Details & Layouts of all Water Heating Installations
(v) Details & Layouts of all Specialized Kitchen Equipment Installations
(w) Details & Layouts of all Sewage & Water Treatment Installations
(x) Details of all equipment and panels
(y) Technical literature for all the services

All Shop / working 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 Client, 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 Shop / Working drawing for approval within twenty one (21) days, the required liaison being maintained with other specialists, such that an agreed layout is submitted for approval.

11.4 Record (As-Built) Drawings:

As soon as the works are complete and all tests satisfactorily carried out, the Contractor shall hand to the Engineer two (2) sets of Record Drawings, together with one (1) set of soft copy of the same in PDF and CAD formats, 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 firefighting installation, as finally installed.

The Engineer will provide the Contractor with a set of Contract Drawings (in addition to the two (2) 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.

12. CONTRACT AGREEMENT AND CONDITIONS

12.1 General:

The articles of Agreement and conditions shall be based on the agreement and schedule of conditions of building contract forms published by the Kenya Association of Building and Civil Engineering Contractors' (KABCEC).

FIDIC conditions for electrical and mechanical works shall form complementary reference where clear interpretation cannot be made.

Communications Authority (CA) conditions for structured cabling, ICT & Security works shall form complementary reference where clear interpretation cannot be made.

12.2 Water and Electricity Supply

The Main Contractor will make water and electrical power available to the Contractor. The Main Contractor and the Contractor will mutually agree whether or not the latter should pay for the water /electricity used for the works. That notwithstanding, no excuse will be entertained for power failure or lack of water as the Contractor is required to make his own arrangements in such circumstances.

12.3 Contractor's Materials

Purchase of materials by the Contractor and their storage on site for inclusion in payment certificates far in advance of reasonable requirements may be allowed at the sole discretion of the Engineer. This however is also subject to availability of such storage space.

Storage space may be provided on site.

13. INSURANCE

The Contractor shall during the execution of the works, insure himself and keep himself insured against all liability under the WIBA or any amendment thereto for accidents to workmen employed by him on the said works and shall hold the client and all parties to the contract harmless in respect of any such liability.

The Contractor shall further insure himself and keep himself insured against all liabilities arising from all Third party claims arising from accidents and he shall hold the client, the Consultants and all parties to the contract harmless in respect of any such liabilities.

No payments on account of the work executed will be made to the Contractor until he has satisfied the Engineer either by the production of an Insurance Certificate that the foregoing provisions have been complied with in all respects.

Thereafter the Engineer may from time to time check that premiums are duly paid up by the Contractor who shall, if called upon to do so, produce receipts of premium renewals for the Engineer's inspection.

14. BOND

The Contractor shall find and submit for the approval by the Engineer one (1) surety who shall be an established bank, Insurance company or fidelity guarantee corporation and who will be willing to be bound to the client and/the Client in an amount equal to ten percent (10%) of the Contract amount for the due performance of the Contractor upto the date of completion as certified by the Engineer and who will then and if called upon, sign a bond to that effect, on the same day as the Contract agreement is signed.

In the event of the surety named not being approved by the Engineer, the Contractor shall furnish within seven (7) days another surety to the approval of the Engineer.

15. SAFETY, HEALTH AND WELFARE OF WORKPEOPLE

The Contractor shall allow for providing for the safety, health and welfare of workpeople and for complying with any relevant ordinances, Regulations or Union agreement.

16. NATIONAL INSURANCE AND PENSIONS

The Contractor shall allow for making any National Social Security Fund and National Hospital Insurance Fund payments due in respect of workpeople.

17. HOLIDAY AND TRANSPORT OF WORKPEOPLE

The Contractor shall allow for providing holidays and transport for workpeople and for complying with any relevant ordinances or union agreement.

18. TRAINING LEVY

The Contractor's attention is drawn to legal notice no. 237 of October, 1971, which requires payments by the Contractor of a training levy on all contracts of more than KShs. 50,000/= in value and his tender must include for all costs arising or resulting therefrom. Proof of payment of those training levies will be required.

19. EXISTING PROPERTY

The Contractor shall take every precaution to avoid damage to all existing property including flower beds, fences, roads, cables, office equipment, pipes, drains, plant, equipment, adjacent buildings and other services and he will be held responsible for all damages arising from the execution of this Contract to the afore-mentioned property and he shall make good all such damage where directed at his own expenses to the satisfaction of the Engineer.

20. FOREMAN

The Contractor shall keep constantly on works a competent English-speaking foreman and any directions or explanations given by the Engineer to such a foreman shall be deemed to have been given to the Contractor.

21. SUPERVISION AND WORKING HOURS

The works shall be executed under the direction, and to the entire satisfaction in all respects, of the Engineer who shall at all times during normal working hours have access to the works and to the yards and workshops of the Contractor or other places where work is being prepared for the Contractor.

The working hours shall be those generally worked by good employers in the building and civil engineering trades taking note of gazetted holidays unless the Engineer shall so direct.
No work shall be covered up in the absence of the clerk of works without the prior approval of the Engineer in writing

22. SAMPLES

The Contractor shall furnish at his own cost any samples of materials or workmanship that may be called for by the Engineer for his approval or rejection and any further samples in the case of rejection until such are approved by the Engineer, and the Engineer may reject any materials or workmanship not in his opinion up to the approved samples.

The Engineer shall instruct for the testing of such materials as he may at his discretion deem desirable and the testing shall be made at the Contractor's cost.

The Contractor shall allow in his tender for such samples and tests.

23. TRADE NAMES

Except where expressly stated, where trade names of manufacturer's catalogue numbers are mentioned in these specifications, the reference is intended, as a guide to the type of the article or material required. The Contractor may use any article or material equal in type or quality to those therein described subject to the prior approval of the Engineer, and at his (Engineer's) absolute discretion. The onus of proof as to equivalent quality will rest with the Contractor, whose tender will be deemed to include for the makes described hereafter.

24. MATERIALS, TOOLS, PLANT ETC.

The Contractor shall allow for providing of all ladders, tools, plant and transport required for the works, except in so far as may be specifically stated otherwise.

All materials and workmanship used in the execution of works shall be of the best quality and description unless otherwise described. Any materials for the works condemned by the Engineer shall immediately be removed from the site at the Contractor's expense.

All materials, fittings and accessories are to be new and in accordance with the requirements of the current legal and regulatory framework 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.
The Contractor shall provide at his own risk and cost all materials, scaffolding, tools, plant, transport and workmen required for the works except, insofar as may be stated otherwise herein.

The Contractor shall order all materials to be obtained from overseas immediately after the Contract is signed and shall also order materials to be obtained from local sources as early as necessary to ensure that such materials are on site when required for use in the works.

Any defects which may appear, either of materials or of workmanship, during the defects liability period provided by the Contract, shall be made good by the Contractor at his own expense, as and when directed.

If the Contractor shall fail to carry out such orders, as by the preceding paragraph provided within such reasonable time as may be specified in the order, the materials or works affected may be made good by others in such manner as the Engineer may direct, in which case the cost thereby incurred shall, upon the written certificate of the Engineer, be recovered from the Contractor as liquidated damages.

25. ORDERS

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

26. INSPECTION AND TESTS AT MANUFACTURER'S WORKS

The Engineer, or his duly authorized 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.

If part of the plant and equipment is being manufactured on other premises, the Contractor shall obtain on behalf of the Engineer, or his duly authorized 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 is 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 specifications and the relevant International Standards where applicable.

27. TRANSPORT

All plant and equipment shall, during transportation be suitably packed, crated and protected to minimize the possibility of damages and to prevent corrosion or other detoriation.

On arrival at site all plant and equipment shall be examined and any damage to parts and protective priming coats made good before installation.

Adequate measures shall be taken by the sub-contractor to ensure that plant and equipment do not suffer any detoriation during transit and transportation.

Prior to installation, all accessories, plant and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment has detoriated or has been damaged to such an extent that it is not suitable for installation, then the sub-contractor shall replace this equipment at his own cost.

28. STORAGE

Space for storage will be provided by the Main Contractor but the Sub-contractor will be responsible for the provision of any lock-up sheds and stores required.

Nominated sub-contractors are to be made liable for the cost of any storage accommodation provided specially for their use. No materials shall be stored or stacked on suspended slabs without the prior approval of the architect and structural engineer

29. 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.

30. BLASTING

Blasting will not be allowed unless with express authority of the Engineer.

31. HOISTING

The Contractor is referred to the Drawings and to the general description of the building. Throughout these specifications generally no mention is made of heights for hoisting.

All prices must include for hoisting and fixing at any level within the limits shown on the drawings or included in the general description of works. Where a particular level is specified the Contractor shall price accordingly.

32. CASING UP AND PROTECTING

The Contractor shall be responsible for casing up or otherwise protecting to the satisfaction of the Engineer all parts of the Contract works liable to cause injury and for removing such protection and making good on completion.

The Contractor shall also 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.

33. BUILDERS WORK & CIVIL WORKS

Builder's Work and Civil Works that are incidental to this section of the Contract (Ordinarily referred to as Builders Works in Conjunction with Services or abbreviated BWICS) 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 the 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 specified 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, ductwork, trays, Ladders, Light fittings and Equipment 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 in clear parallel lines i.e. as shown on Drawings and as may be required at site to the Engineers approval.

34. 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.

35. 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 special tests made at the Manufacturer's Works shall be repeated at limits approved by the Engineer.

36. WORKS TO BE DELIVERED UP CLEAN

On completion of the works, the site and the works shall be cleared of all plant, scaffolding, rubbish and unused materials and shall be delivered up in a clean and perfect condition in every respect to the satisfaction of the Engineer.

37. TESTING AND SITE PERFORMANCE

The Contractor shall allow for all testing of material and installations required by these specifications and he shall be responsible for all expenses incurred in completing such tests, including costs of materials and labour, equipment, transport and all other costs.

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 (5) days to the date of the specified tests. Unless otherwise agreed the tests shall take place within seven (7) 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 and avail proof that test instruments are in good working condition and have been calibrated by an authorized 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.

38. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

The Contractor shall proceed with the works in such manner and in such order, as the Engineer shall direct so as to complete the works on the shortest possible time.

It is the responsibility of the Contractor to ensure that all material, fittings, equipment and items to be supplied are ordered and delivered to the site ready for installation at such times as to cause no hold up to the programme of work

NOTE:
(a) The sub-contract completion period shall be the same as that of main contract.
(b) Liquidated damages and Ascertained damages shall be calculated pro-rata on the rate provided in the main contract.

39. SPECIALIST MANUFACTURERS

Where specialists are not nominated by the Client, 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 Engineer. 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 authorized by the supplier to deal in the plant and equipment and that he is authorized to stock the necessary spare parts or that the Client will be authorized 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 and disruptions to his programme, or otherwise, in his compliance with the above requirements.

40. PAYMENT AND CERTIFICATES

Payments shall be made through certificates direct to the Contractor. All payments shall be less retention as specified in the Contract agreement. The Contractor shall be paid only for work done and /or materials on site. Payments shall be subject to prevailing statutory deductions such as withholding tax, etc.

The percentage of certified value retained should be 10%. Limit of Retention shall be a sum equivalent to 5% of the Contract sum.

No certificate so issued by the Engineer/Architect shall in itself be considered conclusive evidence as to the sufficiency of any work or materials to which the terms and conditions of this agreement or from his liability to make good all defects as provided thereby.

41. VALUATION OF LUMP SUMS AND PRELIMINARY COSTS

Lump sums entered in these bills of quantities against any item of general condition or preliminaries will be included in appropriate valuations according to reasonable assessment by the engineer of actual costs involved in each item.

42. PAYMENT FOR MATERIALS ON SITE

All materials for incorporation in the works must be properly installed before payment is effected unless specifically exempted by the Engineer. This is to include the materials of the Contractor, and his nominated suppliers.

43. PAYMENT FOR MATERIALS OFF SITE

Payment for any material off site will be subject to the Contractor providing a bank guarantee of equivalent value and clearly indicating that the bank undertakes to pay the client the full sum of the guarantee amount immediately upon the client's first written demand declaring the tenderer to be default and without cavil or argument. This shall be from an **Approved Bank**.

The Bank Guarantee validity period to be no sooner than the end of the Defects Liability Period of the project except where a special waiver is granted by the client in writing.

Advance payments will also be treated as Material off site save for being secured by an Advance Payment bank bond.

44. CLAIMS FOR EXTRAS

This is a fixed price contract and no claims whatsoever on extras will be entertained save where a variation to the contract is expressly directed by the engineer in writing.

45. FLUCTUATIONS

This is a fixed price Contract and no claims will be allowed on fluctuations. The tenderer's prices will be deemed to have allowed for forecasts on price fluctuations, inflation or exchange rate.

46. COMMISSIONING & TRAINING

The Contractor shall train the Client's Maintenance management team or his representative on the operation and maintenance of the various components forming the mentioned installation and shall provide drawings, diagrams and manuals to ensure the Maintenance Management Team or his representative is completely conversant with such installations.

Proof of training will be required and must have the names and signatures of those trained and the dates and what they were trained on.

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

47. 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.

48. 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 Engineer.

49. PAINTING & FINISHING

All 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.

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 dispatch. 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.

50. LABELS

All items related to the installations shall be neatly and clearly labeled 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 labeled externally with identification marks corresponding with those on the Drawings or Technical Specifications using "Red Trafolyte Labels" of Minimum 10mm Height.

Final details shall be agreed upon by the Contractor and the Engineer.

All labels/plates shall be in English language

51. DEFECTS LIABILITY PERIOD

The defects liability period shall be as provided in the main contract.
Whereas it is not solely described in the contract, the default Defects Liability Period Shall be the Period of six (6) months from the date of issue of the Certificate of Practical Completion to the contractor.

52. COMPLETION DOCUMENTS

The contractor shall supply the Engineer with the following sets of completion documents in three (3) sets hard copy on scale of 1:100 and a soft copy in both PDF and CAD formats.

52.1 Record (As-Built) Drawings: As stated above.

52.2 Maintenance manuals:

At the start of the defects liability period, the Contractor shall hand over to the Engineer, Three (3) sets of maintenance and operations manuals for each plant and equipment installed. These manuals shall be in English and shall be fully illustrated.

52.3 Test Records: As stated above.

53. WARRANTY AND PERFORMANCE STANDARDS

The Contractor must furnish the client through the Engineer with a general written warranty covering quality of workmanship, material and equipment and be compelled thereby for a period as shall be provided in the Contract Schedules.

Whereas in a case where the period is not mentioned, then the Warranty cover should be for a minimum of one year (12 Months) after practical completion of the Contract.

The Contractor must make good, at his own expense, such repairs and replacements as may be required as a consequence of negligent workmanship or defective materials.

The Contractor must also procure such warranties and guarantees as aforesaid from all manufacturers and/or suppliers of materials or equipment incorporated in the project under this contract.

The Contractor must comply in all respects with given standards of workmanship as defined and described in the specifications and Bills of Quantities and relevant codes of Practice.

The Contractor must also comply with all tests of materials as required and/or directed by the Engineer.

Total for preliminaries and general conditions C/F to price summary page

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2b. PARTICULAR SPECIFICATIONS FOR STRUCTURED CABLING INSTALATIONS

54. SCOPE

The scope of the contract is twofold namely supply, deliver, install, test and provide certification for a complete and operational structured cabling system and to perform the disconnections, removal and relocations etc. of the existing telephone and computer installations.

This will involve backbone connection from the server in the Computer room to the new GIBIC/switches and Horizontal cabling from the administration cabinet

The structured cabling shall be of star topology.

UTP installation shall be purely Cat 6A (Unless Otherwise stated in the Bills of Quantities) structured cabling.

All necessary accessories shall be inclusive.

55. STANDARDS & REGULATIONS

The system should follow the following standards as a minimum:

- ISO / IEC, CAK, ATM CENELEC 11801
- ANSI/ BICSI / EIA / TIA 56
- Latest Edition of the IEEE / IET regulations
- Kenya Bureau of Standards
- National Electrical Code
- UL 2024A Optical Fiber Cable Routing Assemblies for non-metallic cable pathways
- NEMA VE1/CSA22.2
- Electric Power Act and Rules made there under.
- Any other Federal, state, and local codes, rules, regulations, and ordinances

56. DEFINITIONS & INTEPRATION OF ICT TERMS

The terms, phrases and abbreviations shall be deemed to have the following meanings wherever used hereinafter and in all contract documents.

Data Point: Shall in the case mean an installation complete with data cable linked from the patch panel in the respective area cabinet to the outlet via the pathways installed by others to close proximity of the desk but excluding the faceplate.

Telephone / Voice Point: Shall in the case mean an installation complete with telephone cable linked from the patch panel in the respective area cabinet to the outlet via the pathways installed by others to close proximity of the desk but excluding the faceplate.

57. NETWORK MANAGEMENT SYSTEM

Bidders must propose the manufacturers Network Management system for centralized configuration, maintenance and troubleshooting of active equipment's. Third party standalone systems should not be offered as part of the solution. Features and functionalities of the system should include the following:

(a) Should be compatible with Microsoft windows/Linux operating systems
(b) Graphical User Interface for central Management and network viewing
(c) Network discovery and inventory management
(d) VLAN, multicast, security and load-balancing/fail over configuration
(e) Downloading and saving of log file from the device flash memory
(f) Centralized upgrade/backup and archiving of active devices
(g) Export of network topology to JPEG or other standard formats.

58. EQUIPMENT NETWORK CABINETS

The work-group network or switches and patch panels arrangement shall be housed in an equipment cabinet/rack to be supplied by the sub – contractor to be appointed

The cabinet shall be metallic (appropriately sized as specified in the BQ) and all mounting accessories

The cabinet should be constructed to enhance cooling and ventilation.

Cabinets shall be required to have the following:

a) Front Doors
   - For Server room Free Standing cabinets, the front door shall be perforated (75%) Arc-Fold with Swing
   - For other wall mount cabinets, the front door shall be made of Tempered glass

b) Rear Doors
   - For Free Standing Cabinets they shall have 1 x Double-section Full Perforation with Swing Handle Lock (Hexagon Honey-Comb)

c) Side doors
   - For Free Standing Cabinets they shall have 2 x Lift Off Type with Quick Release Catch & Cam Lock
   - For Wall Mounted Cabinets they shall have 2 x Lift Off Type with Quick Release Catch & Cam Lock

d) Top Tray - 6 x 4-inch Top Fan Tray with Guard & Filter (Low Noise)
e) Frame – Shall be Full Vented Top Frame with Front / Rear / Side Cable Entrance
f) Finish – Shall be as Epoxy Powder Coating (RAL 9004 Black)
g) Complete with Cable Management, Cable duct cover, Lock & Key, Panel Mounts, Base frame with provision for cable entrance, Set of Heavy Duty Castor wheels, Set of Levelling stands
h) 12 Way Power Distribution unit with 13A UK Sockets for 240V and all other accessories required.

59. NETWORK SWITCHES (ACTIVE CONTROL EQUIPMENT)

The network switches used shall be able to support Gigabit speeds and will have power over Ethernet capability, UTP Star cabling topology, preferably a switching hub capable of being set up as a Virtual LAN (V-LAN) and compatible with any existing LAN Management devices.

The new network switches should have a minimum of (24No) twenty-four UTP cable connections employing standard RJ45 female connectors plus one (1No.) GIBIC Fast Ethernet port for stacking or connecting to the backbone.

All the ports shall be individually numbered.

In addition the system shall have the following standards as a minimum:

CORE EQUIPMENT:

(a) IEEE 802.3 compliant for power over Ethernet
(b) IEEE 802.1 based security compliant
(c) SNMP compliant for security
(d) Layer 2/3/4 switch
(e) Backplane/switch fabric Bandwidth Capacity of 150 GBPS or more.
(f) Should support Gigabit Ethernet to the desktop
(g) Should have at least 10-slots or higher chassis
(h) The core switches should have two links to each floor configured in active/active configuration. The links should deliver 2GBPS throughput when all ports are active.
(i) The core switch should have redundant power supply, redundant fan tray and redundant CPU/ supervisor engine installed
(j) Fiber cable linking stacks on each floor to the core should be connected to 1000Base X(GBIC) port on the core switch.
(k) Should be installed with the latest version of system software at the time of delivery.
(l) Should support Quality of service for various applications.

LAN EDGE EQUIPMENT:

(a) IEEE 802.3 compliant for power over Ethernet
(b) Should support IEEE 802.1, SSH, SNMP
(c) The equipment's should support layer 3 routing.
(d) Switch Fabric forwarding Bandwidth of 64GBPS or more.
(e) Active control equipment's at the LAN Edge should support 10/100/1000 MBPS on all ports (RJ45) and Gigabit to the desktop connectivity
(f) The switches should have 24/48 ports of 10/100/1000 MBPS.
(g) The equipment's should have at least two 1000BaseX Gigabit uplink ports for terminating backbone Fiber.
(h) More than 12,000MAC addresses should be available on each switch.

(i) Each stack on the edge will have two links of Fiber to the core switch, totaling two fiber terminations from the core switch to the stack.

(j) Should support Jumbo frames.

(k) Total stack throughput bandwidth of 64 GBPS or more.

60. UTP PATCH PANELS

All UTP Fiber links to individual floors should be terminated on Patch Panels. The patch panels shall:

(a) Be as Cat 6A UTP patch panels.

(b) Be able to fit into any standard EIA 19-inch equipment rack, secured to the rack firmly with nuts and bolts at all the four corners.

(c) Have rear cable management and front designation strips, 110 PCB mounted connectors and integral RJ mounted jack sockets.

(d) Be RoHS Compliant

61. FIBER PATCH PANELS

All Backbone Fiber links to individual floors should be terminated on Fiber Patch Panels. The patch panels shall:

(a) Contain Connector interfaces should support ST, SC simplex, SC duplex, FC, LC or MT-RJ.

(b) Contain TIA/EIA-604 FOCIS compliant or compatible simplex or duplex fiber optic adapters

(c) Meet TIA/EIA-568-B.3 requirements

(d) Follow the TIA/EIA-568-C.3 suggested color identification scheme

(e) Contain split sleeve material: Zirconia ceramic

(f) Supports UPC connector

62. DATA OUTLETS (UTP & FIBER)

All UTP cabling outlets to individual points should be terminated on Face plates. The face plates shall:

(a) Have UTP as CAT 6A Face plates and as specified in ISO 11801.

(b) Have Individual modules snap in and out of provided insert

(c) Have Single or double gang configurations as specified.

(d) Be Excellent for copper applications

(e) Have Shutters to protect modules when not in use

(f) Be of 86 x 86mm single gang faceplate frame and one 1/2 size sloped shuttered module insert. Depth to rear of modules: 18.0mm

(g) Be mounted on trunking faceplates, wall recessed patress boxes, floor outlet communications stations, floor mounted pedestals or floor boxes.

(h) Have the UTP data outlet jacks feature 110, Krone LSA or universal style insulation displacement connectors. The same tools required for termination of the patch panels shall be used for the data jacks.

(i) Have all the CAT 6A Snap-in data jacks be fully compliant with Category 6A TSB 40A requirements.

(j) RoHS Compliant

The trunking and pedestals are to be supplied and installed by others unless otherwise specified in bills of quantities.

63. COPPER CABLING (U/UTP, F/UTP, SF/UTP, U/FTP, F/FTP, SF/FTP)

The UTP cable shall meet or exceed the following specifications;

(a) CATEGORY 6A compliant UTP cable
(b) 4-pair cables with 100 ohm impedance.
(c) Compliant to standards such as TIA/EIA – 268-B. 2-1 and IEC 61156-5
(d) Compliant to ISO 11801.
(e) Made of polyolefin insulation
(f) Pulling force should support up to 50N/mm2

The cabling shall be drawn in trunking or conduits and the points mounted on trunking faceplates, wall recessed patress boxes, floor outlet communications stations, floor mounted pedestals or floor boxes.

64. FIBER CABLING (OPTICAL)

The Fiber cable shall meet or exceed the following specifications;

(a) Multimode or Single Mode compliant Optical Fiber cable as specified in the BQ.
(b) Graded Index: Nominal 62.5/125 micron
(c) OSI & OS2 Cables shall be Compliant to standards such as ITU-TG.652 (Categories A, B, C & D), EN 50173, IEC 60793-1, ISO/IEC 24072 & TIA-492CAAA
(d) OS3 Cables shall exceed IEC 60793-1-10, TIA/EIA 492AAAA and Telcordia GR-20-CORE specifications
(e) Low Smoke Zero Halogen (LSZH) rated jackets shall meet IES 60332-1, IEC 60332-3C, IEC 61034 and IEC 60754-2 for standards compliant safety.
(f) RoHS Compliant
(g) Shall be made of flexible to allow for quick breakout and ease of routing

OSI / OS2 specifications;

(i) Core Diameter: 8.2µm typical for OS1 & OS2 and
(ii) Cladding Diameter: 125µm ± 0.7µm
(iii) Cladding Non-Circularity: ≤ 1%
(iv) Core-Cladding Concentricity: ≤ 0.5µm
(v) Coating Diameter: 242µm ± 7µm
(vi) Coating-Cladding Concentricity: ≤ 12µm
(vii) Attenuation: 1310nm: ≤ 0.39dB/km , 1310 – 1625nm: ≤ 0.34dB/km and 1550nm: ≤ 0.25dB/km
(viii) Numerical Aperture: 0.14 typical
(ix) Operating Temperature Range: -60° C to +85° C
(x) Temperature Dependence (-60° C to +85° C): ≤ 0.05dB/km

(xi) Temperature-Humidity Cycling (-10° C to +85° C, up to 98% RH): ≤ 0.05dB/km

(xii) Water Immersion (23° C ± 2° C): ≤ 0.05dB/km

(xiii) Heat Aging (85° C ± 2° C): ≤ 0.05dB/km

OS3 specifications;

(i) Colored buffers for ease of identification

(ii) High quality buffering offers ease of stripping while maintaining optical performance

(iii) Cable shall support network transmission speeds up to 10 Gb/s for link lengths up to 300 metres with an 850nm source per IEEE 802.3ae 10 GbE Standard; backward compatible for use with all 50/125µm system requirements

(iv) Core Diameter: 50.0µm ± 2.5µm

(v) Core Non-Circularity: ≤ 5%

(vi) Cladding Diameter: 125µm ± 1µm

(vii) Cladding Non-Circularity: < 1%

(viii) Core-Cladding Concentricity: ≤ 1.5µm

(ix) Coating Diameter: 245µm ± 10µm

(x) Coating-Cladding Concentricity: < 10µm

(xi) Attenuation: 850nm: ≤ 3dB/km, 1300nm: ≤ 1dB/km

(xii) Temperature Dependence - 850nm (-60° C to +85° C): ≤ 0.10dB/km

(xiii) Temperature Dependence - 1300nm (-60° C to +85° C): ≤ 0.10dB/km

(xiv) Temperature-Humidity Cycling - 850nm (-10° C to +85° C, >90% RH): ≤ 0.20dB/km

(xv) Temperature-Humidity Cycling - 1300nm (-10° C to +85° C, >90% RH): ≤ 0.20dB/km

(xvi) Connector

The cabling shall be drawn in defined pathways such as cable trays, trunking or conduits and the points mounted on outlet communications stations among other device

65. TELEPHONE OUTLETS & CABLING

This shall involve drawing of telephone multicore cable from the supply undertaking termination point to the main distribution center and the necessary terminations from the distribution terminal to the administration cabinet.

Cabling shall be done to the various RJ45 work area outlets using Cat 6A UTP or SC TP 4 pair stranded cable.

The telephone outlets cabling shall be drawn in trunking or conduits and the points mounted on trunking faceplates, wall recessed patress boxes, floor outlet communications stations, floor mounted pedestals or floor boxes.

The trunking and pedestals are to be supplied and installed by others unless otherwise specified in bills of quantities.

The UTP data outlet jacks shall feature 110, Krone LSA or universal style insulation displacement connectors. The same tools required for termination of the patch panels shall be used for the data jacks.

All the Cat 6A Snap-in data jacks shall be fully compliant with category 6A TSB 40A requirements.

66. BACKBONE & HORIZONTAL CABLING

Cat 6A, Unscreened Twisted pair (UTP) 4 pair Copper cables conforming to EIA/TIA 568A and ISO 11801 Standards, radiate from the administration cabinet in the server room to the various works areas.

Cat 6A UTP 4 pair copper cables should be laid in trunking / Conduits from the Hubs to the data outlets.

Cat 6A UTP 4 pair copper cables should be laid in trunking / conduits from the patch panels to the telephone outlets as shown on the drawing.

Cable installations should be carried out by trained cable technicians skilled in the installation of telecommunications cables and use of associated tools such as IDC punch down tools and hand cables held cable testers.

Maximum pulling forces should not be infringed during installation to avoid cable damage or performance impairment. Recommended minimum bending radius during and after installation should be adhered to.

It is important to minimize the twisting of cable during installation and cables must never be laid off over the flange of a cable reel.

During installation, cable management precautions that should be observed include the elimination of cable stress caused by tension, sharp bends and tightly bunched cables.

Cables should be dressed into neat groups and fixed into place whether in trunking, cable tray or cabinet, using nylon cable ties. Cable ties should be fitted at 300mm centers and should be fitted with just enough tension, such as not to deform cables.

Installed cables should be clearly identified at both ends with printed self-laminated wrap round labels.

During installation and subsequently, care should be taken to prevent damage to the cabling and especially where cables are exposed in cable trays.

67. PATCHCORDS

All Patch cords shall be factory fabricated

CAT 6A stranded 4 pair UTP RJ45 connector terminated cables shall be provided as per the specified lengths in the bills of quantities

68. EARTHING

All data equipment cabinets must be earthed for safety.

All earth conductors shall be colour coded as green or green & yellow insulated

All earth conductors shall be made of copper.

Each cabinet must have its own specific conductor connecting it to earth. Serial connections from one cabinet to another are not allowed.

Each patch panel installed in the data cabinet should also be earthed to the cabinet using a separate conductor.

69. TESTING

The installation shall be Tested and Certified CAT 6A compliant per ISO 11801 requirements.

The test must include but not limited to:

- Basic link test
- Attenuation
- Attenuation to Cross Talk Ratio (ACR)
- Near End Cross Talk (NEXT)
- Wire map
- Cable length Impedanc Every single cable must be tested in both directions.

2c. PARTICULAR QUALIFICATION FOR BIDDERS – STRUCTURED CABLING

TABLE 01:

NOTE: All Attachments should be bound in 1No. document with fliers separating the particular sections which shall be presented as part of the Bid

BIDDERS REQUIREMENTS			
Item	**Feature**	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
A	***MANDATORY REQUIREMENTS FOR BID EVALUATION***		
A1	**Company / Firm Registration Certificate**	Attach Certificate	

A2	**Registration with Relevant Bodies & Category as applicable** (Note: For Any Document Listed, Documentary Evidence of the Certificate should be Attached)	NCA	
		LOCAL AUTHORITY	
		P.I.N Registration Certificate	
		VAT Registration Certificate	
		Tax Compliance Certificate	
		CA	
		OTHER (Fill in Pen)	
A3	**Company Profile** A detailed soft company profile indicating the principle place of business MUST be attached to the Bid (Hard Copy or Soft copy in CD / USB Flash drive)	Attach	
A4	**Power of attorney of signatory of Bid (if Joint Venture)**	Attach Copy	
A5	**Indicate Total Annual Revenue of Construction work performed in the last 3 years in KShs.** • Attach Proof of Financial Statements • Attach Bank Contacts: Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Employer.	2019	
		2020	
		2021	
A6	**Long Lead Items Program of Works:** Bidder to attach a Proposed program (Work method and schedule), Descriptions, drawings, and charts, as necessary, which show the lead times for the long lead items timelines	Attach	
B	***OTHER REQUIREMENTS***		
B1	**Brochures of Equipment's offered**	Attach with all details	
B2	**Financial Resources Access:** • Evidence of access to Financial Resources to meet the qualification requirements: cash in hand, lines of credit, etc. • List here as appropriate & Note that Proof in Documentary Evidence may be require to be provided upon request	Attach	
B3	**Equipment Guarantee (By bidder) and warranty period specified by manufacturer** **Note:** Minimum of 24 Months is required **Note:** Schedule to be attached of all equipment on warranty	Attach: Note: Warranty shall be specific from date of completion of project.	
B4	**Annual Maintenance Charges**	1st Year (KShs.)	**Kshs.**

	After expiry of DLP and Warranty Period, indicate the proposed charges to be levied for annual maintenance of equipment and accessories Note: The above are to be labour only charges excluding parts which shall be fitted only with prior approval by the client		
		2nd Year (KShs.)	**Kshs.**
		3rd Year (KShs.)	**Kshs.**
B5	**Foreign Currency**	State Foreign currency used in the pricing (if any) and rate of exchange to KShs.	**1…… (Foreign Currency)** **= ……. KShs.**
B6	**Response Time**	In event of emergency, the response time shall be how many hours (Preferred is 3 Hours)	**…… Hours**

TABLE 02:

1.11	**Work of a similar nature and volume performed as Prime Contractor over the last five years. The values should be indicated in the same currency used above. Also list details of work under way or committed, including expected completion date.**

PROJECT NAME & COUNTRY	CLIENT / CONTACT PERSON	LEAD CONSULTANT	TYPE OF WORK DONE & YEAR OF COMPLETION	CONTRACT VALUE (KShs.)

TABLE 03:

1.12	**Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.**

POSITION	NAME	QUALIFICATIONS	YEARS OF EXPIRIENCE IN PROPOSED POSITION
PROJECT MANAGER			
SITE FOREMAN			
OTHER(S)			

TABLE 04:

1.13	**Proposed contracts and firms involved.**

SECTION OF THE WORKS	VALUE OF CONTRACT	CONTRACTOR (NAME & ADDRESS)	EXPIRIENCE IN SIMILAR WORK

TABLE 05:

1.14	**Information on current litigation in which the Bidder is involved.**	
OTHER PARTY(IES)	CAUSE OF DISPUTE	AMOUNT INVOLVED

TABLE 06:

1.15	**Additional Requirements:** Bidders should provide any additional information required in these documents to fulfill the requirements thereof if applicable	

Signed (As in form of Tender)_____

Official Stamp & Date _____

2d. SPECIAL NOTES TO ALL TENDERERS

1. **CONTRACT TYPE:** This is a fixed price Contract and no claims shall be entertained on whatever ground. The Contractor is advised to include all such costs as he projects may arise in his unit rates. Any variations in the exchange rate will also be no excuse for any variations in the contract sum.

2. **COPYRIGHT:** The copyright of this specification is vested in the Engineers and no part thereof may be reproduced without their express permission, given in writing.

3. **CURRENCY:** The specifications must be priced in Kenya Currency i.e. Shillings and Cents unless Otherwise as may be expressly stated

4. **QUALIFICATION:** The tenderer shall not otherwise qualify the text of this specification. Any alteration or qualification made without authority will be ignored and the text of the specification as printed adhered to.

5. **BILLS OF QUANTITIES:** The Bills shall be read in conjunction with the Preliminaries, General Conditions of Contract, Technical Specifications and Drawings

6. **PAGES IN DOCUMENT:** The tenderer is required to check the number of pages in this document and should any be found to be missing or the figures indistinct, he/she must inform the Engineers at once and have the same rectified. Should the tenderer be in doubt the precise meaning of any item, word or figures or for any reason whatsoever observe any apparent omission of words or figures, he must inform the Engineers in order that the correct meaning may be decided upon before the date for the submission of the tenders.

7. **RATES & PRICES:** The rates and prices tendered in the priced Bills of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Plant, equipment, labor, supervision, materials, erection, maintenance, insurance, profit, together with all general risks, liabilities and obligations set out or implied in the Contract, including taxes and duties (including V.A.T). The quantities given are provisional and are for guidance only. The whole works shall be re-measured upon practical completion.

8. **FILLING OF RATES:** A rate or price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of Quantities.

9. **PRICE ALLOWANCES:** The tenderer shall be deemed to have made allowances in his unit prices generally to cover items of preliminaries or additions to prime cost Sums or other items priced against the respective items.

10. **TAXES:** The tenderer's price shall include all government taxes including duties, VAT, etc. No claims whatsoever will be allowed if the tenderer does not price them as aforementioned. VAT must be calculated for all sums as filled in the document which includes contingencies, PC Sums etc.

11. **COST:** The whole cost of complying with the provision of the Contract shall be included in the Items provided in the Bills of Quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

12. **TENDER EXPENSES:** In no case will expense incurred by the tenderer in preparation of this tender be reimbursed.

13. **REFERENCES:** General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. Reference to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.

14. **PC SUMMS & CONTINGENCIES:** Provisional Sums and contingencies included and so designated in the Bills of Quantities shall be expended in whole or in part at the sole discretion of the Engineer.

    Under no circumstances shall the contingencies in the BQ be used to cater for contractor's omissions or underquoting of items listed in the Bills.

    Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the PC sums and contingencies if the client were to remove the PC Sum item

15. **ERRORS:** No liability whatsoever will be admitted nor claim allowed in respect of errors in the completed tender due to mistakes in this document which should have been rectified in the manner described above.

    Errors in pricing will be corrected by the Engineer for any arithmetic errors in computation or summation as follows: -
    a) Where there is a discrepancy between amounts in figures and in words, the amount in words will govern; and
    b) Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Engineer, there is an obviously gross misplacement of the decimal point in the unit prices, in which event the total amount as quoted will govern and the unit rate will be corrected.

16. **MATERIALS ORDERING:** The Contractors shall be solely responsible for the accurate ordering of materials in accordance with the drawings and these specifications.

17. **CLIENT SUPPLY ITEMS:** The client has the right to choose between the contractor to supply specific fittings / items as specified and the fittings / items being a direct procurement by the client.

    Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the "Client Supplied" items if the client were to Omit any items noted as "Client Supply" in the Bills

Signed (As in form of Tender)_____

Official Stamp & Date _____

SECURITY

INSTALLATIONS

PARTICULAR

SPECIFICATIONS

2b. PARTICULAR SPECIFICATIONS FOR SECURITY INSTALLATIONS

CCTV PARTICULAR SPECIFICATIONS

General System Description

1) The IP video management system shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data.

2) The offered system shall comply with the latest regulations and its amendments. Any subsequent update of this regulation shall be followed in full during the time of implementation.

3) The contractor shall furnish and install all security video cameras, mounts, housings, monitors and consoles, work stations, storage servers, video encoders, video decoders, virtual matrix configuration manager and keyboards, and all other hardware and software to provide a fully operational system to the reasonable satisfaction of the client and project Engineer.

4) The security video system shall provide full video control at the security control room, with additional full selection capability at any point within the network from a workstation. The security video system shall provide unlimited expansion capability for the addition or modification of video inputs.

5) The IP video management system shall permit the normal and event monitoring of all secured areas on composite, VGA or DVI/HDMI monitors as required or shown in the specifications and drawings. Workstations shall be installed at the control room and as shown on the drawings and described in these specifications. In all cases, the equipment shall be state of the art, standardized commercial off-the-shelf, and modular. In all cases, the method of communication from remote locations within the network to the central components shall be transparent to the user. Equipment shall be selected and installed so repairs may be accomplished on site by module replacement, utilizing spare components whenever possible.

6) The IP video management system shall permit the normal and event monitoring of all secured areas on composite, VGA or DVI/HDMI monitors as required or shown in the specifications and drawings.

7) Video monitoring of all cameras shall be possible at the remote location control room and the local site. Review capabilities for the digitally recorded video via the secure network specified without interruption to recording capabilities.

8) SAN storage shall be configured using fault-tolerant RAID-5 drive arrays. All cameras shall be recorded at 1920x1080, 12fps, for 180 days. Consider 10% spare capacity, in terms of both camera channel as well as storage when configuring the storage. If there are any applicable local guidelines at the time of release of the tender that are higher than the specified resolution and time, then the higher value shall be considered for storage.

9) Based on the monitor display configuration, the streaming from the cameras would vary. On a configuration like 2x2 or 1x1 the decoders and workstations shall request the highest resolution stream. However, when the display

changes to 3x3, 4x4, 5x5 or higher, the decoding devices would request a low-resolution stream at maximum frame rate. The two display streams are independent of the recording stream, which is mentioned in the recording requirement. Thus all cameras shall support minimum 3 or more streams, each possible to be configured at a different resolution and frame rate.

10) Provide enterprise class hard drives specified by the drive manufacturer as suitable for RAID & IP Video applications.

11) The end user shall have the flexibility to select the hardware of his choice when it comes to video servers, storage, workstation and displays. Proprietary hardware technologies should not be used in the project.

12) The IP video management system shall be able to handle future expansion of an unlimited total capacity from what is shown in the drawings, including but not limited to cameras, monitors, alarm circuits and relay closures.

13) The IP VMS shall have a central database server for maintaining all camera profiles, user profiles, alarm log, alarm events etc.

14) The intent of this specification is to provide to the owner a networked digital security system supplied by the Contractor and shall be a complete and operational system per the performance requirements and objectives of these specifications. Contractor shall be responsible for the coordination of related work with other trades affecting his work or the work of others.

15) All cameras shall feature intelligent analytic behaviors to reduce false alarms. Refer camera specifications for required analytic behaviors per camera. The analytics available with the camera shall be integrated with the provided video management system.

16) The IP video management system shall provide support for IP cameras from multiple manufacturers. As a minimum, the VMS shall support ONVIF profiles. If VMS is provided from the same manufacturer as the cameras, then no additional hardware or license would be needed to connect to third party cameras.

17) For the benefit of the operator, the offered VMS shall feature bi-directional audio support.

18) The VMS shall support ONVIF protocol to connect cameras from multiple vendors. This should not require a separate license to activate or a separate hardware. The VMS shall connect any ONVIF camera seamlessly without the need for any additional devices

19) Mapping support shall be an inherent feature of the Video Management system. It shall be possible to import the site layout as JPEG/BMP file. Camera & sensor icons can be placed on the map. Clicking a camera icon on the map brings up the live view. Likewise, alarms shall be able to be turned on/off from the map. The map shall have an auto-link feature. If this option is set and an event occurs while viewing a map layout, the view automatically shall switch to the corresponding map, which contains the event-generating device. It shall be possible to have a perspective view thus converting a 2D map to 3D

20) The VMS system shall be installed by **a manufacturer certified dealer/integrator**.

21) There shall not be any recurring cost for maintenance or software upgrade. All upgrades shall be provided free of cost for the life of the system. The end user shall be able to install the client software on as many workstations as required on the site.

22) The contractor shall provide highly resilient enterprise video management solution. Failover shall be considered for the video/recording servers. The design of the system shall be such that it is available at all times with no single point of failure. The failover shall complete within 30 seconds. Once the failed server comes back online, the failback should start immediately. All recordings from the failover server to failback server shall start automatically without any user intervention. The VMS shall also have redundant system manager configuration

23) All components of the IP video management system shall be based on Windows® operating systems.

24) The enterprise VMS shall have a dedicated system dashboard utility. The dashboard utility shall allow real time monitoring of the system health status as well as provide event statistics and graphs. The dashboard shall be based on web browser and utilize HMTL5. It shall be possible to get detailed information on status of all devices and modules not limited to CPU Usage, memory usage, network usage and disk usage. It shall provide trend analysis status of CPU, memory and network. The trending shall be possible based on day/week/month/3 months. Trend analysis shall also be possible for a particular type of event for a particular camera. In addition, the dashboard shall also provide information about user log and user action.

25) The system shall be fully distributed in nature and shall support the video signal quality control.

26) It shall be possible to use Multicast streams and shall support unlimited video inputs.

27) The IP video management system shall log all alarms and events in the system manager database.

28) The IP video management system shall utilize a system manager to provide user and database management.

29) The IP VMS shall support LDAP (Lightweight Directory Access Protocol) to allow importing of user information from active directory.

30) A dedicated integration module shall allow the VMS to integrate with other systems such as the Access control system, Fire alarm, intruder alarm, Building management system and Call for Assistance.

31) The VMS shall integrate with building management system to provide status of system health and events through open protocol such as Open Platform Communications (OPC).

32) The VMS shall be capable to export/send the system logs to any centralized log server through the network via SNMP traps/equivalent mechanism.

33) The VMS shall support advanced search functions to reduce the search time. It should be able to summarize the video data from the recorded video by extracting the events that occurred in a particular time and area. This feature shall utilize the Meta data generated by the cameras. User shall be able define areas or draw lines on the recorded frame and search based on enter, exit or motion detection.

34) The VMS shall support Google Map integration. This feature shall provide location based surveillance for the School. It shall allow monitoring the location of camera, devices, alarms and events on a single screen. It shall allow creation of layers, drag & drop icons on google map and set home position. Google map shall also be integrated with the event viewer and shall be displayed along with the event information. It shall allow measurement of distance between two points on the google map.

35) The IP video management system network shall be arranged so each area will operate independently and shall communicate via a 1000baseT (Giga-bit) network at a minimum to the System Manager. The system shall utilize virtual matrix switcher. The System Manager shall provide a user interface and database management of the IP

video management system. The System Manager shall allow for users to be restricted via software to logical configurable groups of cameras, monitors and system operations

36) Provide built in event statistics and analysis reporting system that allows generating various, general and detailed reports on functioning of the distributed security system: report on hardware failures, report on alarms, video report, various statistical reports, including alarms and hardware failures.

37) The communication between all devices shall be secure access method using SSL protocol.

CODES AND STANDARDS

1) Work shall be performed in accordance with the applicable national and local codes or standards current at the commencement of installation. The following list summarizes applicable standards:

a. National Electrical Safety Code, current edition.
b. National Fire Protection Association National Fire Codes, current edition.
c. EIA/TIA – 568: Commercial Building Telecommunications Wiring Standard.
d. EIA/TIA – 569: Commercial Building Standard for Telecommunications Pathways and Spaces.
e. EIA/TIA – 606: Administrative Standards for the Telecommunications Infrastructure of Commercial Buildings.
f. IEEE, RS 170 Variable Standard.
g. NTSC/PAL
h. IEEE 802.3 digital data network standard.
i. Premises cabling standard EIT/TIA568A.
j. Applicable local guidelines at the time of release of the bid.

2) Where more than one code or regulation is applicable, the more stringent regulation shall apply.

WARRANTIES

1) All security system components, Software, Hardware, and are to be fully warranted for parts and labor for a minimum of one year from the final successful acceptance of the CCTV system. In the event any component manufacturer warranties the item for longer than one year, the vendor will repair or replace parts and/or labor per the warranty for the length of this warranty at no cost to the client. Software/Firmware versions or other replaceable programming and revisions are guaranteed to be the latest versions/revisions for this one year.

2) The vendor will contact the equipment's manufacturer one month before the warranty is to expire to establish if a new version has become available. If newer, versions become available it will be provided and installed at no cost. If it is later determined that a new version had been available and was not provided, the vendor will provide and install the current version at no cost no matter when the discovery was made.

SUBMITTALS

1) Product Data: Include detailed manufacturer's product specifications for each component specified. Include data sheets reflecting the model numbers, features, ratings, performance, power requirements, and dimensions

2) Shop Drawings: For the IP Video Security System equipment shall include plans, elevations, sections, details, and attachments to other Work.

3) Include dimensioned plans and elevation views of components and enclosures. Show access and workspace requirements. Shop drawings shall include mounting details for all racked equipment. Such details shall include all mounting brackets, hardware, and connections to the building.

4) It is the Contractors responsibility to submit for approval the complete designed system configuration and layout showing all devices, and locations along with other required information as specified herein for the completely integrated system proposed for installation

5) Coordination Drawings: Plans drawn to scale and coordinating locations of IP Video Security System equipment. Show the following:

a. Location of items requiring installation coordination including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and other architectural features.
b. Product Certificates: Signed by the manufacturer as Certified for installation of equipment and components certifying that products furnished to the Contractor comply with requirements
c. Installer Certificates: Signed by the manufacturer certifying that installers comply with manufacturers requirements for Installation
d. Field Test Reports: Indicate and interpret test results for compliance with performance requirements of installed systems
e. Maintenance Data: Maintenance Data for Distributed Network Video Surveillance System equipment and components shall be a part of the maintenance manuals. In addition to requirements specified "Contract Closeout," include the following:
    i. Detailed operating instructions covering operation under both normal and abnormal conditions.
    ii. Routine maintenance requirements for system components.
    iii. Lists of spare parts and replacement components recommended are to be stored at the site for ready access.
    iv. Calculations and Parameters; Contractor shall submit for approval by the Owner, the calculations used and plans and diagrams for the Field of View calculations, and bandwidth calculations for the IP Video Security System.

TRAINING

a. The entire system shall be tested and demonstrated in the presence of Client representatives.
b. The Contractor shall promptly make all corrections and adjustments necessary for intended operation to the satisfaction of the owner.
c. Vendor will be required to provide training in the complete use of all parameters of the system to the staff as part of this contract, at no additional cost.

d. Training should be configured so as to take a person to a level of competence that will permit their being melded into the ongoing daily console operations with a minimum of disruption to the integrity of their normal daily functions.
e. Training is to be provided at the site or a facility maintained by either the vendor or manufacturer. All expenses such as transportation, lodging and meals are to be borne by the vendor.

SYSTEM SPECIFICATIONS

The items described in the schedules to be priced are to meet the under listed minimum specifications and of the stated model or equal and approved:

BMS CONNECTION

The CCTV system should be BMS compatible
The BMS protocol to be used is to be "BACNET IP protocol"

EQUIPMENT

GENERAL

1) All equipment and materials used shall be standard components that are regularly manufactured and used in the manufacturer's system.
2) All systems and components shall have been thoroughly tested and proven in actual use.
3) All systems and components shall be provided with the availability of an authorized distributor or integrator.
4) Systems shall be supplied of the type shown in locations as per the layout drawings or in the specifications requirements.
5) Contractor shall be responsible for selecting the correct camera lens in order to achieve the intended field of view (FOV).
6) In compliance with DPS (Dynamic Purchasing System) regulations, camera type / locations shall be as follows:

CCTV CAMERAS & SYSTEMS

The CCTV Cameras & Systems to be quoted for in this document should have the following as a minimum and should be included in the costs. They should be:

Camera Type 1a

a. The camera shall be of dome type, suitable for internal installation.
b. The network camera shall feature at least 3-5 Mega Pixel resolutions.
c. The camera shall be able to support H.264 and H.265 compression.

d. Minimum three separate streams shall be supported and each shall be possible to be configured at a different resolution, compression and frame rate. It should be possible to configure the live stream at high resolution such as 1080p, 25fps and the recording stream at 1280 x 720, 12fps. The third stream could be used for configuring sequence or multiplexed view in a lower resolution format such as 640x480, 25fps. All three streams shall be simultaneous and will not affect the performance of the cameras.
e. The camera shall feature a day / night mode that incorporates an infrared cut filter removal mechanism for true color reproduction and the best possible low light performance.
f. The camera shall feature Smart Codec functions that controls quantization parameter in H.265 and H.264 to efficiently manage bitrate of the video stream and reduce the storage required. It shall also be capable of dynamic assignment of GOV length based on the complexity of the scene to efficiently manage bitrate of the video stream and reduce the storage required. Both functions shall operate independently or can be selected to function together. The functions shall be available for both H.264 as well as H.265 compression.
g. The camera shall feature integrated IR with a viewable length of up to 20 metres.
h. The camera shall feature a varifocal lens of 2.8~12mm.
i. The camera shall feature a multi exposure true Wide dynamic range of minimum 120dB.
j. The camera shall feature a high performance 2D & 3D noise reduction that automatically adapts the type of technology used according to movement in the field of view. 2D noise reduction compares adjacent pixels while 3D technology compares the same pixel in the previous and subsequent images, giving a higher level of detail. When the camera detects movement in a region of the image it will apply 2D noise reduction to that area and 3D noise reduction to the remainder of the image.
k. The camera shall feature an automatic back light compensation technology that detects and enhances dark areas in the field of view and increases the gain in those areas.
l. The camera shall feature integrated motion detection, tampering and defocus detection analytics.
m. The camera shall have Lens Distortion Control.
n. It shall be possible to have Hallway view thus able to rotate the image to 90/270 degrees.
o. The camera shall feature privacy mask to hide certain areas from operator view.
p. The network camera shall provide video transmission in an open format with H.264, H.265 or MJPEG compression.
q. The camera shall support ONVIF profile S for operation with 3rd party systems.
r. The camera shall also support ONVIF Profile G.
s. The network camera should be configurable through a built-in web server that can be accessed via standard browsers including Internet Explorer, Firefox, Chrome & Safari.
t. The cameras shall support micro-SD/SDHC/SDXC flash memory card for upto 128GB for recording video footage on event, network loss or continuously.
u. The camera shall feature at least one alarm input and one alarm output for any localized I/O support.
v. It shall have flexible power options between 12VDC and POE.

Camera Location	**Camera Type**
Circulation Corridors,	Type 1a. Indoor full HD 1080p dome camera, 3Mpix resolution, Maximum 30fps at all resolutions, 120dB WDR, integrated Adaptive IR, 2.8~12mm varifocal lens, H.264/H.265/Mjpeg compression, multiple streams, built in I/O ports, POE & 12VDC.
External	Type 2a: Outdoor full HD 1080p Bullet camera, 3Mpix resolution, maximum 60fps at all resolutions, 150dB four frame exposure, 5~50mm varifocal lens, Multiple streams, DIS, edge analytics, built in I/O ports, POE & 12VDC.

CAMERA

Sr. No.	Feature	Requirement
1.	**Imaging Device**	1/2.9" 2.19 MP CMOS
2.	**Total Pixels**	2000 (H) x 1121(V) total; 1984 (H) x 1105 (V) effective
3.	**Scanning System**	Progressive
4.	**Min. Illumination**	
a.	**Color**	0.095 Lux (30IRE)
b.	**B/W**	0.0 Lux (IR LED ON)
c.	**G. S / N Ratio**	50dB.

LENS TYPE

Sr. No.	Feature	Requirement
1.	**Lens Type**	DC Auto Iris, varifocal
2.	**Mount Type**	Board-in type
3.	**Focal Length**	(Zoom Ratio) 2.8~ 12mm (4.3X)
4.	**Max. Aperture Ratio**	F1.4
5.	**Angular Field of View**	H: 103.8˚ (Wide) ~ 32.4˚ (Tele)
		V: 53.7˚ (Wide) ~ 18.4˚ (Tele)
6.	**Min. Object Distance**	0.5M (1.64ft)

OPERATION

Sr. No.	Feature	Requirement
1.	**Camera Title**	Off / On (Displayed up to 40 characters)
2.	**Day & Night**	Auto (ICR) / Color / B/W
3.	**Backlight Compensation**	Off, BLC
4.	**Wide Dynamic Range**	120dB

NETWORK PROTOCOL

Sr. No.	Feature	Requirement
1.	**Ethernet**	RJ-45 (10/100Base-T)
2.	**Video Compression Format**	H.264 (MPEG-4 part 10/AVC), H.254, MJPEG
3.	**Resolution**	1920 x 1080, 1280 x 1024, 1280 x 960, 1280 x 720, 1024 x 768, 800 x 600, 720 x 576, 720 x 480, 640 x 480, 320 x 240
4.	**Max. Framerate**	H.264/H.265 Max 30fps for all resolutions.
5.	**Intelligent Codec**	GOV & ROI shall be available for both H.265 & H.264
6.	**Video Quality Adjustment**	i. H.264/H.265 Compression level, Target bit rate level
		ii. MJPEG Quality level control
7.	**Bitrate Control Method**	i. H.264/H.265 CBR or VBR
		ii. MJPEG VBR
8.	**Streaming Capability**	Multiple Streaming (Up to 3 Streams minimum)
9.	**Audio**	Line In
10.	**Audio Compression Format**	G.711 u-law /G.726 Selectable
11.	**IP**	IPv4, IPv6
12.	**Protocol**	TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
13.	**Security**	i. HTTPS (SSL) Login Authentication
		ii. Digest Login Authentication
		iii. IP Address Filtering
		iv. User access Log 802.1x Authentication
14.	**Streaming Method**	Unicast, Multicast
15.	**Memory Slot**	SD/SDHC/SDXC
16.	**ONVIF Conformance**	Profile S & G. HTTP, CGI
17.	**I/O**	1 Alarm input/1 Alarm output.

ELECTRICAL

Sr. No.	Feature	Requirement
1.	**Voltage**	POE/12VDC
2.	**Consumption**	Max. 5.4W

ENVIRONMENTAL SPECIFICATIONS

Sr. No.	Feature	Requirement
1.	**Operating Temperature**	-10°C ~ +55°C
2.	**Storage Temperature**	-30°C ~ +60°C (-22°F ~ +140°F)
3.	**Operating Humidity**	Less than 90% RH

CERTIFICATIONS

1. CE mark
2. FCC mark

WARRANTY

1. 3 years, parts and labour.

For installations inside staircases, type A camera shall be provided with IK10 &IP66 Vandal proof ratings.

CCTV CABLING

The CCTV cabling should follow the following guidelines:

i.) Cabling should be done in CAT 6A Cables shielded UTP cables

ii.) Cabling should be housed in conduits unless otherwise stated

iii.) Cabling Should be done with ease of installation through identical wiring methods

iv.) Maximum cabling distance shall not be more than 100m from a switch

v.)

NETWORK VIDEO RECORDER (NVR)

The Equipment should be adaptable to function both as a Network Video Recorder (NVR) or a Digital Video Recorder (DVR)

The NVR should operate on a fully open architecture thus making it compatible with other manufacturer's devices.

The NVR should:

- Be Rack-mountable
- Have enough storage capacity of information for permanent recording of all cameras for minimum of 30 days in regards with the number of cameras
- Be a fully scalable multimedia management system. This network-based system architecture should enable simultaneous monitoring of video and audio, live and recorded, from multiple stations.
- Be complete with all accessories i.e. power cords, USB Keyboard & Mouse, Bexel Key, Rack mount kits, documentation, resource and recovery discs, etc

The NVR should be supported by the following Certifications, Ratings & Patents as a minimum:

- CE, class A; Meets EN50130-4 standard requirements
- C-Tick
- FCC, class A
- UL/cUL listed

The NVR should meet the following specifications.

Feature	Minimum Requirements
GENERAL	
Registered Channels	Between 128 to 250 per server
Support	400 Mpbs of write throughput (recording, viewing & Export) to support IP and analog video
Camera Streams	Supports up to 128 IP Camera Streams; up to 64 Analog Cameras per server
Software	Optimized to Support Pre-Installed DS NVs Software & Integrated into the NVR Hardware
Recording	Streams H.264, H.265, MPEG4, MJPEG, and G.711.
Compatibility	~ Compatible with Third-Party IP Cameras & Network Encoders ~ Compatible with DS Control Point for Simultaneous Monitoring of All DS Series and DX Series Products in a Single Client Interface ~ Compatible with the DS Archive Utility
Expandability	Expandable by Networking an Unlimited Number of Servers and Encoders (Dependent on Available Network Bandwidth)
Recording	Recording Rate Configurable per Individual Camera
Codec (Dual)	Recording codec and monitoring codec selectable by each camera
Resolution	QXGA, UXGA, SXGA, HD, SVGA, 4CIF, Half D1, VGA, CIF, QVGA.
Quality	10 Levels
Record time	Pre 1 ~ 16CH 60sec, 17~ 32CH 30sec, 33 ~ 64CH 15s Post 1200sec
Viewing, Control, Management	Unlimited Operators
Hard Disk Drives	~ Front Accessible Hard drives ~ Up to 6No. hot-swappable HDDS
Internal Storage	Up to 24TB internal per server
External Storage	Up to 24TB internal per server
Storage Options	Capability for local or network-attached storage for backup and export
Deployment	Stand-alone or network recorder
SYSTEM	
Processor	2nd Generation Intel® Core™ i7
Operating System	Windows 7 Ultimate 64-bit SP1
Internal Memory	8 GB RAM
Internal Storage (JBOD or RAID 5)	DS-SRV = [500 GB, 3 TB, 6 TB, 9 TB, 12 TB, 15 TB, or 18 TB] DS-SRV-DVD = [500 GB, 3 TB, 6 TB, 9 TB, or 12 TB] (This Will be as Specified in the Bills of Quantities)
RAID Level	RAID 5
External Storage	Up to 24 TB JBOD or RAID 5 through DX8100HDDI (requires optional DS-SRV-SCSI card)
NETWORK	
Interface	2 Gigabit Ethernet RJ-45 (1000Base-T)
Auxiliary Interfaces	USB Ports 1 front (USB 2.0) 4 rear (2 USB 3.0; 2 USB 2.0)
POWER	
Power Input	100 to 240 VAC, 50/60 Hz, auto ranging
Power Supply	Internal
Power Consumption	213W Maximum
CONNECTIONS	
Video Out	2 DVI-D connectors
Audio Out	1, 1/8-inch audio jack connector
FRONT INDICATORS	
Buttons	Power

Indicators	Unit Status Primary Network Secondary Network Software Status Hard Disk Status	Green, amber, red Green, amber, red Green, amber, red Green, amber, red (based on diagnostics) Green, red, off (behind bezel)
ENVIROMENTAL		
Temperature	Operating Temp of 10°C to 35°C (50°F to 95°F)	
Operating Humidity	20% to 80%, noncondensing	
Connectivity	ONVIF Profile S Standard Conformant or equivalent	
WARRANTIES		
Warranty	3-Year Warranty and Support	

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MONITOR

The Monitor should be of High definition.

The Monitor should meet the following specifications.

MONITOR		
Feature	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
GENERAL		
Size	Size as Specified in Bills of Quantities as Commercial Screens	
Native Resolution	Minimum 1920 x 1080p full HD native resolution.	
LED Backlight Technology	Must use energy saving LED backlighting rather than cold cathode fluorescent lights (CCFL)	
PIP	Must provide picture-in-picture (PIP) for any combination of 2 inputs.	
Energy Star certified	Must be energy Star certified, ensuring reliability in a 24/7 security installation environment	
Design	Must be constructed of a lightweight aluminum frame composition for desktop or wall-mount installations.	
Compliance	ENERGY STAR® Level 5.1 Compliant	
Response Time	6.5ms Response Time (typical)	
Viewing Angle (H/V)	178°/178°	
Refresh Rate	60 Hz	
Panel Life	50,000 plus hours (typical)	
Display Colors	1.07 billion	

Panel Aspect Ratio	16:9	
WARRANTIES		
Warranty	3-Year Warranty and Support	

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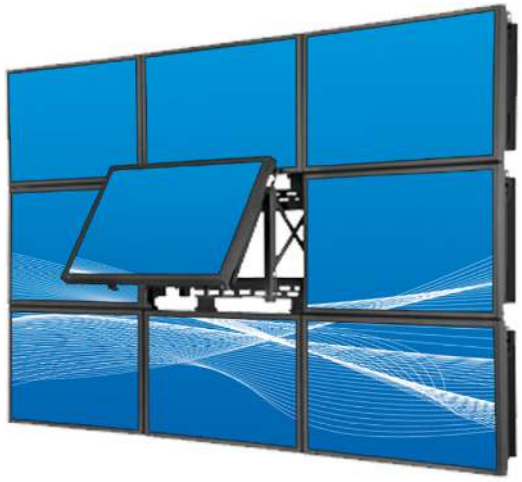
VIDEO WALL & ACCESSORIES

The Video wall and the Network Based Graphic controller should be integrated to form a compatible system that achieves a display that is comfortable to the human eye.



The Video Wall will have key features such as:

- Almost unlimited number of cascadable displays
- Expandable for future system upgrades
- Frameless design, minimal gaps
- Optimized for video walls (profile frame, ventilation system, etc.)
- Robust metal design
- Best image quality
- Optional with sensor-based Color adjustment system for LCD video walls (EYE-LCD-CAS)

The Video Wall should meet the following specifications.

VIDEO WALL		
Feature	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
VIDEO WALL SYSTEM C/W MOUNTS		
Modular-Version	With stacking frame for LCD based display walls.	
Mount	Stackable frames enable quick and simple assembly of display walls	
Gamma Correct	Dynamic adjustment over the complete gamma curve	
Internal Split Controller	Images scalable over several modules, possible up to a matrix of 10x10 displays	
Loop-through for RGB and DVI Signals:	Signal loop from display to display. Customer advantage: No additional signal distributors necessary	
PIP	Picture-in-Picture (Video on data representation) on one	

	display; possible with all displays of a display wall.	
PSS	Panel-Security-System. Security features for long-term operation to reduce the so-called image sticking effect.	
PSC	Panel-Self-Control. Provides various functions, such as automatic panel dimming, automatic temperature and ventilation adjustments and emergency cut-out.	
Control	Internal control board enables the addressing and control of all functions.	
PDS	Panel-Database-Solution. Open interface, easy connection to other systems avoids maloperations. User-friendly GUI.	
PSM	Panel-Status-Monitoring. Comprehensive and detailed survey of the complete system (status messages).	
Service-friendly	Modular design, pluggable component connections results in short MTTR (optional: Front maintenance version).	
Optimal Ventilation Concept:	Ventilation ducts for air-supply and exhaust.	
Technology	S-PVA TFT	
Display Resolution	1,366 x 768 Pixel (WXGA)	
Pixel Pitch	0.7455 mm (H/V)	
Backlight MTBF	50,000 hrs.	
Ambient Light Sensor	Automatic adjustment to the ambient light conditions (e.g. day and night adjustment)	
DISPLAY CHARACTERISTICS		
Colours	8 Bit / 16.7 million	
Aspect Ratio	16:9	
Viewing Angle	H 178° / V 178°	
Response Time	8 ms	
Contrast Ratio	3000 : 1	
Brightness	typ. 500 cd/m2 (max. 700 cd/m2)	
CONNECTORS		
Inputs	Power Supply 100-250V 50/60Hz 2 x DVI IN (DVI) 2 x RGB IN (HD15 + DVI) 2 x Composite Video (BNC) 1 x S-Video (Mini-DIN 4pol) 1 x IR (Mini Jack 2.5 mm) 1 x RS232	
Outputs	1 x DVI-D 1 x RS232	
DIMENSIONS		
Display	with Stacking Frame 1026.6 x 580.8 x 232 mm (WxHxD)	
Bezel Width	2.7 mm bottom/right, 4.6 mm top/left (Active-to-Active: 7.3 mm)	
ENVIROMENTAL		
Power Consumption	300 Watt	
DPMS	< 1 Watt	
Thermal Load	230 Watt	
Temperature	typ. 0 - 40 °C	
Humidity	typ. 25 - 60 % (max. 90% RH)	
CERTIFICATES		

EMI	CE	
ISO	ISO 13406/2 (pixel error class 2)	
SUPPORT & LOCAL DEALERSHIP		
Authorized distributor	Attach Manufacturer's Authorization Form	
Warranty	3 Year Manufacturer's warranty	
Support	2 Years comprehensive preventive and maintenance contract	
Reference	At least 3 similar reference sites within country with contact number of the customer	
Electrical Engineering Services	Category of Registration with National Construction Authority (NCA 1 -3)	
Local Support	Equipped local lab and qualified/certified personnel to provide after sale support	
Spares	Stored locally for fast replacement and minimum down time of the system.	
Standard /Rating	ISO 9001	

JOYSTICK CONTROLLER MODULE

The Joystick Controller Module will have key features such as:

- The controller shall be able to take a snapshot in a jpeg format and store it to the storage device connected to its USB port.
- When the controller is connected to a PC, it shall automatically detect the device and start installation.

The Joystick Controller Module should meet the following specifications.

JOYSTICK CONTROLLER MODULE		
Feature	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
GENERAL		
LCD	5" TFT touch LCD	
Control	Control PTZ dome cameras, DVRs, matrix switchers and virtual matrix monitor wall.	
Control Operation	Centralized control of up to 255 units with a single controller	
Connections	Connect up to 16 controllers in a system	
Outlook Design	Ergonomic design and easy-to-use keypad	

Joystick	Detachable 3D joystick to control PTZ function	
Joystick / Jogshuttle Flexibility	Detachable joystick/jogshuttle for universal use (right/left hand use)	
Protocol	Support for multi-protocol	
Interface Use	User friendly Graphical User Interface (GUI)	
Camera controls	PTZ, focus, Autofocus, Preset, Group, Tour, Swing, Swing, Trace, Auto tracking, Alarm off/on, Freeze	
Video wall control	Camera-tile (Channel) mapping, Layout (Display division mode) change	
COMMUNICATION		
Interface	RS-485/422 (Operating distance 1km), TTL (Matrix)	
Data Port	• 8-pin RJ-45 connector (Female) (RS-485 serial port) • BNC (Video input, Loop through), USB 2.0 (F/W updatable)	
Baud Rate	2,400 ~ 38,400bps	
Protocol	• PTZ - Samsung-T/E, Pelco-D/P, Vicon, AD, Honeywell, ELMO, Bosch, GE • DVR - SRD, SVR • Matrix - SMX-25632 • Receiver - Samsung-T	
OPERATIONAL		
LCD Display	5" TFT touch LCD	
Joystick	3 Axis twist zoom	
Jog Shuttle	DVR playback control	
On Screen Display	English	
ELECTRICAL		
Input Voltage	12V DC	
Input Current	4A	
Power Consumption	Max 4W	
MECHANICAL		
Dimensions	459mm x 59mm x 178mm (18.07" x 2.32" x 7") Max	
Weight	1.5Kg (3.3 lb.) Max	
WARRANTIES		
Warranty	3-Year Warranty and Support	

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SYSTEM MANAGER

The System Manager should meet the following specifications.

Feature	Minimum Requirements
HARDWARE	
Processor	Intel® Xeon® E5-2430 v2 2.50GHz, 15M Cache, 7.2GT/s QPI, Turbo, 6C, 80W, Max Mem 1600MHz
Operating System	Microsoft® Windows Server® 2008 R2 for Embedded Systems Standard (1-4 CPU, 5 CAL Version)
HDD Capacity	120GB SSD SATA Read Intensive MLC 3Gbps 2.5" Hot-plug HDD 3.5" CARR
RAID Controller	Integrated RAID Controller, Mini Type Integrated RAID Controller, Mini Type
Network	4 ports 10/100/1000
System Memory	8GB RDIMM, 1333 MHz, Low Volt, Dual Rank, x4 Bandwidth
Graphics Card	GE Force GTX 960 or better.
Optical drive	Microsoft® Windows Server® 2008 R2 for Embedded Systems Standard (1-4 CPU, 5 CAL Version)
WARRANTIES	

Warranty	3-Year Warranty and Support

WORKSTATION

The Workstation should meet the following specifications.

Feature	Minimum Requirements
HARDWARE	
Processor	4th Gen Intel Core I7-4770S Processor (Quad Core HT, 3.10GHz Turbo, 8MB, w/ HD Graphics 4600)
Operating System	Windows Embedded Standard 7 Runtime [WS7P] Embedded Systems Standard (1-4 CPU, 5 CAL Version)
HDD Capacity	128GB Solid State Drive
System Memory	8GB (2x4GB) 1600MHz DDR3 Non-ECC
Graphics Card	GE Force GTX 960 or better.
Optical drive	16X Half Height DVD-ROM Drive
WARRANTIES	
Warranty	3-Year Warranty and Support

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SOFTWARE

IP Video management System Software

NOTE: Operating software should NOT have annual renewable licenses.

The IP Video management System Software should meet the following specifications.

IP VIDEO MANAGEMENT SOFTWARE	
Feature	**Requirements**
Recording Server Software	a) The recording software shall support various video and audio formats including H.264, H.265, MPEG4, MJPEG, and G.711. b) The recording software shall support recording of video resolutions as provided by the camera. c) The recording software shall have a performance of 400Mbps of recording throughout, 400Mbps of streaming throughput and 100Mbps dedicated bandwidth for playback/backup. d) The recording software shall provide triplex operation: recording, live video transfer and recorded video transfer. Search/playback of recorded video shall also be provided. e) Consider N+1 failover recording server. The hot-stand by server shall automatically take over the functions of the failed server. f) One failover server shall be considered for every 8 recording server. g) The recording software shall support video transfer of various recording options such as continuous recording, event based recording (motion detection, I/V detection, video loss, alarm signal input) and also scheduled recording (including holiday setup). h) The recording software shall provide event notification including user-defined alert sound output, email to pre-assigned receiver, and notification to monitoring (CMS) software. An event log shall be generated to track events. i) The recording software shall provide manual backup and schedule backup to CD, DVD or external storage (USB and NAS). j) The recording software shall provide multiple disk allocation and distribution, multi-level user access and authority management, IP filtering function for

	security access, automatic search of network cameras for configuration, camera management (including IP change, configuration, and firmware upgrade), and automatic self-upgrade (with connection to Upgrade Server). k) The IP VMS shall have a central database server for maintaining all camera profiles, user profiles, alarm log, alarm events etc. l) The IP video management system shall provide support for IP cameras from multiple manufacturers. As a minimum the VMS shall support ONVIF profiles. If VMS is provided from the same manufacturer as the cameras, then no additional hardware or license would be needed to connect to third party cameras. m) For the benefit of the operator, the offered VMS shall feature bi-directional audio support n) The system shall be fully distributed in nature and shall support the video signal quality control. o) It shall be possible to use Multicast streams and shall support unlimited video inputs	
Updates	There shall not be any recurring cost for maintenance or software upgrade. All upgrades shall be provided free of cost for the life of the system. The end user shall be able to install the client software on as many workstations as required on the site	
Devices	Network Camera, Encoders	
Recording	Registered Channels max.	Between 128 to 250 per server.
	Recording Performance	up to 400Mbps of write throughput.
	Video Codec	MPEG-4, MJPEG, H.264, H.265
	Audio Codec	G.726, G.711, G.723, PCM
	Codec Dual	Recording codec and monitoring codec selectable by each camera
	Resolution	QXGA, UXGA, SXGA, HD, SVGA, 4CIF, Half D1, VGA, CIF, QVGA.
	Quality	10 levels
	Record Time	a) Pre 1 ~ 16CH 60sec, 17~ 32CH 30sec, 33 ~ 64CH 15s b) Post 1200sec
	Record Mode	Continuous, Event (Pre/Post alarm), and Scheduled.
		All cameras shall be recorded at 1920x1080, 12fps, for 31 days. Consider 10% spare capacity both in terms of camera channel as well as storage when configuring the storage
Storage	a) SAN storage shall be configured using fault-tolerant RAID-5 drive arrays. All cameras shall be recorded at 1920x1080, 12fps, for 180 days. Consider 10% spare capacity, in terms of both camera channel as well as storage when configuring the storage. If there are any applicable local guidelines at the time of release of the tender that are higher than the specified resolution and time, then the higher value shall be considered for storage b) Storage space assigning by each disk, Warning against lower disk space	
Back up	Manual	DVD/CD, USB HDD, USB flash memory
		Format: AVI, Native format.
	Schedule	NAS (Network Attached Storage), USB HDD
		Format: Native format
Operating System	All components of the IP video management system shall be based on Windows® operating systems.	

Optical Drive	Provide enterprise class hard drives specified by the drive manufacturer as suitable for RAID & IP Video applications
Viewing and Management	a) The VMS system shall be installed by a manufacturer certified dealer/integrator b) The IP video management system shall log all alarms and events in the system manager database. c) The IP video management system shall utilize a system manager to provide user and database management. d) The IP VMS shall support LDAP (Lightweight Directory Access Protocol) to allow importing of user information from active directory. e) A dedicated integration module shall allow the VMS to integrate with other systems such as the Access control system, Fire alarm, intruder alarm, Building management system and Call for Assistance. f) The VMS shall support advanced search functions to reduce the search time. It should be able to summarize the video data from the recorded video by extracting the events that occurred in a particular time and area. This feature shall utilize the Meta data generated by the cameras. User shall be able define areas or draw lines on the recorded frame and search based on enter, exit or motion detection.

Central Management Software

CENTRAL MANAGEMENT SOFTWARE	
Feature	**Requirements**
Deployment	The Security Manager software shall allow installation on a single PC or across multiple PCs in a distributed configuration.
Modules	The software shall consist of five modules; System Manager, media gateway, Workstation, Service Manager and Scheduled backup.
Devices	The System Manager Software module shall manage all of the devices and users of the system.
Events	The System Manager module shall have the capacity to manage up to 800 events per second.
Operation/Configuration	a) The System Manager module shall log all events and actions within the entire system b) The System Manager module shall manage all access to the system. c) The System Manager shall use a SQL or equivalent database. d) The System Manager shall be provided in a redundant configuration.
Media Gateway	a) The media gateway software module shall act as a relay server for the transmission of video, and events. b) The Media Gateway module shall be integrated along with the Recording Server module. c) The Media Gateway module shall be capable of handling up to 400Mbit/second incoming and 400Mbit/second outgoing bandwidth. d) Each Media Gateway module shall allow the connection of unlimited devices, limited only by the bandwidth. e) When the recording server is used along with the Media Gateway module it shall allow the connection of up to 128~250 directly connected IP cameras or encoders.
Console Software	a) The Console software module shall act as the user interface for all configuration and operation of the CCTV system. b) The Console shall support up to four directly connected monitors with any combination of multiple live / map views, a playback / backup monitor and an event viewing monitor. c) The Console live view shall support a popup instant playback window, allowing

	fast access to recently recorded images. d) The Console shall support up to 64 cameras on a single live view monitor. e) The Console shall support up to 100 simultaneous live images across four directly connected monitors, displaying up to 25 images per monitor. f) The console shall support a series of layouts including but not limited to the following 4:3 screen modes 1/4/6/8/9/10/13/16/17/21/25/36/49/64 and 16:9 screen modes 6/12/20/30. g) The Console shall feature a sequence mode capable of displaying up to 16 way split layouts. h) The Console shall support H.264, H.265, MPEG-4 and MJPEG video compression formats. i) The Console shall support G.711 u-law (PCM), G.723, G.726 (ADPCM) audio compression formats j) The Console shall support bi directional audio in either half or full duplex modes. k) The Console shall support a 'drag to move' proportional pan and tilt function. l) The Console shall support Area Zoom functionality allowing the operator to click on a point in the image to command a fully functional camera to center on that area, as well as being able to draw a rectangle on the image to command the camera to center and zoom in to the defined area. m) The Console shall support the control functions Go to 1x zoom, Focus, Zoom, Patrol, Swing/Auto pan, Group/Scan, Trace/Pattern, Preset and Iris control. n) The Console shall support split screen map / live view displays with cameras, sensors & alarms being displayed on the map as icons. There shall also be a pop up instant viewer accessible from the map camera icons. o) The Console shall feature a Simple Record function that allows the instant recording of a selected video tile for up to one hour. p) The Console shall feature OSD On/Off, Snapshot / Print Image, Brightness /Contrast control, Keep Aspect Ratio/Original size, De-interlacing, Flip and Digital zoom functions. q) The Console Search mode shall support Date, Event, Smart Search, POS Search based on DVR / NVR & Local folder playback. r) The Console Search mode shall support Start/stop, Pause, Faster/Slower forward/backward, Step Forward/Backward and Skip Forward /Backward functions. s) The Console shall be able to playback up to 16 cameras simultaneously. t) The Console shall feature a Digital Zoom function that can be used on playback. u) The Console shall feature a snapshot feature, allowing live or playback images to be saved or printed quickly. v) The Console shall feature a backup function allowing AVI or Native format files to be downloaded to local storage. w) The Console shall feature an Event Monitoring window that allows live monitoring or searching of previous events. x) The Console Event Monitoring window shall feature live or search filtering of events by User, System, Camera, Sensor, Alarm Out, Video Loss, Motion, Passing, Entering, Exiting, Disappearing /Appearing, Tampering, Scene Change, Tracking, Face Detection and Audio Detection. y) The Console Event Monitoring window shall feature a report generator that shows events and statistics. It shall then be possible to print or save this data in PDF, Word or Excel format. z) The Console Event Monitoring window shall feature an instant display, displaying the video event, event remarks and the event status. This function shall work in live monitoring or event search mode. aa) It shall be possible to define various system actions on a device event such as Instant Viewer pop up, Preset activation, Alarm out, Pop-up, Sound and E-mail notification. bb) The Console Configuration shall allow Site, User group, User account management and

	cc) Permission management for viewer functions. dd) The Console Configuration shall allow Automatic device IP scanning, Viewing the device settings via the device webpage, Exporting or importing devices settings and updating the device firmware. ee) The Console Configuration shall allow the management of layouts. These layouts can only be added, edited and deleted in the configuration mode. ff) The Console Configuration shall allow the setting of Multi Monitor defaults, Split Screen, Sequences, switching to I-Frame on a configured number of cameras being displayed and using low resolution images on split screens over a certain number of cameras. gg) The Console Configuration shall allow the setting of OSD hh) Display, Date & Time, Capture, Recording, Startup, Language, UI auto lock and Log options. ii) The Console Configuration shall allow the backup and restoration of SSM settings as well as the ability to restore settings to default values. jj) It shall be possible to download and playback videos recorded on the SD memory card from the console. kk) The software shall feature a NTP client and server function. ll) The software shall feature an automatic upgrade function downloading the latest software update from the upgrade server.
Viewing and Management	Use only manufacturer recommended hardware and OS for VMS. Use of minimum recommended configuration is not allowed. It is always recommended to use equal or better than the recommended specifications by the manufacturer.

Virtual Matrix

VIRTUAL MATRIX	
Feature	**Requirements**
Deployment	a) A virtual Matrix module shall be provided to control the monitor wall. b) It shall provide a Multi-screen management solution. c) It should be possible to run the solution on standard PC's. No proprietary hardware shall be required to install the software. d) It shall provide simple and easy configuration through the virtual matrix manager. e) It shall be possible to install the decoder software on a standard PC. f) It shall provide multi-level user access and authority support
Operation/Configuration	a) It shall be possible to setup rules for camera views and layouts b) Event-driven virtual salvo switching functions such as: Wall spot, Monitor spot, Tile spot shall be a standard feature of the virtual matrix. c) It shall be possible to have live monitoring & map display simultaneously on the decoders. d) It shall be possible to select any monitor and address any camera to this monitor. e) It shall be possible to manually drag and ping cameras into the monitor views f) Critical cameras of the facility shall be watched continuously while non critical cameras shall be sequenced. g) The virtual matrix shall provide extensive sequence options. It shall be possible to have wall sequence, where a group of monitors can be set to sequence together at the same time. h) It shall be possible to have upto four monitors per decoder. It shall be possible to display simultaneously 100 cameras across four monitors (25 cameras per monitor). If only one monitor is connected to a decoder, it shall be possible to display upto 64 cameras on one monitor. i) It shall be possible to merge multiple monitors to create a larger monitor. j) Sequencing is an important feature of the VMS. The console/workstation shall be able to switch the entire pane/layout. Individual camera connection for sequencing is not allowed.

SAN Storage (Approved makes Promise/Rasilient/Dell/Fibrenetix)

Storage Units.

The recording system should be a unified SAN with minimum RAID 6.

The SAN shall be optimized for video surveillance.
The hard disks required for recording must be enterprise level with minimum 7200rpm.

SAN Storage	
Feature	**Requirements**
Storage Units	a) The recording system should be a unified SAN with minimum RAID 6. b) The SAN shall be optimized for video surveillance. c) The hard disks required for recording must be enterprise level with minimum 7200rpm.
Functionality for Video Storage.	a) The storage hardware shall incorporate custom built Storage controller for Video Storage: i. It should have built in technology using hardware based ASM to efficiently handle streaming data like videos. ii. Storage controller shall support failover in a NSPF environment iii. Storage controller shall be host independent and O/S transparent. iv. It should provide sustained minimum throughput rate of 2400MB/s and shall also be provided to the expansions. b) Hardware shall incorporate 10GbE pots for SCSI data transfers. c) Support for 128 multiple nodes, 128 hosts and up to 1024 sessions per controller.
Scalability and Performance	a) Storage capacity shall scale linearly and non-disruptively by adding expansion JBODs. b) Hard disk drives can be added without performance degradation c) Disk and RAID sets shall be automatically configured without user intervention while adding capacity. d) Capacity scaling shall be non-disruptive allowing new capacity to be dynamically added to the system without interrupting access to data. e) Physical capacity added to the system shall be configurable into new volumes or added to existing defined volumes without the need to interrupt data access. f) The system shall support solid-state write cache if required. g) Addition of storage performance capability shall be non-disruptive and not require data access to be interrupted. h) The system shall support co-existence of different hard drive technologies within the same enclosure. i) Storage system shall support multi-path. j) Storage system shall support virtualization technologies on O/S, network and storage level.
Availability	a) Storage system shall support high availability with no single point of failure causing loss of data or interrupting access to data. b) Storage shall protect against loss of a networking path between servers and storage, including network interface card, cables and switches, with the ability storage shall support dynamic replacement of hardware components without interrupting access to data. i. Storage shall support redundant storage controllers in active-active configuration. ii. Storage shall support the ability to replace disk drives without the need to interrupt data access. iii. Storage shall support the ability to replace power supplies without the need to interrupt data access. iv. Storage shall support the ability to replace fan modules without the

	need to interrupt data access. v. Storage shall support the ability to replace servers without the need to interrupt data access. vi. Storage shall support the ability to replace network switches without the need to interrupt data access. c) Storage shall support dynamic management features to ensure continuous data access i. Storage shall be expandable by the addition of disk capacity without the need to interrupt data access. ii. Storage shall be expandable by the addition of processing capacity without the need to interrupt data access. iii. Storage shall be expandable by the addition of network bandwidth without the need to interrupt data access. iv. Storage shall support the ability to dynamically alter data protection options (RAID Level) without the need to interrupt data access to the affected data. d) Storage shall provide flexible, selectable data protection options. i. Storage shall provide enhanced RAID 6 data protection for critical data protection. ii. Storage shall provide enhanced RAID 1 data protection for higher IO performance data protection. iii. Data protection options shall be selectable and configurable on a volume by-volume basis. iv. Storage system shall provide advanced data recovery methods to maximize data availability. v. Storage system shall include dynamic virtual sparing capabilities to allow immediate rebuilding of failed drives. vi. System shall conduct background disk data verification to ensure maximum data availability. vii. System shall have the ability to prioritize data recovery versus data access and to have that priority dynamically alterable before or during data recovery. viii. System shall have the ability to prioritize recovery tasks by volume. ix. System shall provide predictive sparing to identify poor performing drives in advance of failure.
Management	a) System shall provide an easy-to-use graphical management capability. i. System shall self-discover its hardware configuration. ii. System shall provide capacity and performance usage statistics. iii. System shall provide fine-tuning capability for video streams. b) System shall allow dynamic configuration of volumes. i. System shall allow volume attributes including RAID type and volume size to be dynamically alterable without interruption of data access. ii. System shall have the ability to prioritize data migration versus data access and to have that priority dynamically alterable before and during data migrations. c) System shall include SNMP (simple network management protocol) management support.
Environmental features.	a) System shall conform to strict emission regulations and requirements. b) The system shall incorporate green technology features such as Auto disk spin down for lower energy consumption and energy efficient power supplies. c) The system shall provide advanced cooling mechanisms for increased MTBF of the overall system. d) The system shall meet all regulatory standards including RoHS, EC, CE, FCC, BSMI, UL, cUL.

SECURITY MANAGEMENT SYSTEM.

The video management system shall also function as an integrated Security management system. If such a capability is not available with the VMS then the security contractor shall provide a dedicated SMS

SECURITY MANAGEMENT SYSTEM	
Feature	**Requirements**
Deployment	a) The SMS shall seamlessly integrate access control system, video management system, intrusion detection system and call for assistance system.
Operation/Configuration	a) It shall be possible to monitor the status of various events in real time on the SMS screen. b) The SMS shall support integrated graphics to import floor layouts. c) The multi-layered map shall allow placement of camera icons, doors, I/O, CFA points etc. d) It shall be possible to monitor the status of each device. For instance the door icon shall show the status of door whether open or close while alarm icon shall show the status whether it is in the alarm state. e) Upon presence of a valid card, the SMS shall be able to display the cardholder image from the ACS database and show the live video for easy verification. f) It shall also be possible to know the health status of each item. g) The authorized user or administrator shall be able to control the door from the map. h) The SMS shall support various events from the access control system. Events such as access granted, access denied, invalid password, duress error, forced door open, change of I/O status etc shall be all available with the SMS. Upon receipt of such events, it shall be possible to link actions such as activate a relay, send an email, run a sequence on the virtual matrix, activate recording, activate sound or display of the appropriate camera on the alarm monitor. i) The SMS shall also monitor the health status of devices. For instance it shall be possible to report to the SMS system events such as video loss, analytic event, log in, log out, configuration import/export, change of time, status of HDD's, status of RAID, backup, network traffic, recording errors, manual reboots, system reset, SD card error etc. j) The SMS shall support various intercom events such as intercom busy, intercom free, station connect/disconnect, call request and I/O status change. k) It shall be possible to link a camera to the intercom event such that a call request shall pop up the nearest camera associated with the intercom. l) It shall also be possible to activate recording upon an intercom event. The recording time shall be configurable from 5sec to 20min. m) The map should show the status of the call station whether idle, off, connected or placed a call request. n) A call request event will be displayed on the top of the event list and shall stay there until confirmed by the operator. o) When multiple call request events are received, it is automatically sorted according to the call priority. p) The SMS shall support SNMP trap function to relay all event information to the BMS or NMS system. q) The SMS shall provide a dashboard application to provide graphical information of all alarms, events and health status of all devices. r) The dashboard application shall be web based and should not require a client setup. s) The dashboard shall provide event summary as well as event trend.,
Scalability and Performance	k) Storage capacity shall scale linearly and non-disruptively by adding expansion JBODs.

	l) Hard disk drives can be added without performance degradation m) Disk and RAID sets shall be automatically configured without user intervention while adding capacity. n) Capacity scaling shall be non-disruptive allowing new capacity to be dynamically added to the system without interrupting access to data. o) Physical capacity added to the system shall be configurable into new volumes or added to existing defined volumes without the need to interrupt data access. p) The system shall support solid-state write cache if required. q) Addition of storage performance capability shall be non-disruptive and not require data access to be interrupted. r) The system shall support co-existence of different hard drive technologies within the same enclosure. s) Storage system shall support multi-path. t) Storage system shall support virtualization technologies on O/S, network and storage level.
Availability	e) Storage system shall support high availability with no single point of failure causing loss of data or interrupting access to data. f) Storage shall protect against loss of a networking path between servers and storage, including network interface card, cables and switches, with the ability storage shall support dynamic replacement of hardware components without interrupting access to data. vii. Storage shall support redundant storage controllers in active-active configuration. viii. Storage shall support the ability to replace disk drives without the need to interrupt data access. ix. Storage shall support the ability to replace power supplies without the need to interrupt data access. x. Storage shall support the ability to replace fan modules without the need to interrupt data access. xi. Storage shall support the ability to replace servers without the need to interrupt data access. xii. Storage shall support the ability to replace network switches without the need to interrupt data access. g) Storage shall support dynamic management features to ensure continuous data access v. Storage shall be expandable by the addition of disk capacity without the need to interrupt data access. vi. Storage shall be expandable by the addition of processing capacity without the need to interrupt data access. vii. Storage shall be expandable by the addition of network bandwidth without the need to interrupt data access. viii. Storage shall support the ability to dynamically alter data protection options (RAID Level) without the need to interrupt data access to the affected data. h) Storage shall provide flexible, selectable data protection options. x. Storage shall provide enhanced RAID 6 data protection for critical data protection. xi. Storage shall provide enhanced RAID 1 data protection for higher IO performance data protection. xii. Data protection options shall be selectable and configurable on a volume by-volume basis. xiii. Storage system shall provide advanced data recovery methods to maximize data availability. xiv. Storage system shall include dynamic virtual sparing capabilities to allow immediate rebuilding of failed drives. xv. System shall conduct background disk data verification to ensure maximum data availability.

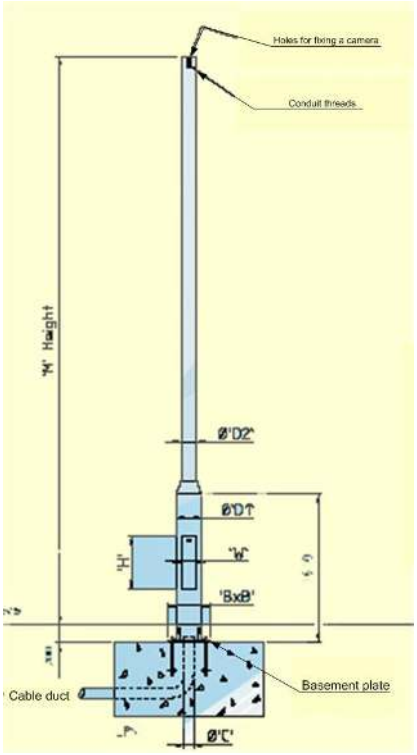
	xvi. System shall have the ability to prioritize data recovery versus data access and to have that priority dynamically alterable before or during data recovery. xvii. System shall have the ability to prioritize recovery tasks by volume. xviii. System shall provide predictive sparing to identify poor performing drives in advance of failure.
Management	d) System shall provide an easy-to-use graphical management capability. iv. System shall self-discover its hardware configuration. v. System shall provide capacity and performance usage statistics. vi. System shall provide fine-tuning capability for video streams. e) System shall allow dynamic configuration of volumes. iii. System shall allow volume attributes including RAID type and volume size to be dynamically alterable without interruption of data access. iv. System shall have the ability to prioritize data migration versus data access and to have that priority dynamically alterable before and during data migrations. f) System shall include SNMP (simple network management protocol) management support.
Environmental features.	e) System shall conform to strict emission regulations and requirements. f) The system shall incorporate green technology features such as Auto disk spin down for lower energy consumption and energy efficient power supplies. g) The system shall provide advanced cooling mechanisms for increased MTBF of the overall system. h) The system shall meet all regulatory standards including RoHS, EC, CE, FCC, BSMI, UL, cUL.

CAMERA POLES

The camera poles for any outdoor cameras shall be supplied & installed by the contractor. The minimum thresholds for installing this poles & cameras are as follows:

- A stable solution for achieving desired camera height, required height may be up to 8 meters.
- Excellent stability characteristics for achieving minimum camera movement.
- Pole should be circular
- Pole shall be tapering at the bottom.
- A desirable column where aesthetics are of importance.
- Totally concealed cable management facility
- Hot dipped galvanized for maximum weather protection both internally and externally.
- Should be painted Black on the external as the final finish
- Custom & bespoke versions tailored to customers' requirements.

The following drawing demonstrates the required columns and their technical specification.



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END

SECURITY INTEGRATION PARTICULAR SPECIFICATIONS

SPECIFIC NOTES TO TENDERERS

EXTENT OF INSALLATION

The Contractor shall carry out all the necessary works for successful installation of the services mentioned as described and set out in the technical specifications, Bills of Quantities and accompanying drawings to the satisfaction of the consulting engineers.

This will include the supply & delivery of equipment, fix, install, connect, test, label, commissioning & the associated labour to a clean and neat working system that meets every detail as described in the specification

WARRANTIES

- All equipment supplied under the scope, including all associated installations shall be warranted by the manufacturer against electronic failure for the duration specified in the specifications and if possible, a lifetime warranted against Electronic & Programming failure. ("Lifetime" means that if the electronics & programming should fail at any time it will always be replaced).

- The **bidder to specify the recommended lifespan (if any)** of the system by which date replacement of the entire system is recommended.

SYSTEM SPECIFICATIONS

The items described in the schedules to be priced are to meet the under listed minimum specifications and of the stated model or equal and approved.

BMS CONNECTION

The system should be BMS compatible

The BMS protocol to be used is to be "BACNET IP protocol"

INTEGRATION SYSTEM

The Integration System shall be installed on the premises to ensure monitoring & control of the premises to the levels desired form a Central Source.

ADMINISTRATION EQUIPMENT CABINET (FLOOR STANDING)

The Administration Cabinet (Floor Standing) should meet the following specifications.

ADMINISTRATION EQUIPMENT CABINET (FLOOR STANDING)		
Feature	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
GENERAL		
Size	Width – 800mm Depth – 1200mm Height – As described in Bills of Quantities (42U, 32U, etc.)	
Finish	Finish with Epoxy Powder Coating (RAL 9004 Black)	
Materials	• SPCC Cold Rolled Steel • Thickness: Mounting Profile 2.0mm, 19-inch Panel Mounting 1.5mm, Others 1.2mm	
Compliance	Comply with ANSI/EIA RS-310-D, IEC297-2, DIN 41491; PART 1 DIN 41494; PART 7, GB/T 3047.2-92, ETSI Standard.	
Protection	IP20	

Static Load	Load rating at 800kg	
Frame	Full Vented Top Frame with Front / Rear / Side Cable Entrance	
Top Tray	6 x 4-inch Top Fan Tray with Guard & Filter (Low Noise)	
Doors	• SIDE DOORS: 2 x Lift Off Type with Quick Release Catch & Cam Lock • FRONT DOOR: 1 x Perforated (75%) Arc-Fold with Swing • REAR DOOR: 1 x Double-section Full Perforation with Swing Handle Lock (Hexagon Honey-Comb)	
Locks	Handle Lock (Hexagon Honey-Comb)	
Cable Management	• 2 x Front Cable management c/w Cable Ring • 1 x Vertical Cable Tray	
Panel Mounts	• 1 x Set Panel Mount Support • 4 x Panel Mount with Unit Indication & Silk Screen Numbering	
Base Frame	1 x Base Frame with Provision of Cable Entrance	
Wheels	• 1 x Set of Heavy Duty Castor Wheels with Lock Mechanism • 1 x Set of Leveling Stand	
Trays	2 x Vented Equipment Fixed Tray	
Power Supply	1 x Power Distribution Unit (12 Way Vertical ZeroU PDU) with 13A UK-Type Sockets for 240V AC	
Accessories	1 Packet of M6 Cage Nuts Assembly (50pcs)	
WARRANTIES		
Warranty	3-Year Warranty and Support	

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ADMINISTRATION EQUIPMENT CABINET (WALL MOUNTED)

The Administration Cabinet (Wall Mounted) should meet the following specifications.

ADMINISTRATION EQUIPMENT CABINET (WALL MOUNTED)		
Feature	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
GENERAL		
Size	Width – 600mm Depth – 600mm Height – As described in Bills of Quantities (16U, 9U, etc.)	
Finish	Finish with Epoxy Powder Coating (RAL 9004 Black)	
Materials	• SPCC Cold Rolled Steel • Thickness: Mounting Profile 2.0mm, 19-inch Panel Mounting 1.5mm, Others 1.2mm	
Compliance	Comply with ANSI/EIA RS-310-D, IEC297-2, DIN 41491; PART 1 DIN 41494; PART 7, GB/T 3047.2-92, ETSI Standard.	

Protection	IP20	
Static Load	Static Load rating at 60kg	
Frame	Full Vented Top Frame with Front / Rear / Side Cable Entrance	
Fan	2 x 4-inch Fan (Low Noise) on Vented Top Flush Panel	
Doors	• SIDE DOORS: 2 x Side Door with Cam Lock • FRONT DOOR: Tempered glass Door with Cam Lock and 180 Degree Swing	
Locks	Handle Lock (Hexagon Honey-Comb)	
Cable Entance	Top and Bottom modular cable entrance	
Panel Mounts	• 4 x Panel Mount with Unit Indication & Silk Screen Numbering	
Mounting	1 x Integrated Wall Mounting Panel with support to hold the cabinet to its maximum static load	
Trays	2 x Vented Equipment Fixed Tray	
Power Supply	1 x Power Distribution Unit (6 Way PDU) with 13A UK-Type Sockets for 240V AC	
Accessories	1 Packet of M6 Cage Nuts Assembly (50pcs)	
WARRANTIES		
Warranty	3-Year Warranty and Support	

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2c. SPECIAL NOTES TO ALL TENDERERS

18. **CONTRACT TYPE:** This is a fixed price Contract and no claims shall be entertained on whatever ground. The Contractor is advised to include all such costs as the projects may arise in this unit rates. Any variations in the exchange rate will also be no excuse for any variations in the contract sum.

19. **COPYRIGHT:** The copyright of this specification is vested in the Engineers and no part thereof may be reproduced without their express permission, given in writing.

20. **CURRENCY:** The specifications must be priced in Kenya Currency i.e. Shillings and Cents unless Otherwise as may be expressly stated

21. **QUALIFICATION:** The tenderer shall not otherwise qualify the text of this specification. Any alteration or qualification made without authority will be ignored and the text of the specification as printed adhered to.

22. **BILLS OF QUANTITIES:** The Bills shall be read in conjunction with the Preliminaries, General Conditions of Contract, Technical Specifications and Drawings

23. **PAGES IN DOCUMENT:** The tenderer is required to check the number of pages in this document and should any be found to be missing or the figures indistinct, he/she must inform the Engineers at once and have the same rectified. Should the tenderer be in doubt the precise meaning of any item, word or figures or for any reason whatsoever observe any apparent omission of words or figures, he must inform the Engineers in order that the correct meaning may be decided upon before the date for the submission of the tenders.

24. **RATES & PRICES:** The rates and prices tendered in the priced Bills of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Plant, equipment, labor, supervision, materials, erection, maintenance, insurance, profit, together with all general risks, liabilities and obligations set out or implied in the Contract, including taxes and duties (including V.A.T). The quantities given are provisional and are for guidance only. The whole works shall be re-measured upon practical completion.

25. **FILLING OF RATES:** A rate or price shall be entered against each item in the priced Bills of Quantities, whether quantities are stated or not. The cost of items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bills of Quantities.

26. **PRICE ALLOWANCES:** The tenderer shall be deemed to have made allowances in his unit prices generally to cover items of preliminaries or additions to prime cost Sums or other items priced against the respective items.

27. **TAXES:** The tenderer's price shall include all government taxes including duties, VAT, etc. No claims whatsoever will be allowed if the tenderer does not price them as aforementioned. VAT must be calculated for all sums as filled in the document which includes contingencies, PC Sums etc.

28. **COST:** The whole cost of complying with the provision of the Contract shall be included in the Items provided in the Bills of Quantities, and where no items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

29. **TENDER EXPENSES:** In no case will expense incurred by the tenderer in preparation of this tender be reimbursed.

30. **REFERENCES:** General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bills of Quantities. Reference to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bills of Quantities.

31. **PC SUMMS & CONTINGENCIES:** Provisional Sums and contingencies included and so designated in the Bills of Quantities shall be expended in whole or in part at the sole discretion of the Engineer.

    Under no circumstances shall the contingencies in the BQ be used to cater for contractor's omissions or underquoting of items listed in the Bills.

    Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the PC sums and contingencies if the client were to remove the PC Sum item

32. **ERRORS:** No liability whatsoever will be admitted nor claim allowed in respect of errors in the completed tender due to mistakes in this document which should have been rectified in the manner described above.

    Errors in pricing will be corrected by the Engineer for any arithmetic errors in computation or summation as follows: -

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

    c) Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Engineer, there is an obviously gross misplacement of the decimal point in the unit prices, in which event the total amount as quoted will govern and the unit rate will be corrected.

33. **MATERIALS ORDERING:** The Contractors shall be solely responsible for the accurate ordering of materials in accordance with the drawings and these specifications.

34. **CLIENT SUPPLY ITEMS:** The client has the right to choose between the contractor to supply specific fittings / items as specified and the fittings / items being a direct procurement by the client.

    Under no Circumstances shall the contractor claim any costs e.g. profits, attendance, etc. connected to the "Client Supplied" items if the client were to Omit any items noted as "Client Supply" in the Bills

Signed (As in form of Tender)_____

Official Stamp & Date _____

2d. PARTICULAR QUALIFICATION FOR BIDDERS

TABLE 01:

NOTE: All Attachments should be bound in 1No. document with fliers separating the particular sections which shall be presented as part of the Bid

BIDDERS REQUIREMENTS			
Item	**Feature**	**Minimum Requirements**	**Bidder's Response / Comment (√ or X)**
A	***MANDATORY REQUIREMENTS FOR BID EVALUATION***		
A1	**Company / Firm Registration Certificate**	Attach Certificate	
A2	**Registration with Relevant Bodies & Category as applicable** (Note: For Any Document Listed, Documentary Evidence of the Certificate should be Attached)	NCA	
		LOCAL AUTHORITY	
		P.I.N Registration Certificate	
		VAT Registration Certificate	
		Tax Compliance Certificate	
		Manufacturers authorization letters	
		OTHER (Fill in Pen)	
A3	**Company Profile** A detailed soft company profile indicating the principle place of business MUST be attached to the Bid (Hard Copy or Soft	Attach	

	copy in CD / USB Flash drive)		
A4	**Power of attorney of signatory of Bid (if Joint Venture)**	Attach Copy	
A5	**Indicate Total Annual Revenue of Construction work performed in the last 3 years in KShs.** • Attach Proof of Financial Statements • Attach Bank Contacts: Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Employer.	2019	
		2020	
		2021	
A6	**Long Lead Items Program of Works:** Bidder to attach a Proposed program (Work method and schedule), Descriptions, drawings, and charts, as necessary, which show the lead times for the long lead items timelines	Attach	
B	***OTHER REQUIREMENTS***		
B1	**Brochures of Equipment's offered**	Attach with all details	
B2	**Financial Resources Access:** • Evidence of access to Financial Resources to meet the qualification requirements: cash in hand, lines of credit, etc. • List here as appropriate & Note that Proof in Documentary Evidence may be require to be provided upon request	Attach	
B3	**Equipment Guarantee (By bidder) and warranty period specified by manufacturer** **Note:** Minimum of 24 Months is required **Note:** Schedule to be attached of all equipment on warranty	Attach: Note: Warranty shall be specific from date of completion of project.	
B4	**Annual Maintenance Charges** **After expiry of DLP and Warranty Period, indicate the proposed charges to be levied for annual maintenance of equipment and accessories** Note: The above are to be labour only charges excluding parts which shall be fitted only with prior approval by the client	1st Year (KShs.)	**Kshs.**
		2nd Year (KShs.)	**Kshs.**
		3rd Year (KShs.)	**Kshs.**
B5	**Foreign Currency**	State Foreign currency used in the pricing (if any) and rate of exchange to KShs.	**1…… (Foreign Currency)**

			= ……. KShs.
B6	**Response Time**	In event of emergency, the response time shall be how many hours (Preferred is 3 Hours)	**…… Hours**

TABLE 02:

1.11	**Work of a similar nature and volume performed as Prime Contractor over the last five years. The values should be indicated in the same currency used above. Also list details of work under way or committed, including expected completion date.**			
PROJECT NAME & COUNTRY	**CLIENT / CONTACT PERSON**	**LEAD CONSULTANT**	**TYPE OF WORK DONE & YEAR OF COMPLETION**	**CONTRACT VALUE (KShs.)**

TABLE 03:

1.12	**Qualification and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data.**		
POSITION	**NAME**	**QUALIFICATIONS**	**YEARS OF EXPIRIENCE IN PROPOSED POSITION**

PROJECT MANAGER			
SITE FOREMAN			
OTHER(S)			

TABLE 04:

1.13	**Proposed contracts and firms involved.**		
SECTION OF THE WORKS	**VALUE OF CONTRACT**	**CONTRACTOR (NAME & ADDRESS)**	**EXPIRIENCE IN SIMILAR WORK**

TABLE 05:

1.14	**Information on current litigation in which the Bidder is involved.**	
OTHER PARTY(IES)	**CAUSE OF DISPUTE**	**AMOUNT INVOLVED**

TABLE 06:

1.15	**Additional Requirements:** Bidders should provide any additional information required in these documents to fulfill the requirements thereof if applicable

Signed (As in form of Tender)_____

Official Stamp & Date _____

EVALUATION CRITERIA (ICT AND SECURITY)

A TENDER INTRODUCTION

All the returned bids were evaluated for responsiveness and compliance with tender conditions.
A responsive bid is one that conforms to the stipulated tendering procedures and also reflects as closely as possible, the actual scope of the task to be performed. The following are generally considered as indications of responsiveness:
(i) Completion of Form of Tender

(ii) Consistency and fairness of the unit rates

(iii) Completion of document
(iv) Complying with the technical specifications stipulated in the Tender document

B PRELIMINARY EVALUATION

MANDATORY EVALUATION		
ITEM	**MANDATORY REQUIREMENT**	
1	Filled 1. Form of Tender 2. Form of undertaking 3. Form of Bond	Client to confirm
2	Certificate of incorporation/registration /CR12	
3	Valid tax compliance certificate	
3	Valid registration with National Construction Authority (NCA1) in Electrical Works	
4	NCA Current and Valid Annual Contractor Practicing License of the Category at Least NCA 4.	
4	Copy of Current Class of licenses with the Communications Authority of Kenya	
5	Business Permit	
6		
5	Company Profile (emphasis on ICT and Security Works)	
7	Valid County Government Electrical Licences	
8	Catalogues for Equipment (**All the material specified in the BoQ**) to be supplied.	
9	Signed and stamped **Business Probity and Litigation History (Appendix 2)**	
	RESULT	

C DETAILED TECHNICAL EVALUATION

ITEM	DESCRIPTION	Marks Total 70
1	**Compliance With Technical Specifications: (Note: Tender Evaluation Committee to carryout analysis showing how decision on this requirement has been arrived at)** *Evidence of the requested items shall be attached by the Bidder for Evaluation.*	
1a	*Technical Compliance as per* ***Technical Compliance Schedule*** *Below* ***(100% yes 22 otherwise 0 mark)***	*22*
1b	*Procurement schedule for local and long lead Equipment / items*	*7*
2	**Experience of the Firm in Electrical and Fire Installations projects** Above 10 years – 7 marks Above 5 years – 3 marks Less than 5 years – 1 mark **Proof:** • Provide Three (3No.) projects of similar nature, complexity or magnitude in the last 5 years • Attach contracts or completion certificates from respective Architects, Clients and indicate the year the project was carried out.	7
3	**Qualification And Experience of the KEY Personnel** Academic Qualifications and Experience (Evidence to be provided)	
3a	**Director of the firm: - 1No.** Holder of at least a Diploma with 10yrs experience in relevant Engineering field	3
3b	**Project Managers: - 1No.** Holder of at least a degree with 10yrs experience in relevant Engineering field	3
3c	**Site Agents/Foremen** 1No. Site Agents with degree or Diploma in Electrical Engineering as a minimum with minimun 5 years experience *(Failure to provide relevant minimum years of experience, C.Vs , employment contracts and copies of relevant certificates will score Zero)*	3
3d	Artisans with Trade Test Certificate in Relevant Field: - 5No. Holder of at least a Certificate in electrical engineering with 10yrs experience in relevant Engineering field. Must be NCA Registered. *(Failure to provide relevant minimum years of experience, C.Vs , employment contracts and copies of relevant certificates will score Zero)*	3
3e	Occupational Health & Safety – First Aider (Bidder to provide CVs supported by academic/professional certificates) One (1No.) First Aid Providers trainer registered under the Company or collaborating companies.	1

Financial Reports

4a	**Financial capability:** Analysis on Audited Financial Statements, Financial position, Bank statements, Turnover; • Average Annual Turnover equal to or greater than the expected turnover of the Bid sum: - 10Marks • Average Annual Turnover above 50% but below 100% of the expected turnover of the Bid sum: - 6Marks • Average Annual Turnover greater than 25% and below 50% of the expected turnover of the Bid sum: - 2Marks • Average Annual Turnover less 25% of the expected Turnover of the Bid sum: - 0 Marks	10
4b	**Financial Resources:** Evidence of Financial Resources (Certified Accounts, Cash at Hand, Lines of Credit, Overdraft facility, etc.) • Has financial resources to finance the projected **monthly cash flow** for 3 months: -6Marks • Has financial resources to finance the projected **monthly cash flow** for 2 months minimum: - 3Marks • Has financial resources to finance the projected equal to the projected **monthly cash flow**: - 1Marks • Has financial resources to finance the projected less than the projected **monthly cash flow**: - 0Marks	6
5	**Adequacy of Tools and Equipment** • Bidder must give proof of ownership or leasing	
	Transportation Equipment	
	2No. Trucks	1
	2No. Pickups'	1
	Various Drilling, cutting, joining and welding tools	2
	Various Testing Equipment	1
TOTAL Marks		**70**
PASSMARK 49		

Note: Only bids that score 70% and above in the technical evaluation shall proceeed to the financial evaluation stage.

D. FINANCIAL EVALUATION

Tender sums submitted by bidders who attain a score of 70% and above in the technical evaluation stage shall be analysed. Refer to Table D1 below for details:

D1. COST ANAYLSIS

	EVALUATION	
	ENGINEER'S ESTIMATE	**TENDERER**
Tender sum		
Number of the tenderer before Analysis		
Difference from the Engineer's Estimate		
Percentage Difference from the Engineer's Estimate		
Corrected Figure (After Analysis)		
Error		
Percentage Error		

D2. AWARD ANALYSIS

Award shall be made to the bidder with the highest combined score (quality-cost). Refer to Table D2 below for details:

TENDERER	**TECHNICAL SCORE (/100)**	**FINANCIAL SCORE(/100)**	**COMBINED SCORE = TECHNICAL SCORE + FINANCIAL SCORE**

Note: Technical score = 70% weight,
Financial score = 30% weight
Combined score = Technical Score + Financial Score

SECTION 03:

Bills of Quantities

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A1	**CCTV Cameras**				
A1.01	**CAMERA 01 - IP Dome Camera as Hikvision or other equivalents subject to Engineer's approval:**	No.	33		-
	IP Camera c/w Licence, mounting accessories and all other accessories as described in the particular specifications of this document. **To have the following parameters:** • Dome Indoor Camera with Vandal Proof IK10 Rating • IP67 Rated • View Angle - 110 Degrees Minimum • Resolution - 4MP • Lens shall be Varifocal, motorized lens, 2.8 to 112 mm • 24/7 colorful imaging • All other properties as described in particular Specification of camera Model				
A1.02	**CAMERA MODEL 02 - IP Bullet Camera as Hikvision or other equivalents subject to Engineer's approval:** **IP Camera c/w Licence, mounting accessories and all other accessories as described in the particular specifications of this document.** **To have the following parameters:** • Outdoor Camera c/w Vandal-resistant IP67 rated casing and IK-10 Impact-Resistant • Resolution - 6MP (2560 x 1440) minimum • IP cameras wired over ethernet Lens shall be Varifocal, motorized lens • Camera shall have D&N functionality for H.265 & 50m IR range. • True Day/Night Functionality with Mechanical IR Cut Filter • Onboard Storage: Built-in microSD/SDHC/SDXC slot, upto 256GB • Power supply (12VDC, 24Vac, POE). • Adjustable stand / clamp for easy mounting • All other properties as described in particular Specification of camera Model	No.	28		-

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A1.03	**Sub - Total for CCTV c/f to PRICE SUMMARY PAGE**				**-**

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A2	**Horizontal Cabling**				
A2.01	**Cabling (UTP):** Horizontal cabling for Cameras wired in 4 pair outdoor Shielded UTP CAT 6A CU cables drawn in Conduitwork / trunking and radiating in a star topology from the Switches in the designated IT cabinets to the individual cameras & Including Associated accessories including factory terminated RJ45 sockets and modules to enable a full operation of the installations.	No.	73		0
A2.02	**FIBER CABLING:** (Appartment blocks cabinets to main cabinet in control room): 2-Core External Grade fiber optic cable (Singlemode) 62.5/12.5 micron.	LM	100		0
A2.03	**ADAPTER JUNCTION BOXES:** 100 x 100 x 60mm deep waterproof 3-compartment PVC adaptable box with 6No. 32/38 mm knock-out provisions for trunking / conduit- link interphase	No.	34		0
A2.04	**Sub - Total for Horizontal Cabling c/f to PRICE SUMMARY PAGE**				-
A3	**Cabinet and Accessories**				
A3.01	**ICT Rack:** Wall mounted 12U Administration Equipment Cabinet for housing all the accessories c/w all other accessories as described in the particular specifications of this document. Dim: W=600mm, D=600mm	No.	3		0
A3.02	PDU with at least 4No. Switched socket outlets and neon indicators as APC or Eaton	No.	3		0
A3.03	**POWER SUPPLY:** Power supply to the various components that need to be powered within the entire CCTV installation and any necessary earthing.	Item	1		0
A3.04	**Sub - Total for Cabinet and Accessories c/f to PRICE SUMMARY PAGE**				-

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A4	**Central Active Equipment - Network Switch, NVR & Storage**				
A4.02	**Network Switch:** 48 Port 10/100/1000 PoE + 2 SFP Standard Image Switch with 2GBIC fiber ports and structured multilayer software Image with in-line power c/w stacking Kit & stacking cables. The switches to be procured from channel partners complete with warranty certificate & support. Proof of where the switch was procured will be required. • Each Port of the switch shall have a POE rating of at least 15W • This shall be as Ubiquiti, Ruckus	No.	2		0
A4.03	**Switch Modules:** Single mode Fiber modules for the above switches. Should be 10G	No.	4		0
A4.04	**Fiber Patch Panel:** 12 port Fiber Optic Modular Panel with the option of using SC, LC or MT-RJ adapters	No.	1		0
A4.05	**Cable Managers:** 2U Cable managers for patch cords, horizontal and vertical cables e.t.c to approved cable organizers	No.	4		0
A4.06	**Adaptors:** Duplex LC Fiber Adaptors	No.	2		0
A4.07	**LC Connectors:** Duplex LC Fiber Connectors	No.	4		0
A4.08	**Fiber Patch Cords:** Factory terminated Fiber patch chords (LC - LC)	No.	2		0

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A4.09	**Storage:** 64-Channel Network Video Recorder to accomodate all the cameras above. This shall be based on the the following: • Storage discs (SSD type) for the system above shall store data for the cameras connected to the NVR • Calculations of the storage to be attached in submission • Number and size of storage disks to be stated • Storage recording shall be at 15fps minimum • Storage compression shall be at 30% as a minimum • Storage capacity shall be a minimum of 30 days *Bidder to fill the following:* • Storage Capacity (TB) =	No.	1		0
A4.10	**Accessories:** Mounting brackets, fixing, accessories such as RJ 45 connectors, fly / interconnect cables, HDMI cables terminations, labling etc.	Item	1		0
A4.11	Any other additional accessories required for the complete installaion of the system to ensure functionality.	Item	1		0
A4.12	**Sub - Total for Central Active Equipment - Switch, NVR & Storage c/f to PRICE SUMMARY PAGE**				-
A5	**Power Back Up Equipement**				
A5.01	**UPS:** 1000VA Rated Online UPS; Single phase IN / Single phase OUT c/w the features outlined in the particular specifications herein.	No.	2		-

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A5.02	**Sub - Total for Power Back Up Equipement c/f to PRICE SUMMARY PAGE**				**-**

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A6	**Labeling and Termination Works**				
A6.01	**CABLE MANAGEMENT:** Sum for cable Ties for holding the cables above to the cable trays and cabinets	Item	1		0
A6.02	**LABELLING:** Allow sum for putting permanent Labels on all installations including cabling as required	Item	1		0
A6.03	**SIGNAGE:** Sum for putting up CCTV Surveillance Signages as required by the international standards.	Item	1		0
A6.04	**Sub - Total for Labeling and Termination Works c/f to PRICE SUMMARY PAGE**				**-**

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
	PRICE SUMMARY PAGE				
Item	**Description**				**TOTAL (KShs.)**
A1	CCTV Cameras				-
A2	Horizontal Cabling				-
A3	Cabinet and Accessories				-
A4	Central Active Equipment - Network Switch, NVR & Storage				-
A5	Power Back Up Equipement				-
A6	Labeling and Termination Works				-
A7	**Preliminaries:** Sum for Preliminaries & Contractual Conditions				-
A8	**LIAISON:** Contractor liason with Service Providers, Client team, etc for connections and all matters pertaining the Installations for the project	Item	1		0

Item	Description	Unit	Qty	RATE (Kshs)	COST (Kshs)
A9	**DOCUMENTATION:** Sum for Completion documents: Comprising Workshop drawings, manufacturer's technical product catalogues, users manuals, maintenance manuals, as installed drawings, test certificates, etc. **{NOTE: Penultimate Valuation will not be paid until these are fully availed & signed off by the engineer}**	Item	1		0
A10	**TESTING & COMMISSIONING:** Sum for Installations, Termination, Programming, Testing, Customization and Certification of all the above mentioned system to a working and functional condition. This shall include providing of all Testing Equipment and Connection to the existing LAN/WLAN.	Item	1		0
A11	**TRAINING:** Sum for Training of client personel / users (At least 5No Staff for 1Week)	Item	1		0
A12	**DLP SUM:** Sum for 6 months comprehensive maintenance from date of practical completion i.e. for maintainance and replacement of consumables such as blown out devices	Item	1		0
A13	Contigency				400,000
A14	**TOTAL Excl. of VAT**				**400,000**

B STRUCTURED CABLING

	All Rates to be Inclusive of VAT				
Item	**Description**	**Unit**	**Qty**	**Rate (Kshs.)**	**Cost (Kshs.)**
B1.01	**DATA POINTS:** Horizontal cabling for data outlet points wired in 4 pair UTP CAT 6A CU cables drawn on cable tray, tunking and/or conduiting and radiating in a star topology from the existing Administration cabinet. As Siemons	No.	41		-
B1.02	**DUAL GANG SOCKETS:** Rj45 Dual Gang socket outlet / faceplate c/w modules As Siemons	No.	1		-
B1.03	**SINGLE GANG SOCKETS:** Rj45 Single Gang socket outlet / faceplate c/w modules As Siemons	No.	9		-
B1.04	**DESK PATCH CORDS:** Drop cables / flyleads. Factory terminated, 3 meters long CAT 6A As Siemons	No.	2		-
B1.05	**CABINET PATCH CORDS**: Cat 6A stranded 4 pair UTP patch cord. Factory terminated, 1 meter long CAT 6A. As Siemons	No.	41		-
B1.06	**DATA PATCH PANEL:** 24 port Data patch panel as siemons	No.	2		-
B1.07	**FIBER PATCH PANEL:** 12 port Fiber Optic Modular Panel with the option of using SC simplex, LC duplex or MT-RJ adapters	No.	1		-
B1.08	**CABLE MANAGER:** Provide 1HU cable organizers for patch leads, horizontal cabling etc to approval.	No.	2		-

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)
B1.09	Fibre Polishing, termination testing and labelling	Item	1		-

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)
B1.10	Rack PDUs - with minimum 8 No. switched outlets each c/w neon light. As APC or EATON	No	2		-
B1.11	**Network Switch:** 24 Port 10/100/1000 PoE + 2 SFP Standard Image Switch with 2GBIC fiber ports and structured multilayer software Image with in-line power c/w stacking Kit & stacking cables. The switches to be procured from channel partners complete with warranty certificate & support. Proof of where the switch was procured will be required. • Each Port of the switch shall have a POE rating of at least 15W • This shall be as Ubiquiti, Ruckus	No.	2		0
B1.12	**Switch Modules:** Single mode Fiber modules for the above switches. Should be 10G	No.	2		0
B1.13	**Fiber Patch Panel:** 12 port Fiber Optic Modular Panel with the option of using SC, LC or MT-RJ adapters	No.	1		0
B1.14	**Cable Managers:** 2U Cable managers for patch cords, horizontal and vertical cables e.t.c to approved cable organizers	No.	1		0
B1.15	**Adaptors:** Duplex LC Fiber Adaptors	No.	2		0

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)
B1.16	**LC Connectors:** Duplex LC Fiber Connectors	No.	4		0
B1.17	**Fiber Patch Cords:** Factory terminated Fiber patch chords (LC - LC)	No.	2		0
B1.18	**Ceiling Mounted Wireless Access Point:** **D**ual-band (2.4GHz & 5GHz) with support for IEEE 802.3af/at, built-in omnidirectional antennas, and PoE (Power over Ethernet) capability. The unit shall include mounting accessories, configuration to the existing network, and all necessary terminations for complete functionality. Equivalent to **Hikvision DS-3WAP522-SI** or approved equivalent, suitable for indoor corridor coverage, with a minimum data rate of 1200 Mbps and coverage radius not less than 30 meters.	No	30		-
B1.19	Labelling of RJ45 sockets to approval.	Item	1		-

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)
B1.20	Termination of data horizontal cables at both ends.	Item	1		-
B1.21	Allow sum for attendance to furniture specialists in terms of proper and stipulated cable management within the furniture to the point of use	Item	1		-
B1.22	Allow for fixing permanent labels on all the equipment and sockets.	Item	1		-
B1.23	Allow sum for liaison with independent service providers	Item	1		-
B1.24	Testing and commissioning	Item	1		-
B1.25	Complete telecommunication earthing to IEE requirements including earth cable, earth rod/matt, earth pit, earth clump and any other necessary accessories c/w soil conditioning that may be required to achieve the stipulated values.	Item	1		-
B1.26	**TOTAL FOR STRUCTURED CABLING c/f to GRAND SUMMARY PAGE**				**-**

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)

GRAND SUMMARY PAGE

ITEM	DESCRIPTION			TOTAL (KShs).
0	Preliminaries and General conditions			-
1	Structured cabling Installations			-
2	**ATTENDANCE & LIAISON:** Allow sum for attendance to other specialists, Contractors & Management team e.g. Security, Building management, Client, BMS, etc.	Item		
3	**DOCUMENTATION:** Sum for Completion documents: Comprising Workshop drawings, manufacturer's technical product catalogues, users manuals, maintenance manuals, as installed drawings, test certificates, etc. **{ NOTE: Penultimate Valuation will not be paid until these are fully availed & signed off by the engineer }**	Item		
4	**TESTING & COMMISSIONING:** Sum for Testing and commissioning of the entire installations Including complete with all accessories, interconnections, controls, BMS link & activation and the necessary programing.	Item		
5	**TRAINING:** Sum for Training of client personel / users (At least 5No Staff for 1Week)	Item		
6	**DLP SUM:** Sum for 6 months comprehensive maintenance from date of practical completion i.e. for maintainance and replacement of consumables such as blown out devices	Item		
7	Contigency	Item		300,000

Item	Description	Unit	Qty	Rate (Kshs.)	Cost (Kshs.)
G2	**TOTAL Excl. of VAT**				**300,000**

C LIGHTNING PROTECTION

ITEM	DESCRIPTION	UNIT	QTY	RATE (Kshs)	COST (Kshs)
C1	**Lightning Protection**				
C1.01	LIGHTNING ROD: Modular Lightning rod with Early Streamer Emission lightning conductor & Incorporates Optimax technology. This should include self Testing Kit. This is as PREVECTRON® 3 S 60TC	No.	1		-
C1.02	STEEL MAST (LIGHTNING ROD): Appropriate Steel mast of 35mm Diameter and 3 Meter height Including Prevectron Adaptor and all other mounting accessories	No.	1		-
C1.03	INFORMATION SIGN: Appropriate Lightning protection Information sign in English	No.	1		-
C1.04	TESTING REMOTE: PREVECTRON® 3 Self Testing Digital Remote	No.	1		-
C1.05	DOWN CONDUCTORS: 25mm x 3mm tinned annealed copper tape as Furse Cat. Ni. TC 230 or Braided Bare Electrolytic Copper Cable of 95mm Diameter	LM	50		-
C1.06	CONDUIT LINK: 50mm diameter Heavy Gauge PVC conduits concealed in Building fabrics linking radially from the Roof to the Ground c/w all accessories (Couplers, Half threads, etc)	LM	50		-
C1.07	TEST JUNCTION: Oblong test / Junction for 95 mm sq CU down conductor. This shall be wall mounted rescessed consisting of manual disconnection system and in a 160mm by 118mm x 75mm Deep PVC water resistant (IP65) Box.	No.	3		-
C1.08	COUNTER: Lightning strike counter to Log in the lightning strikes that occour within the external lightning protection system. This should have a range of upto 100kA (10/350 µS). This should be as Ingesco CDR-1.	No.	2		-
C1.09	BONDING: Equipotential Bonding of the lightning protection system to the main earthing system present in the proposed development	Item	1		-
C1.10	ACCESSORIES: Saddles, fasteners, Clips and clamps etc required for securing the various installations	Item	1		-

C1.11	Contigency				50,000
C1.12	**Total Exclusive of VAT to electrical price summary page.**				**50,000**

ICT AND SECURITY PRICE SUMMARY PAGE

ITEM	DESCRIPTION	COST (Kshs)
1	CCTV	400,000
2	Structured Cabling	300,000
3	**DOCUMENTATION:** Sum for Completion documents: Comprising Workshop drawings, manufacturer's technical product catalogues, users manuals, maintenance manuals, as installed drawings, test certificates, etc. **{ NOTE: Penultimate Valuation will not be paid until these are fully availed & signed off by the engineer }**	
4	**TESTING & COMMISSIONING:** Sum for Testing and commissioning of the entire installations Including LV and Switchgear complete with all accessories, interconnections, controls, and the necessary programing.	-
5	**TRAINING:** Sum for Training of client personel / users (At least 5No Staff)	-
6	**DLP SUM:** Sum for 6 months comprehensive maintenance from date of practical completion i.e. for maintainance and replacement of consumables such as blown out devices	-
7	Preliminaries	35,000
8	**Total Exclusive of VAT**	735,000

9	**Add:** 16% VAT	117,600
10	**Total for 1No. Block Electrical Installations Inclusive of VAT**	852,600
11	**2No. Blocks**	2
12	**Total for 2No. Block Electrical Installations Inclusive of VAT**	1,705,200

Total amount in words: Kshs_____

Name of firm / company _____

Official rubber-stamp _____

P.I.N. No.: _____V.A.T. Reg. No. : _____

Signed by: _____ Date _____