REPUBLIC OF KENYA
MANDERA COUNTY GOVERNMENT

TENDER DOCUMENT

FOR

INSTALLATION OF CCTV CAMERAS, IP PBX AND LAN CABLING AT NEW COUNTY HEADQUARTERS IN MANDERA EAST SUB COUNTY

IN

MANDERA COUNTY

MCG/OT/78/2020-2021

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INTRODUCTION

1.1 This standard tender document for the procurement services has been prepared for use by procuring entities in Kenya. It is to be used in the procurement of all types of services e.g.

i. Security.
ii. Cleaning.
iii. Servicing and repairs.
iv. Transport.
v. Clearing and forwarding.
vi. Air ticketing and travel arrangements and all others where there is no specific standard tender document for procurement of that service.

1.2 The following general directions should be observed when using the document.

a) Specific details should be finished in the invitation to tender and in the special conditions of contract. The final document to be provided to the tenderers should not have blank spaces or give options.

b) The instructions to tenderers and the general conditions of contract should remain unchanged. Any necessary amendments to these parts should be made through the appendix to the instructions to the tenderers or the general conditions of contract respectively.

1.3 Information contained in the invitation to tender shall conform to the data and information in the tender documents to enable potential tenderers to decide whether or not to participate in the tender and shall indicate any important tender requirements,

1.4 The invitation to tender shall be issued as an advertisement in accordance with the regulations or as a letter of invitation addressed to the tenderers who have expressed interest following an advertisement of a prequalification tender.

1.5 The cover of the tender document should be modified to include;

i. Tender number.
ii. Tender name.
iii. Name of procuring entity.
iv. Delete name and address of PPOA.

SECTION I – INVITATION TO TENDER

Tender REF No. MCG/OT/78/2020-2021

Tender name INSTALLATION OF CCTV CAMERAS, IP PBX AND LAN CABLING AT NEW COUNTY HEADQUARTERS IN MANDERA EAST SUB COUNTY

1.1 Prospective candidates may obtain further information from the office of the director supply chain management services at the county treasury during normal working hours and via email on supplychain@mandera.go.ke.

1.2 Interested eligible candidates may obtain and inspect tender documents from our website www.mandera.go.ke. For any more information/clarification interested applicants can visit the office of the Director of Supply Chain Management Office, next to Read sea resort of -Mandera, during normal working hours.

1.3 Prices quoted should be net inclusive of all taxes, must be in Kenya shillings and shall remain valid for the contract period.

1.4 Original and a copy of tender documents are to be enclosed in plain sealed envelopes marked with Tender name and reference number and deposited in the Tender Box located at the supply chain management office in Mandera or to be addressed to

Addressed to:
COUNTY CHIEF OFFICER ICT AND E-GOVERNMENT
Mandera County Government
P.O Box 13-70300
Mandera, Kenya

So as to be received on or before Friday, 16th APRIL 2021 at 10.00 Am at the county treasury building.

No contractors or their representatives are allowed during the opening due to adherence to the government regulations of Covid 19 prevention that includes ban on public gathering

Supply Chain Management officer
FOR: COUNTY CHIEF OFFICER-ICT AND E-GOVERNMENT

SECTION II – INSTRUCTIONS TO TENDERERS

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SECTION II INSTRUCTIONS TO TENDERERS

2.1 Eligible tenderers

2.1.1. This Invitation to tender is open to all tenderers eligible as described in the instructions to tenderers. Successful tenderers shall provide the services for the stipulated duration from the **date** of commencement (hereinafter referred to as the term) specified in the tender documents.

2.1.2. The procuring entity's employees, committee members, board members and their relative (spouse and children) are not eligible to participate in the tender unless where specially allowed under section 131 of the Act.

2.1.3. Tenderers shall provide the qualification information statement that the tenderer (including all members, of a joint venture and subcontractors) is not associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Procuring entity to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the services under this Invitation for tenders.

2.1.4. Tenderers involved in corrupt or fraudulent practices or debarred from participating in public procurement shall not be eligible.

2.2 Cost of tendering

2.2.1 The Tenderer shall bear all costs associated with the preparation and submission of its tender, and the procuring entity, will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

2.2.2 The price to be charged for the tender document shall not exceed Kshs.5,000/=

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

2.3 Contents of tender documents

2.3.1. The tender document comprises of the documents listed below and addenda issued in accordance with clause 6 of these instructions to tenders

i) Instructions to tenderers
ii) General Conditions of Contract

iii) Special Condtions of Contract
iv) Schedule of Requirements
v) Details of service
vi) Form of tender
vii) Price schedules
viii) Contract form
ix) Confidential business questionnaire form
x) Tender security form
xi) Performance security form
xii) Principal's or manufacturers authorization form
xiii) Declaration form

2.3.2. The Tenderer is expected to examine all instructions, forms, terms, and specifications in the tender documents. Failure to furnish all information required by the tender documents or to submit a tender not substantially responsive to the tender documents in every respect will be at the tenderers risk and may result in the rejection of its tender.

2.4 Clarification of Documents

2.4.1. A prospective candidate making inquiries of the tender document may notify the Procuring entity in writing or by post, fax or email at the entity's address indicated in the Invitation for tenders. The Procuring entity will respond in writing to any request for clarification of the tender documents, which it receives no later than seven (7) days prior to the deadline for the submission of tenders, prescribed by the procuring entity. Written copies of the Procuring entities response (including an explanation of the query but without identifying the source of inquiry) will be sent to all prospective tenderers who have received the tender documents"

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

2.5 Amendment of documents

2.5.1. At any time prior to the deadline for submission of tenders, the Procuring entity, for any reason, whether at its own initiative or in response to a clarification requested by a prospective tenderer, may modify the tender documents by issuing an addendum.

2.5.2. All prospective tenderers who have obtained the tender documents will be notified of the amendment by post, fax or email and such amendment will be binding on them.

2.5.3. In order to allow prospective tenderers reasonable time in which to take the amendment into account in preparing their tenders, the Procuring entity, at its discretion, may extend the deadline for the submission of tenders.

2.6 Language of tender

2.6.1. The tender prepared by the tenderer, as well as all correspondence and documents relating to the tender exchanged by the tenderer and the Procuring entity, shall be written in English language. Any printed literature furnished by the tenderer may be written in another language provided they are accompanied by an accurate English translation of the relevant passages in which case, for purposes of interpretation of the tender, the English translation shall govern.

2.7 Documents Comprising the Tender

The tender prepared by the tenderer shall comprise the following components:

(a) A Tender Form and a Price Schedule completed in accordance with paragraph 9, 10 and 11 below.

(b) Documentary evidence established in accordance with Clause 2.11 that the tenderer is eligible to tender and is qualified to perform the contract if its tender is accepted;

(c) Tender security furnished is in accordance with Clause 2.12
(d)Confidential business questionnaire

2.8 Form of Tender

2.8.1 The tenderers shall complete the Form of Tender and the appropriate Price Schedule furnished in the tender documents, indicating the services to be performed.

2.9 Tender Prices

2.9.1 The tenderer shall indicate on the Price schedule the unit prices where applicable and total tender prices of the services it proposes to provide under the contract.

2.9.2 Prices indicated on the Price Schedule shall be the cost of the services quoted including all customs duties and VAT and other taxes payable:

2.9.3 Prices quoted **by** the tenderer shall remain fixed during the term of the contract unless otherwise agreed by the parties. **A** tender submitted with an adjustable price quotation will be treated as non-responsive and will be rejected, pursuant to paragraph 2.22.

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

2.9.5 Where contract price variation is allowed, the variation shall not exceed 10% of the original contract price.

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

2.10 **Tender Currencies**

2.10.1 Prices shall be quoted in Kenya Shillings unless otherwise specified in the appendix to in Instructions to Tenderers

2.11 Tenderers Eligibility and Qualifications.

2.11.1 Pursuant to Clause 2.1 the tenderer shall furnish, as part of its tender, documents establishing the tenderers eligibility to tender and its qualifications to perform the contract if its tender is accepted.

2.11.2 The documentary evidence of the tenderers qualifications to perform the contract if its tender is accepted shall establish to the Procuring entity's satisfaction that the tenderer has the financial and technical capability necessary to perform the contract.

2.12 **Tender Security**

2.12.1 The tenderer shall furnish, as part of its tender, a tender security for the amount and form specified in the Invitation to tender.

2.12.2 The tender security shall be in the amount not exceeding 2 per cent of the tender price.

2.12.2 The tender security is required to protect the Procuring entity against the risk of Tenderer's conduct which would warrant the security's forfeiture, pursuant to paragraph 2.12.7

2.12.3 The tender security shall be denominated in a Kenya Shillings or in another freely convertible currency and shall be in the form of:

a) A bank guarantee.

b) Cash.

c) Such insurance guarantee approved by the Authority.

d) Letter of credit

2.12.4 Any tender not secured in accordance with paragraph 2.12.1 and 2.12.3 will be rejected by the Procuring entity as non responsive, pursuant to paragraph 2.20

2.12.5 Unsuccessful tenderer's security will be discharged or returned as promptly as possible but not later than thirty (30) days after the expiration of the period of tender validity prescribed by the procuring entity.

2.12.6 The successful tenderer's tender security will be discharged upon the tenderer signing the contract, pursuant to paragraph 2.29, and furnishing the performance security, pursuant to paragraph 2.30.

2.12.7 The tender security may be forfeited:

(a) If a tenderer **withdraws** its tender **during** the period of tender validity specified by the procuring entity on the
Tender Form; or

(b) In the case of a successful tenderer, *if* the tenderer fails:

(i) to sign the contract in accordance with paragraph 30
or
(ii) to furnish performance security in accordance with paragraph 31.

(c) If the tenderer rejects, correction of an error in the tender.

2.13 Validity of Tenders

2.13.1 Tenders shall remain valid for 60 days or as specified in the invitation to tender after date of tender opening prescribed by the Procuring entity, pursuant to paragraph 2.18. A tender valid for a shorter period shall be rejected by the Procuring entity as nonresponsive.

2.13.2 In exceptional circumstances, the Procuring entity may solicit the Tenderer's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. The tender security provided under paragraph 2.12 shall also be suitably extended. A tenderer may refuse the request without forfeiting its tender security. A tenderer granting the request will not be required nor permitted to modify its tender.

2.14 Format and Signing of Tender

2.14.1 The tenderer shall prepare two copies of the tender, clearly / marking each "ORIGINAL TENDER" and "COPY OF TENDER," as appropriate. In the event of any discrepancy between them, the original shall govern.

2.14.2 The original and all copies of the tender shall be typed or written in indelible ink and shall be signed by the tenderer or a person or persons duly authorized to bind the tenderer to the contract. All pages of the tender, except for unamended printed literature, shall be initialed by the person or persons signing the tender.

2.14.3 The tender shall have no interlineations, erasures , or overwriting except as necessary to correct errors made by the tenderer, in which case such corrections shall be initialed by the person or persons signing the tender.

2.15 Sealing and Marking of Tenders

2.15.1 The tenderer shall seal the original and each copy of the tender in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes shall then be sealed in an outer envelope.
The inner and outer envelopes shall:
(a) be addressed to the Procuring entity at the address given in the invitation to tender

(b) bear, tender number and name in the invitation to tender and the words: "DO NOT OPEN BEFORE(**Friday 16th April 2021 at 10:00 am**),"

2.15.3 The inner envelopes shall also indicate the name and address of the tenderer to enable the tender to be returned unopened in case it is declared "late". —

2.15.4 If the outer envelope is not sealed and marked as required by paragraph 2.15.2, the Procuring entity will assume no responsibility for the tender's misplacement or premature opening.

2.16 **Deadline for Submission of Tenders**

2.16.1 Tenders must be received by the Procuring entity at the address specified under paragraph 2.15.2 no later than (*day, date and time of closing*)

2.16.2 The procuring entity may, at its discretion, extend this deadline for the submission of tenders by amending the tender documents in accordance with paragraph 6, in which case all rights and obligations of the procuring entity and candidates previously subject to the deadline will thereafter be subject to the deadline as extended.

2.16.3 Bulky tenders which will not fit in the tender box shall be received by the procuring entity as provided for in the appendix.

2.17 **Modification and withdrawal of tenders**

2.17.1 The tenderer may modify or withdraw its tender after the tender's submission, provided that written notice of the modification , including substitution or withdrawal of the tender's is received by the procuring entity prior to the deadline prescribed for the submission of tenders.

2.17.2 The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of paragraph 2.15. A withdrawal notice may also be sent by cable, but followed by a signed confirmation copy, postmarked not later than the deadline for submission of tenders.

2.17.3 No tender may be modified after the deadline for submission of tenders.

2.17.4 No tender may be withdrawn in the interval between the deadline for submission of tenders and the expiration of the period of tender validity specified by the tenderer on the Tender Form. Withdrawal of a tender during this interval may result in the Tenderer's forfeiture of its tender security, pursuant to paragraph 2.12.7.

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

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

2.18 Opening of Tenders

2.18.1 The Procuring entity will open all tenders in the presence of tenderers' representatives who choose to attend, at …(*time, day, and date of closing*) and in the location specified in the invitation to tender. The tenderers' representatives who are present shall sign a register evidencing their attendance.

2.18.3 The tenderers' names, tender modifications or withdrawals, tender prices, discounts, and the presence or absence of requisite tender security and such other details as the Procuring Entity, at its discretion, may consider appropriate, will be announced at the opening.

2.18.4 The procuring entity will prepare minutes of the tender opening which will be submitted to the tenderers that signed the tender opening register and will have made the request.

2.19 Clarification of tenders

2.19.1 To assist in the examination, evaluation and comparison of tenders the procuring entity may at its discretion , ask the tenderer for a clarification of its tender. The request for clarification and the response shall be in writing, and no change in the prices or substance shall be sought, offered, or permitted.

2.19.2 Any effort by the tenderer to influence the procuring entity in the procuring entity's tender evaluation, tender comparision or contract award decisions may result in the rejection of the tenderers tender.

Comparison or contract award decisions may result in the rejection of the tenderers' tender.

2.20 Preliminary Examination and Responsiveness

2.20.1 The Procuring entity will examine the tenders to determine whether they are complete, whether any computational errors have been made, whether required securities have been furnished whether the documents have been properly signed, and whether the tenders are generally in order.

2.20.2 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected. if the candidate does not accept the correction of the errors, its tender will be rejected, and its tender security may be forfeited. If there is a discrepancy between words and figures, the amount in words will prevail.

2.20.3 The Procuring entity may waive any minor informality or nonconformity or irregularity in a tender which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any tenderer.

2.20.4 Prior to the detailed evaluation, pursuant to paragraph 23, the Procuring entity will determine the substantial responsiveness of each tender to the tender documents. For purposes of these paragraphs, a substantially responsive tender is one which conforms to all the terms and conditions of the tender documents without material deviations. The Procuring entity's determination of a tender's responsiveness is to be based on the contents of the tender itself without recourse to extrinsic evidence.

2.20.5 If a tender is not substantially responsive, it will be rejected by the Procuring entity and may not subsequently be made responsive by the tenderer by correction of the nonconformity.

2.21 **Conversion to a single currency**

2.21.1 Where other currencies are used, the procuring entity will convert those currencies to Kenya shillings using the selling exchange rate on the date of tender closing provided by the central bank of Kenya.

2.22 **Evaluation and comparison of tenders**.

2.22.1 The procuring entity will evaluate and compare the tenders which have been determined to be substantially responsive, pursuant to paragraph 2.20

2.22.2 The comparison shall be of the price including all costs as well as duties and taxes payable on all the materials to be used in the provision of the services.

2.22.3 The Procuring entity's evaluation of a tender will take into account, in addition to the tender price, the following factors, in the manner and to the extent indicated in paragraph 2.22.4 and in the technical specifications:

(a) operational plan proposed in the tender;

(b) deviations in payment schedule from that specified in the Special Conditions of Contract;

2.22.4 Pursuant to paragraph 22.3 the following evaluation methods will be applied:

(a) ***Operational Plan.***

The Procuring entity requires that the services under the Invitation for Tenders shall be performed at the time specified in the Schedule of Requirements. Tenders offering to perform longer than the procuring entity's required delivery time will be treated as non-responsive and rejected.

(b) ***Deviation in payment schedule.***

Tenderers shall state their tender price for the payment on a schedule outlined in the special conditions of contract. Tenders will be evaluated on the basis of this base price. Tenderers are, however, permitted to state an alternative payment schedule and indicate the reduction in tender price they wish to offer for such alternative payment schedule. The Procuring entity may consider the alternative payment schedule offered by the selected tenderer.

2.22.5 The tender evaluation committee shall evaluate the tender within 30 days from the date of opening the tender.

2.22.6 To qualify for contract awards, the tenderer shall have the following:-

(a) Necessary qualifications, capability experience, services, equipment and facilities to provide what is being procured.

(b) Legal capacity to enter into a contract for procurement

(c) Shall not be insolvent, in receivership, bankrupt or in the process of being wound up and is not the subject of legal proceedings relating to the foregoing

(d) Shall not be debarred from participating in public procurement.

2.23. **Contacting the procuring entity**

2.23.1 Subject to paragraph 2.19, no tenderer shall contact the procuring entity on any matter relating to its tender, from the time of the tender opening to the time the contract is awarded.

2.23.2 Any effort by a tenderer to influence the procuring entity in its decisions on tender evaluation tender comparison or contract award may result in the rejection of the tenderers tender.

2.24 Award of Contract

a) **Post qualification**

2.24.1 In the absence of pre-qualification, the Procuring entity will determine to its satisfaction whether the tenderer that is selected as having submitted the lowest evaluated responsive tender is qualified to perform the contract satisfactorily.

2.24.2 The determination will take into account the tenderer's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the tenderers qualifications submitted by the tenderer, pursuant to paragraph 2.1.2, as well as such other information as the Procuring entity deems necessary and appropriate.

2.24.3 An affirmative determination will be a prerequisite for award of the contract to the tenderer. A negative determination will result in rejection of the Tenderer's tender, in which event the Procuring entity will proceed to the next lowest evaluated tender to make a similar determination of that Tenderer's capabilities to perform satisfactorily.

b) **Award Criteria**

2.24.3 Subject to paragraph 2.29 the Procuring entity will award the contract to the successful tenderer whose tender has been determined to be substantially

responsive and has been determined to be the lowest evaluated tender, provided further that the tenderer is determined to be qualified to perform the contract satisfactorily.

2.24.4 The procuring entity reserves the right to accept or reject any tender and to annul the tendering process and reject all tenders at any time prior to contract award, without thereby incurring any liability to the affected tenderer or tenderers or any obligation to inform the affected tenderer or tenderers of the grounds for the procuring entity's action. If the procuring entity determines that none of the tenderers is responsive; the procuring entity shall notify each tenderer who submitted a tender.

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

2.25 **Notification of award**

2.25.1 Prior to the expiration of the period of tender validity, the Procuring entity will notify the successful tenderer in writing that its tender has been accepted.

2.25.2 The notification of award will signify the formation of the Contract subject to the signing of the contract between the tenderer and the procuring entity pursuant to clause 2.29. Simultaneously the other tenderers shall be notified that their tenders have not been successful.

2.25.3 Upon the successful Tenderer's furnishing of the performance security pursuant to paragraph 31, the Procuring entity will promptly notify each unsuccessful Tenderer and will discharge its tender security, pursuant to paragraph 2.12

2.26 **Signing of Contract**

2.26.1 At the same time as the Procuring entity notifies the successful tenderer that its tender has been accepted, the Procuring entity will simultaneously inform the other tenderers that their tenders have not been successful.

2.26.2 Within fourteen (14) days of receipt of the Contract Form, the successful tenderer shall sign and date the contract and return **it** to the Procuring entity.

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

2.27 Performance Security

2.27.1 Within thirty (30) days of the receipt of notification of award from the Procuring entity, the successful tenderer shall furnish the performance security in accordance with the Conditions of Contract, in the Performance Security Form provided in the tender documents, or in another form acceptable to the Procuring entity.

2.27.2 Failure of the successful tenderer to comply with the requirement of paragraph 2.29 or paragraph 2.30.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the tender security, in which event the Procuring entity may make the award to the next lowest evaluated or call for new tenders.

2.28 Corrupt or Fraudulent Practices

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

2.28.2 The procuring entity will reject a proposal for award if it determines that the tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

2.28.3 Further, a tenderer who is found to have indulged in corrupt or fraudulent practices risks being debarred from participating in public procurement in Kenya.

APPENDIX TO INSTRUCTIONS TO THE TENDERERS

Notes on the appendix to instruction to Tenderers

1. The appendix to instructions to tenderers is intended to assist the procuring entity in providing specific information in relation to corresponding clauses in the instructions to tenderers included in section II and the appendix has to be prepared for each specific procurement

2. The procuring entity should specify in the appendix information and requirements specific to the circumstances of the procuring entity, the processing of the procurement and the tender evaluation criteria that will apply to the tenderers
3. In preparing the appendix the following aspects should be taken into consideration

    a. The information that specifies and complements provisions of section III to be incorporated

    b. Amendments of section II as necessitated by the circumstances of the specific procurement to be also incorporated.

4. Section II should remain intact and only be amended through the appendix.

Appendix to instructions to tenderers

The following information for procurement of services shall complement or amend the provisions of the instructions to tenderers. Wherever there is a conflict between the provisions of the instructions to tenderers and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the instructions to tenderers

INSTRUCTIONS TO TENDERERS REFERENCE	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERS
	The Bidder shall submit original and a copy of the tender document, clearly marking each "ORIGINAL TENDER" and "COPY OF TENDER" on or before **Friday 16th April 2021 at 10:00 am** *The bidder shall submit a minimum bid security of* ***2% of the tender sum*** *from a reputable bank or recognized insurance company recognized by PPRA.*

EVALUATION AND COMPARISON OF TENDERS

Evaluation and comparison of Tenders: the following evaluation criteria shall be applied not withstanding any other requirement in the tender documents.

a) Mandatory requirements(MR)

The following requirements must be met by the tenderer failure to which the bid will be eliminated from further evaluation.

PRELIMINARY EVALUATION CRITERIA

S/No	REQUIREMENTS	Score Mandatory	B1	B2	B3	B4	B5	B6	B7	B8
1	Dully filled and stamped confidential business questionnaire	**Mandatory (Yes/No)**								
2	Form of tender duly filled, signed and stamped	**Mandatory (Yes/No)**								
3	The form of power of attorney shall be duly filled, signed and stamped	**Mandatory (Yes/No)**								

4	The bidder shall submit a minimum bid security of **2% of the tender sum** from a reputable bank or recognized insurance company recognized by PPRA	**Mandatory (Yes/No)**								
5	Telecommunications contractor certificate from Communication Authority of Kenya (CAK)	**Mandatory (Yes/No)**								
6	Communication Authority of Kenya (CAK) Telecommunication certificates for Technical Personnel	**Mandatory (Yes/No)**								
7	Copy of Network Switches Manufacturer authorization Certificate	**Mandatory (Yes/No)**								
8	Must submit a self-declaration that the person/ tenderer will not engage in any corrupt or fraudulent practice.	**Mandatory (Yes/No)**								
9	Must submit a self-declaration that the person/ tenderer/firm is not debarred in the matter of the Public Procurement and asset Disposal Act 2015.	**Mandatory (Yes/No)**								
10	Valid current year business permits from mandera county certified by commissioner of oaths/advocates	**Mandatory (Yes/No)**								
11	Valid current year tax compliance certificate	**Mandatory (Yes/No)**								

	certified by commissioner of oaths /advocates.									
12	Certificate of incorporation certified by commissioner of oaths/advocates.	**Mandatory (Yes/No)**								
13	PIN/VAT certificate from KRA certified by commissioner of oaths/advocates	**Mandatory (Yes/No)**								
14	CR 12 form certified by commissioner of oaths/advocates	**Mandatory (Yes/No)**								
15	Serialization of the tender document	**Mandatory (Yes/No)**								
16	Submit tender document in original and copy	**Mandatory (Yes/No)**								

KEY
Bidder 1: B1
Bidder 2: B2
Bidder 3: B3
Bidder 4: B4
Bidder 5: B5
Bidder 6: B6
Bidder 7: B7
Bidder 8: B8

NB: At this stage, the tender's submission will either be responsive or non-responsive. The non-responsive submission will be eliminated from the entire evaluation process and will not be considered further.

TECHNICAL EVALUATION CRITERIA SUMMARY

	Criteria	Maximum scores
Experience of the Firm		**25**
1	Experience of projects of comparable size, complexity and technical specialty in similar projects 5 projects and above ---------- 20 marks 4 marks each	20
Proposal		**5**
1	Approach and Methodology Work Plan (including staffing schedule)	5
I. Personnel		**35**
1	Team Leader/supervisor a)Academic Qualifications Degree in ICT or equivalent -----8 marks b). Experience in similar works 5 and above years ----------7 marks	15
2	Project engineer technician with relevant certification from a reputable institution and a diploma in ICT, computer science, electrical engineering or related field	12
3	Support Staff 2NO Technician with diploma in ICT, computer science or related field Each 4 marks	8
/ Financial capacity		**40**
3	Attach audited financial report by a certified accountant for the last two years 2018 and 2019-12 marks for each year. Total 24 marks	24
	-Provide bank statement for the last 6 months (6marks for bank statement	6
	-line of credit/credit facility of 10million and above-10	10
Total Score		**100**

The minimum qualifying marks is 70% (pass mark).

Tenders will proceed to the Financial Evaluation Stage only if they qualify in the mandatory technical evaluation clause and the attain the mandatory score of 70 %

Financial Evaluation

At this stage, consideration will be as follows:-

The bidder with the lowest evaluated financial will be recommended for the award of the contract.

SECTION III GENERAL CONDITIONS OF CONTRACT

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SECTION III GENERAL CONDITIONS OF CONTRACT

3.1 Definitions

In this contract the following terms shall be interpreted as indicated:

a) "The contract" means the agreement entered into between the Procuring entity and the tenderer as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

b) "The Contract Price" means the price payable to the tenderer under the Contract for the full and proper performance of its contractual obligations.

c) "The services" means services to be provided by the contractor including materials and incidentals which the tenderer is required to provide to the Procuring entity under the Contract.

d) "The Procuring entity" means the organization sourcing for the services under this Contract.

e) "The contractor means the individual or firm providing the services under this Contract.

f) "GCC" means general conditions of contract contained in this section

g) "SCC" means the special conditions of contract

h) "Day" means calendar day

3.2 Application

These General Conditions shall apply to the extent that they are not superceded by provisions of other part of contract.

3.3 Standards

3.3.1 The services provided under this Contract shall conform to the 7 standards mentioned in the Schedule of requirements

3.5 **Patent Right's**

The tenderer shall indemnify the Procuring entity against all third-party claims of infringement of patent, trademark, or industrial design tights arising from use of the services under the contract or any part thereof .

3.6 **Performance Security**

Within twenty eight (28) days of receipt of the notification of Contract award, the successful tenderer shall furnish to the Procuring entity the performance security where applicable in the amount specified in Special Conditions of Contract.

3.6.2 The proceeds of the performance security shall be payable to the Procuring entity as compensation for any loss resulting from the Tenderer's failure to complete its obligations under the Contract.

3.6.3 The performance security shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring entity and shall be in the form of :

a) Cash.

b) A bank guarantee.

c) Such insurance guarantee approved by the Authority.

d) Letter of credit.

3.6.4 The performance security will be discharged by the procuring entity and returned to the candidate not later than thirty (30) days following the date of completion of the tenderer's performance of obligations under the contract, including any warranty obligations under the contract.

3.7 Inspections and Tests

3.7.1 The Procuring entity or its representative shall have the right to inspect and/or to test the services to confirm their conformity to the Contract specifications. The Procuring entity shall notify the tenderer in writing, in a timely manner, of the identity of any representatives retained for these purposes.

3.7.2 The inspections and tests may be conducted on the premises of the tenderer or its subcontractor(s). If conducted on the premises of the tenderer or its subcontractor(s), all reasonable facilities and assistance, including access to

drawings and production data, shall be furnished to the inspectors at no charge to the Procuring entity.

3.7.3 Should any inspected or tested services fail to conform to the Specifications, the Procuring entity may reject the services, and the tenderer shall either replace the rejected services or make alterations necessary to meet specification requirements free of cost to the Procuring entity.

3.7.4 Nothing in paragraph 3.7 shall in any way release the tenderer from any warranty or other obligations under this Contract.

3.8 **Payment**

3.8.1 The method and conditions of payment to be made to the tenderer under this Contract shall be specified in SCC

3.9 **Prices**

Prices charged by the contractor for services performed under the Contract shall not, with the exception of any Price adjustments authorized in SCC , vary from the prices by the tenderer in its tender or in the procuring entity's request for tender validity extension as the case may be. No variation in or modification to the terms of the contract shall be made except by written amendment signed by the parties.

3.10 **Assignment**

The tenderer shall not assign, in whole or in part, its obligations to perform under this contract, except with the procuring entity's prior written consent.

3.10 Termination for Default

The Procuring entity may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the tenderer, terminate this Contract in whole or in part:

a) if the tenderer fails to provide any or all of the services within the period(s) specified in the Contract, or within any extension thereof granted by the Procuring entity.

b) if the tenderer fails to perform any other obligation(s) under the Contract.

c) if the tenderer, in the judgment of the Procuring entity has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

In the event the Procuring entity terminates the Contract in whole or in part, it may procure, upon such terms and in such manner as it deems appropriate, services similar to those undelivered, and the tenderer shall be liable to the Procuring entity for any excess costs for such similar services.

3.12 Termination of insolvency

The procuring entity may at the any time terminate the contract by giving written notice to the contractor if the contractor becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the contractor, provided that such termination will not produce or affect any right of action or remedy, which has accrued or will accrue thereafter to the procuring entity.

3.13 Termination for convenience

3.13.1 The procuring entity by written notice sent to the contractor may terminate the contract in whole or in part, at any time for its convenience. The notice of termination shall specify that the termination is for the procuring entity convenience, the extent to which performance of the contractor of the contract is terminated and the date on which such termination becomes effective.

3.13.2 For the remaining part of the contract after termination the procuring entity may elect to cancel the services and pay to the contractor on agreed amount for partially completed services.

3.14 Resolution of disputes

The procuring entity's and the contractor shall make every effort to resolve amicably by direct informal negotiations any disagreement or dispute arising between them under or in connection with the contract.

If after thirty (30) days from the commencement of such informal negotiations both parties have been unable to resolve amicably a contract dispute either party may require that the dispute be refered for resolution to the formal mechanisms specified in the SCC.

3.15 Governing Language

The contract shall be written in the English language. All correspondence and other documents pertaining to the contract, which are exchanged by the parties, shall be written in the same language.

3.16 Force Majeure

The contractor shall not be liable *for* forfeiture of its performance security, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

3.17 Applicable Law.

The contract shall be interpreted in accordance with the laws of Kenya unless otherwise specified in the SCC

3.18 Notices

Any notices given by one party to the other pursuant to this contract shall be sent to the other party by post or by fax or E-mail and confirmed in writing to the other party's address specified in the SCC

A notice shall be effective when delivered or on the notices effective date, whichever is later.

SECTION IV SPECIAL CONDITIONS OF CONTRACT

Notes on Special Conditions of Contract

The clauses in this section are intended to assist the procuring entity in providing contract specific information in relation to corresponding clauses in the general conditions of contract.
The provisions of section IV complement the general conditions of contract included in section III, specifying contractual requirements linked to the special circumstances of the procuring entity and the procurement of services required. In preparing section IV, the following aspects should be taken into consideration.

a) Information that complement provisions of section III must be incorporated

b) Amendments and/or supplements to provision of section III, as necessitated by the circumstances of the specific service required must also be incorporated

Where there is a conflict between the provisions of the special conditions of contract and the provisions of the general conditions of contract the provisions of the special conditions of contract herein shall prevail over the provisions of the general conditions of contract.

SECTION IV SPECIAL CONDITIONS OF CONTRACT

4.1 Special conditions of contract shall supplement the general conditions of contract, wherever there is a conflict between the GCC and the SCC, the provisions of the SCC herein shall prevail over those in the GCC.

4.2 Special conditions of contract with reference to the general conditions of contract.

General conditions of contract reference	Special conditions of contract
3.6	Specify performance security if applicable
3.8	Specify method and conditions of performance
3.9	Specify price adjustments allowed
23.14	Specify resolution of disputes
3.17	Specify applicable law
3.18	Indicate addresses of both parties
Other's as necessary	Complete as necessary

SECTION V – SCHEDULE OF REQUIREMENTS

Notes for preparing the schedule of requirements

The schedule of requirements for the services shall be included in the tender documents by the procuring entity and shall cover at the minimum a description of the goods and services to be supplied and the delivery schedule.
The objectives of schedule of requirements is to provide sufficient information to enable tendrerers to prepare their tenders efficiently and accurately, in particular, the price schedule, for which information is provided.
In addition, the schedule of requirements, together with the price schedule, should serve as a bases in the event of quantity variations at the time of award of contract pursuant to instructions to tenderers clause 26.
The date or period of delivery should be carefully specified, taking into account the date prescribed herein from which the procuring entity's delivery obligations start (notice of award).

This part will include any deliverables under the service contract

Number	Description	Quantity	Delivery Time Start_____ End_____

SECTION VI DESCRIPTION OF SERVICES

Notes for preparing technical specifications

A set of precise and clear description of the services required is a prerequisite for tenderers to respond realistically and competitively to requirements of the procuring entity without qualifying their tenders, the specifications should require that all goods and services to be incorporated be new, and of the most recent improvements – in design and materials unless otherwise provided for in the contract.
Samples of specifications from previous similar procurement are useful in their respect.

Care must be taken in describing the services to ensure that they are not restrictive. In the description of services describing the services recognized national or international standards should be used as much as possible. Where other particular standards are used, the description should state the services that meet other authoritative standards and which ensure at least a substantially equal quality than other standards mentioned will also be acceptable.

This part will include any deliverables under the service contract.

SECTION VI – DESCRIPTION OF SERVICES

The service entails the contractual agreement with CCTV CAMERAS, IP PBX AND LAN CABLING service providers and the department of devolved units for collection of garbage and town cleaning to improve on the cleanliness of the towns in the various sub counties. The project involves collection of garbage from various CCTV CAMERAS, IP PBX AND LAN CABLING points to the dumpsites at various locations within the sub counties. The sanitation trucks will be hired on contractual basis on a contract that will run for a year.

SECTION VII- STANDARD FORMS

Notes on standard forms

1. The tenderer shall complete and submit with its tender the form of tender and price schedules pursuant to instructions to tenderers clause 9 and in accordance with the requirements included in the special conditions of contract.

2. When requested by the appendix to the instructions to tenderers, the tenderer should provide the tender security, either in the form included herein or in another form acceptable to the procuring entity pursuant to instructions to tenderers clause 12.3

3. The contract form, the price schedules and the schedule of requirements shall be deemed to form part of the contract and should be modifies accordingly at the time of contract award to incorporate corrections or modifications agreed by the tenderer and the procuring entity in accordance with the instructions to tenderers or general conditions of contract.

4. The performance security and bank guarantee for advance payment forms should not be completed by the tenderers at the time of tender preparation. Only the successful tenderer will be required to provide performance/entity and bank guarantee for advance payment forms in accordance with the forms indicated herein or in another form acceptable to the procuring entity and pursuant to the – conditions of contract.

5. The principal's or manufacturer's authorisation form should be completed by the principal or the manufacturer, as appropriate in accordance with the tender documents.

SECTION VI - STANDARD FORMS

1. Form of tender
2. Price schedules
3. Contract form
4. Confidential Questionnaire form
5. Tender security form
6. Performance security form
7. Bank guarantee for advance payment
8. Declaration form

FORM OF TENDER

TO: MANDERA COUNTY GOVERNMENT _____*[Date]*

REF: **INSTALLATION OF CCTV CAMERAS, IP PBX AND LAN CABLING AT NEW COUNTY HEADQUARTERS IN MANDERA EAST SUB COUNTY.MCG/OT/78/2020-2021**

Dear Sir:

1. Having examined the tender documents which is hereby duly acknowledged, wed, the undersigned, offer to provide **CCTV CAMERAS, IP PBX AND LAN CABLING** in conformity with the said tender documents for the sum of _____

   _____

   [total tender amount in words and figures] or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Tender.

2. We undertake, if our Tender is accepted, to provide the services in accordance with the services schedule specified in the Schedule of Requirements.

3. If our Tender is accepted, we will obtain the tender guarantee in a sum equivalent to 2% percent of the Contract Price for the due performance of the Contract, in the form prescribed by (Procuring entity).

4. We agree to abide by this Tender for a period of **1 year** from the date fixed for tender opening of the Instructions to tenderers, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

5. Until a formal Contract is prepared and executed, this Tender, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.

   Dated this _____ day of _____20_____

   Signature _____in the capacity of_____
duly authorized to sign tenders for and on behalf of _____*[Name of Employer]*
of_____[*Address of Employer]*

   Witness; Name_____

   Address_____

   Signature_____

   Date_____

PRICE SCHEDULE OF SERVICES

Name of Tenderer _____Tender Number_____. Page ____of _____.

1	**2**	**3**	**4**	**5**	**6**	**7**
Item	**Description**	**Quantity & quality**	**Duration**	**Unit Price**	**Total Price** EXW per item (cols. 4x5)	**Unit Price of other incidental services payable**

Signature of tenderer _____

Note: In case of discrepancy between unit price and total, the unit price shall prevail.

CONTRACT FORM

THIS AGREEMENT made the ___day of _____20____between……[name of procurement entity] of …….[country of Procurement entity](hereinafter called "the Procuring entity") of the one part and ……[name of tenderer] of …….[city and country of tenderer](hereinafter called "the tenderer") of the other part.

WHEREAS the procuring entity invited tenders for certain materials and spares. Viz……..[brief description of materials and spares] and has accepted a tender by the tenderer for the supply of those materials and spares in the spares in the sum of ……[contract price in words and figures]

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:

    (a) the Tender Form and the Price Schedule submitted by the tenderer;
    (b) the Schedule of Requirements;
    (c) the Technical Specifications;
    (d) the General Conditions of Contract;
    (e) the Special Conditions of Contract; and
    (f) the Procuring entity's Notification of Award.

3. In consideration of the payments to be made by the Procuring entity to the tenderer as hereinafter mentioned, the tenderer hereby covenants with the Procuring entity to provide the materials and spares and to remedy defects therein in conformity in all respects with the provisions of the Contract

4. The Procuring entity hereby covenants to pay the tenderer in consideration of the provision of the materials and spares and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written.

Signed, sealed, delivered by_____the _____(for the Procuring entity)

Signed, sealed, delivered by_____the _____(for the tenderer)

in the presence of_____.

CONFIDENTIAL BUSINESS QUESTIONNAIRE

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2(b) or 2(c) whichever applied to your type of business.

You are advised that it is a serious offence to give false information on this form.

Part 1 General

Business Name.....
Location of Business Premises .....
Plot No, ...Street/Road.....
Postal address .....Tel No. .....Fax Email.....
Nature of Business .....
Registration Certificate No. .....
Maximum value of business which you can handle at any one time – Kshs.....
Name of your bankers.....
Branch.....

	Part 2 (a) – Sole Proprietor Your name in full……Age……. Nationality……Country of Origin…….. Citizenship details ……..
	Part 2 (b) – Partnership Given details of partners as follows Name Nationality Citizenship details Shares 1. …… 2. …… 3. …… 4. ……
	Part 2 (c) – Registered Company Private or Public State the nominal and issued capital of company Nominal Kshs. Issued Kshs. Given details of all directors as follows Name Nationality Citizenship details Shares 1. …… 2. …… 3. …… 4. ……
	Date…….Signature of Candidate……..

TENDER SECURITY FORM

Whereas ……..[name of the tenderer]

(hereinafter called "the tenderer")has submitted its tender dated……..[date of submission of tender] for the provision of ……..

[name and/or description of the services]

(hereinafter called "the Tenderer")……..

KNOW ALL PEOPLE by these presents that WE……

Of……having registered office at

[name of procuring entity](hereinafter called "the Bank")are bound unto……

[name of procuring entity](hereinafter called "the procuring entity") in the sum of ……..

for which payment well and truly to be made to the said Procuring entity, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this_____ day of 20_____.

THE CONDITIONS of this obligation are:
1. If the tenderer withdraws its Tender during the period of tender validity specified by the tenderer on the Tender Form; or
2. If the tenderer, having been notified of the acceptance of its Tender by the Procuring entity during the period of tender validity:

(a) fails or refuses to execute the Contract Form, if required; or
(b) fails or refuses to furnish the performance security, in accordance with the instructions to tenderers;

we undertake to pay to the Procuring entity up to the above amount upon receipt of its first written demand, without the Procuring entity having to substantiate its demand, provided that in its demand the Procuring entity will note that the arnouut claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions. This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the above date.

_____
[signature of the bank]

(Amend accordingly if provided by Insurance Company)

PERFORMANCE SECURITY FORM

To: ……..

[name of the Procuring entity]

WHEREAS…….[name of tenderer]

(hereinafter called "the tenderer") has undertaken, in pursuance of Contract No._____[reference number of the contract] dated _____20_____to

supply……..

[Description services](Hereinafter called "the contract")

AND WHEREAS it bas been stipulated by you in the said Contract that the tenderer shall furnish you with *a* bank guarantee by a reputable bank for the sum specified therein as security for compliance with the Tenderer's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the tenderer a guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the tenderer, up to a total of ……
[amount of the guarantee in words and figures],

and we undertake to pay you, upon your first written demand declaring the tenderer to be in default under the Contract and without cavil or argument, any sum or sums within the limits of ……..
[amount of guarantee] as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the _____ day of 20

_____
Signature and seal of the Guarantors

_____
[name of bank or financial institution]

_____
[address]

_____
[date]

(Amend accordingly if provided by Insurance Company)

BANK GUARANTEE FOR ADVANCE PAYMENT

To……

[name of tender]……

Gentlemen and/or Ladies:

In accordance with the payment provision included in the special conditions of contract, which amends the general conditions of contract to provide for advance payment,

……

[name and address of tenderer][hereinafter called "the tenderer"] shall deposit with the Procuring entity a bank guarantee to guarantee its proper and faithful performance under the said clause of the contract in an amount of …… *[amount of guarantee in figures and words]*. We,the ……

[bank or financial institution], as instructed by the tenderer, agree unconditionally and irrevocably to guarantee as primary obligator and not as surety merely, the payment to the Procuring entity on its first demand without whatsoever right of objection on our part and without its first claim to the tenderer, in the amount not exceeding *[amount of guarantee in figures and words]*.

We further agree that no change or addition to or other modification of the terms of the Contract to be performed thereunder or of any of the Contract documents which may be made between the Procuring entity and the tenderer, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition, or modification.

This guarantee shall remain valid and in full effect from the date of the advance payment received by the tenderer under the Contract until *[date]*.

Yours truly,

Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date]

LETTER OF NOTIFICATION OF AWARD

Address of Procuring Entity
_____
_____

To:_____
_____
_____
_____

RE: Tender No._____

Tender Name_____

This is to notify that the contract/s stated below under the above mentioned tender have been awarded to you.

_____
_____

1. Please acknowledge receipt of this letter of notification signifying your acceptance.

2. The contract/contracts shall be signed by the parties within 30 days of the date of this letter but not earlier than 14 days from the date of the letter.

3. You may contact the officer(s) whose particulars appear below on the subject matter of this letter of notification of award.

   *(FULL PARTICULARS)*_____
   _____

SIGNED FOR ACCOUNTING OFFICER

FORM RB 1

REPUBLIC OF KENYA

PUBLIC PROCUREMENT ADMINISTRATIVE REVIEW BOARD

APPLICATION NO…….OF……..….20……...

BETWEEN

…….APPLICANT

AND

……RESPONDENT *(Procuring Entity*)

Request for review of the decision of the…… (*Name of the Procuring Entity)* of ……dated the…day of ……20…….in the matter of Tender No……..…of ……..20…

REQUEST FOR REVIEW

I/We……,the above named Applicant(s), of address: Physical address…….Fax No……Tel. No……..Email ……, hereby request the Public Procurement Administrative Review Board to review the whole/part of the above mentioned decision on the following grounds , namely:-

1.

2.

etc.

By this memorandum, the Applicant requests the Board for an order/orders that: -

1.

2.

etc

SIGNED …….(Applicant)

Dated on…….day of ……/…20…

FOR OFFICIAL USE ONLY

Lodged with the Secretary Public Procurement Administrative Review Board on …… day of ……...20…..……

SIGNED
Board Secretary

FORM OF POWER OF ATTORNEY

(All bidders shall complete this form otherwise, their bids shall be considered non-responsive)

We _____ (Name of Bidder)

having our offices located in _____ (Name of Town and Building) duly authorise _____ (Name of person appointed to act for and on behalf of the bidder) to act for and on our behalf on all matters pertaining to the execution of works as stipulated under **INSTALLATION OF CCTV CAMERAS, IP PBX AND LAN CABLING AT NEW COUNTY HEADQUARTERS IN MANDERA EAST SUB COUNTY**. **MCG/OT/78/2020-2021**

Duly signed and delivered:

Name of appointed attorney: _____

Signature of appointed attorney: _____

Witnessed by:

1. Name of First Company Director: _____

   Signature: _____

2. Name of Second Company Director: _____

   Signature: _____

Company Seal:

_____

MANUFACTURER'S AUTHORIZATION FORM

To Mandera county government
P.o box 13-70300
Mandera

WHEREAS ……[*name of the manufacturer]* who are established and reputable manufacturers of …….. [*name and/or description of the goods]* having factories at …… [*Address of factory]* do hereby authorize …… [*Name and address of Agent]* to submit a tender, and subsequently negotiate and sign the Contract with you against tender No. ……. [*Reference of the Tender]* for the above goods manufactured by us.

We hereby extend our full guarantee and warranty as per the General Conditions of Contract for the goods offered for supply by the above firm against this Invitation for Tenders.

_____

[*Signature for and on behalf of manufacturer]*

Note: This letter of authority should be on the letterhead of the Manufacturer and should be signed by a person competent.

FIFTH SCHEDULE

SELF DECLARATION FORMS (r.47) FORM SD1

SELF DECLARATION THAT THE PERSON/TENDERER IS NOT DEBARRED IN THE MATTER OF THE PUBLIC PROCUREMENT AND ASSET DISPOSAL ACT 2015.

I, ……, of Post Office Box ……. being a resident of …… in the Republic of ……. do hereby make a statement as follows:- 1. THAT I am the Company Secretary/ Chief Executive/Managing Director/Principal Officer/Director of …… (insert name of the Company) who is a Bidder in respect of Tender No. ……. for ……(insert tender title/description) for ……(insert name of the Procuring entity) and duly authorized and competent to make this statement.

2. THAT the aforesaid Bidder, its Directors and subcontractors have not been debarred from participating in procurement proceeding under Part IV of the Act.

3. THAT what is deponed to herein above is true to the best of my knowledge, information and belief.

…… ……

(Title) (Signature) (Date)

Bidder Official Stamp

FORM SD2
SELF DECLARATION FORMS

SELF DECLARATION THAT THE PERSON/TENDERER WILL NOT ENGAGE IN ANY CORRUPT OR FRAUDULENT PRACTICE.

I, ……of P. O. Box ……. being a resident of ……. in the Republic of ……. do hereby make a statement as follows:- 1. THAT I am the Chief Executive/Managing Director/Principal Officer/Director of ……. ……. (insert name of the Company) who is a Bidder in respect of Tender No. ……. for ……(insert tender title/description) for ……(insert name of the Procuring entity) and duly authorized and competent to make this statement. 854 Kenya Subsidiary Legislation, 2020

2. THAT the aforesaid Bidder, its servants and/or agents /subcontractors will not engage in any corrupt or fraudulent practice and has not been requested to pay any inducement to any member of the Board, Management, Staff and/or employees and/or agents of ……(insert name of the Procuring entity) which is the procuring entity.

3. THAT the aforesaid Bidder, its servants and/or agents /subcontractors have not offered any inducement to any member of the Board, Management, Staff and/or employees and/or agents of ……(name of the procuring entity)

4. THAT the aforesaid Bidder will not engage /has not engaged in any corrosive practice with other bidders participating in the subject tender

5. THAT what is deponed to hereinabove is true to the best of my knowledge information and belief

…… …… ……
(Title) (Signature) Date)

Bidder's Official Stamp

SPECIFICATION

PARTICULAR AND TECHNICAL SPECIFICATIONS OF MATERIALS AND WORKS FOR STRUCTURED CABLING WORKS

TELECOMMUNICATIONS DISTRIBUTION SYSTEM – STRUCTURED CABLING

PART 1/1

A. GENERAL TECHNICAL SPECIFICATIONS

a. Section Includes: Equipment, materials, labor, and services to provide telephone and data distribution system including but not limited to:

1. **Telephone and data cabling terminations**
2. **Optical fiber and terminations**
3. **Data/voice outlets**
4. **Terminal blocks/cross-connect systems**
5. **Equipment racks and cabinets**
6. **System testing**
7. **Documentation and submissions**
8. **Surface trunking, cable ladder**
9. **Core switch, edge switches**

b. Provide all equipment, materials, labor, and services, not specifically mentioned or shown, which may be necessary to complete or perfect all parts of the installation. Ensure that they are in compliance with requirements stated or reasonably inferred by the contract documents.

1. REFERENCES

a. Design, manufacture, test, and install telecommunications cabling networks per manufacturer's requirements and in accordance with NFPA-70 (*National Electrical*

Code®)/IEE Regulations, state codes, local codes, requirements of authorities having jurisdiction, and particularly the following standards: ANSI/NECA/BICSI-568 -- Standard for Installing Commercial Building Telecommunications Cabling ANSI/TIA/EIA Standards.

1) ANSI/TIA/EIA-568-B.1 -- *Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements*

2) ANSI/TIA/EIA-568-B.2 -- *Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components*

3) ANSI/TIA/EIA-568-B.3 -- *Optical Fiber Cabling Components Standard*

4) ANSI/TIA/EIA-569-A -- *Commercial Building Standard for Telecommunications Pathways and Spaces*

5) ANSI/TIA/EIA-606(A) -- *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*

6) ANSI/TIA/EIA-607(A) -- *Commercial Building Grounding and Bonding Requirements for Telecommunications*

7) ANSI/TIA/EIA-526-7 -- *Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant*

8) ANSI/TIA/EIA-526-14A -- *Measurement of Optical Power Loss of Installed Multimode Fiber Cable Plant*

(9) ANSI/TIA/EIA-758(A) -- *Customer-Owned Outside Plant Telecommunications Cabling Standard*

(10) ISO/IEC 1101 *Amendment 2*

b. Local codes, rules, regulations, and ordinances governing the work, are as fully part of the specifications as if herein repeated or hereto attached. If the contractor should note items in the drawings or the specifications, construction of which would be code violations, promptly call them to the attention of the Project Manager in writing. Where the requirements of other sections of the specifications are more stringent than applicable codes, rules, regulations, and ordinances, the specifications shall apply.

1. PERMITS, FEES, AND CERTIFICATES OF APPROVAL

a. The Contractor to include the cost of application and pay for building permit.
b. As prerequisite to final acceptance, supply to the client certificates of inspection from an inspection agency acceptable to the owner and approved by local municipality and utility company serving the Project Manager.

2. SYSTEM DESCRIPTION

a. A telecommunications cabling system generally consists of one telecommunications outlet in each workstation, wall telephones in common and power socket outlet.

b. The typical work area consists of a single-gang plate with two standards compliant work area outlets.

c. One work area outlet consists of one (1) four-pair data Category 6 cable or above, installed from work area outlet to the data cabinet. Terminate data cables on modular patch panels located in the appropriate data cabinet.

d. One work area outlet consists of one (1) four-pair screened (ScTP) cable installed from work area outlet to the data termination rack in the cabinet. Terminate data cables on rack mounted modular patch panels.

2.1 Vertical/horizontal copper backbone cabling consists of multiple pair unshielded twisted-pair installed from the main cross-connect (MC) to the horizontal cross-connect (HC) and/or from the MC to the intermediate cross-connect (IC) to the HC.

2.2 Vertical/horizontal backbone cabling consists of 62.5/125 μm multimode optical fiber cable installed from the MC to the HC and/or from the MC to the IC to the HC.

2.3 Vertical/horizontal backbone cabling consists of 50/125 μm multimode optical fiber cable installed from the MC to the HC and/or from the MC to the IC to the HC. *Specification Note: State what this backbone will be utilized for. Examples are voice telecommunications service, premises switching equipment, data communications, etc.*

3. SUBMITTALS

a. Submit to the P.M shop drawings, product data (including cut sheets and catalog information), and samples required by the contract documents. Submit shop drawings, product data, and samples with such promptness and in such sequence as to cause no delay in the work or in the activities of separate contractors. The engineer will indicate approval of shop drawings, product data, and samples submitted to the engineer by stamping such submittals "APPROVED" with a stamp. Submitted shop drawings shall be initialed or signed by the contractor, showing the date and the contractor's legitimate firm name.

1) By submitting shop drawings, product data, and samples, the contractor represents that he or she has carefully reviewed and verified materials, quantities, field measurements, and field construction criteria related thereto. It also represents that the contractor has checked, coordinated, and verified that information contained within shop drawings, product data, and samples conform to the requirements of the work and of the contract documents. The engineer/designer remains responsible for the design concept expressed in the contract documents as defined herein.

2) The P.M approval of shop drawings, product data, and samples submitted by the contractor shall not relieve the contractor of responsibility for deviations from requirements of the contract documents, unless the contractor has specifically informed the engineer/designer in writing of such deviation at time of submittal, and the engineer/designer has given written approval of the specific deviation. The contractor shall continue to be responsible for deviations from requirements of the contract

documents not specifically noted by the contractor in writing, and specifically approved by the engineer in writing.

3) The P.M approval of shop drawings, product data, and samples shall not relieve the contractor of responsibility for errors or omissions in such shop drawings, product data, and samples.

4) The P.M review and approval, or other appropriate action upon shop drawings, product data, and samples, is for the limited purpose of checking for conformance with information given and design concept expressed in the contract documents. The engineer's review of such submittals is not conducted for the purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the contractor as required by the contract documents.

The review shall not constitute approval of safety precautions or of construction means, methods, techniques, sequences, or procedures. The P.M approval of a specific item shall not indicate approval of an assembly of which the item is a component.

b. Shop drawings: Submit the following:

Coordinate with Part 2.

1) *Backbone (riser) diagrams*
2) *System block diagram, indicating interconnection between system components and subsystems*
3) *Interface requirements, including connector types and pin-outs, to external systems and systems or components not supplied by the contractor*
4) *Fabrication drawings for custom-built equipment*

c. Product Data -- Provide catalog cut sheets and information for the following:

Coordinate with Part 2.

1) *Wire, cable, and optical fiber*
2) *Outlets, jacks, faceplates, and connectors*
3) *All metallic and nonmetallic raceways, including surface raceways, outlet boxes, and fittings*
4) *Terminal blocks and patch panels*
5) *Enclosures, racks, and equipment housings*
6) *Over-voltage protectors*
7) *Splice housings*

d. Samples-- Submit samples as required by the Engineer.

e. Project record drawings:

1) Submit project record drawings at conclusion of the project and include:

(a) Approved shop drawings.
(b) Plan drawings indicating locations and identification of work area outlets, nodes, data cabinet rooms, and backbone (riser) cable runs.
(c) Cross-connect schedules including entrance point, main cross-connects, intermediate cross-connects, and horizontal cross-connects.
(d) Labeling and administration documentation.
(e) Warranty documents for equipment.
(f) Copper certification test result printouts and diskettes.
(g) Optical fiber power meter/light source test results.
(h) Operation and maintenance manuals:

4. QUALITY ASSURANCE

1.1 The contractor shall have worked satisfactorily for a minimum of five (5) years on systems of this type and size.

1.2 Upon request by the P.M, furnish a list of references with specific information regarding type of project and involvement in providing of equipment and systems.

1.3 Equipment and materials of the type for which there are independent standard testing requirements, listings, and labels, shall be listed and labeled by the independent testing laboratory.

1.4 Where equipment and materials have industry certification, labels, or standards (i.e., NEMA - National Electrical Manufacturers Association), this equipment shall be labeled as certified or complying with standards.

1.5 Material and equipment shall be new, and conform to grade, quality, and standards specified. Equipment and materials of the same type shall be a product of the same manufacturer throughout.

1.6 Subcontractors shall assume all rights and obligations toward the contractor that the contractor assumes toward the client and P.M.

5. WARRANTY

5.1 Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, and workmanship for a period of not less than fifteen (15) years from date of commissioning of the project for active components.

5.2 Transfer manufacturer's warranties to the owner in addition to the General System Guarantee. Submit these warranties on each item in list form with shop drawings. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract

during the guarantee period. Final payment shall not relieve you of these obligations.

6. DELIVERY, STORAGE, AND HANDLING

6.1 Protect equipment during transit, storage, and handling to prevent damage, theft, soiling, and misalignment. Coordinate with the client for secure storage of equipment and materials. Do not store equipment where conditions fall outside manufacturer's recommendations for environmental conditions. Do not install damaged equipment; remove from site and replace damaged equipment with new equipment.

7. SEQUENCE AND SCHEDULING

7.1 Submit schedule for installation of equipment and cabling. Indicate delivery, installation, and testing for conformance to specific job completion dates. As a minimum, dates are to be provided for bid award, installation start date, completion of station cabling, completion of riser cabling, completion of testing and labeling, cutover, completion of the final punch list, start of demolition, owner acceptance, and demolition completion.

8. USE OF THE SITE

8.1 Access to building wherein the work is performed shall be as directed by the P.M. The client will occupy the premises during the entire period of construction for conducting his or her normal business operations. Cooperate with the client to minimize conflict and to facilitate the owner's operations.

Schedule necessary shutdowns of plant services with the main contractor, and obtain written permission from the client.

Proceed with the work without interfering with ordinary use of streets, aisles, passages, exits, and operations of the client.

PART 2/1 - PRODUCTS

1. MANUFACTURERS

Provide products of manufacturers as named in individual articles. Where no manufacturer is specified, provide products of manufacturers in compliance with requirements.

2. FABRICATION

Fabricate custom-made equipment with careful consideration given to aesthetic, technical, and functional aspects of equipment and its installation.

3. SUITABILITY

Provide products that are suitable for intended use, including, but not limited to environmental, regulatory, and electrical.

4. VOICE/DATA TELECOMMUNICATIONS SERVICE BACKBONE CABLE

a. Solid copper, 24 AWG, 100 Ω balanced twisted-pair (UTP) backbone cable, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA-568-B.2

b. Multimode 62.5/125 μm diameter tight-buffered optical fiber, with fiber counts as indicated on drawings, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA-568-B.3

5. VOICE TELECOMMUNICATIONS STATION CABLE

a. Solid copper, 24 AWG, 100 Ω balanced twisted-pair (UTP) Category 6A cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 up to 100 MHz.

6. DATA STATION CABLE (Copper)

a. Solid copper, 24 AWG, 100 Ω balanced twisted-pair (UTP) Category 6A cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 up to 100 MHz.

b. Solid copper, 24 AWG, 100 Ω balanced twisted-pair, screened (ScTP) cables with four individually twisted-pairs, which meet or exceed the mechanical and transmission performance specifications in ANSI/TIA/EIA-568-B.2 (Annex K) up to 100 MHz.

7. DATA STATION CABLE (Optical Fiber)

a. Multimode 62.5/125 μm diameter tight-buffered optical fiber, with the required number of fiber counts, with mechanical and transmission performance specifications that meet or exceed ANSI/TIA/EIA-568-B.3

8. UNDERGROUND TELECOMMUNICATIONS CABLE (Copper)

If you have copper cables installed outside between buildings, be certain to specify overvoltage protectors on both ends of the cable. See article, OVERVOLTAGE PROTECTORS.

Solid copper, 24 AWG 100 Ω balanced twisted-pair, gel-filled duct cable, in sizes as indicated on the drawings, which meet or exceed the mechanical and transmission performance specifications listed in ANSI/TIA/EIA-568-B.2 and ANSI/TIA/EIA-758(A).

9. UNDERGROUND TELECOMMUNICATIONS CABLE (Optical Fiber)

Singlemode 8.7 μm to 10 μm diameter, armored, gel-filled optical fiber, with number of usable fibers as shown on drawings, which meet or exceed the mechanical and transmission performance specifications listed in ANSI/TIA/EIA-568-B.3 and ANSI/TIA/EIA-758(A).

10. VOICE/DATA – COPPER & OPTICAL FIBER WORK AREA OUTLETS

Edit for items that will actually be used on the project.
Pick a color for the faceplate and each type of jack, or make them all one color.

Determine which pinning standard is to be used, T568A, T568B, or USOC. If not otherwise specified, specify T568A. Use either 10c with SC connectors or 10d (1) for ST connectors. SC connectors are preferred. Use ST connectors to match existing cable plant if required.

Single-gang mounting plate with two (2) openings containing the following devices:

a. Data Outlet - 8-pin modular, category 6A, unkeyed, black, pinned to either T568 (A or B) standards.
b. Optical Fiber Connectors – simplex ST - ST adapter.
Provide two optical fiber adapters for each faceplate

11. VOICE/DATA WORK AREA OUTLETS (Copper only)

Single-gang mounting plate with four (4) openings containing the following devices:
Data Outlet - 8-pin modular, Category 6A, unkeyed, black, pinned to either T568 (A or B) standards.

12. VOICE ONLY WORK AREA OUTLET

Single-gang faceplate with 8-pin modular, category 6A, unkeyed, ivory telephone jack, pinned to either T568 (A or B) standards

13. TERMINATION BLOCKS

For items that will actually be used on the project: Coordinate with MC, IC and HC layout drawing.
a. Product(s) as approved by the P.M: Wiring blocks are to be in following configurations:

1) List dimensional configurations
2) ER – List pairs categorized for PABX portion of ER and pairs field terminated for backbone and CO portion of ER

Provide wiring troughs between ER frame sections.

14. PATCH PANELS

Specification Note: Alter quantities to match job requirements.
19 in. rack mountable, 24-port 8-pin modular to insulation displacement connector (IDC) meeting Category 6A performance standards, and pinned to either T568 (A or B) standards. Typical examples of IDC connections are the 110, BIX, and Krone.

15. WALL MOUNTED OPTICAL FIBER PATCH PANELS

Specification Note: Alter quantities to match job requirements
Wall-mounted optical fiber termination panel with 12-fiber capacity, hinged door, cable strain relief, slack storage, and two 6-port SC or approved alternative connector panels with adapters and provisions for two splice trays.

16. RACK MOUNTED OPTICAL FIBER TERMINATION PANEL
Specification Note: Alter size to match job requirements. Coordinate with connector type.
19 in. rack mounted 72-port rack-mounted optical fiber termination panel with cable strain relief, grounding lugs, slack storage and three 12-port duplex SC or approved alternative connector panels with adapters and provisions for six (6) splice trays.

17. *SPLICE TRAYS*
Sized for single mode and multimode fibers, nonmetallic with clear plastic cover, 12-fiber splice capacity, compatible with splice enclosure and splicing method.

18. OPTICAL FIBER CONNECTORS
Ceramic tipped field installed 568SC connectors, which meet or exceed the performance specifications in ANSI/TIA/EIA-568-B.3. Various alternative field installed connector designs, which meet or exceed the performance specifications in ANSI/TIA/EIA-568-B.3 (Annex A).

19. OPTICAL FIBER JUMPERS
Dual 62.5/125-µm (*and/or single mode*) optical fiber jumper cable, 1 m long with 3.0 mm Duplex 568SC optical fiber connectors on each end.
Dual 62.5/125-µm (*and/or single mode*) optical fiber jumper cable, 1 m long with approved alternative duplex optical fiber connectors on each end.

20. OPTICAL FIBER PIGTAILS
62.5/125 µm (*and/or single mode*) optical fiber pigtail 1 m long with 3.0 mm single 568 SC optical fiber connectors on one end

21. OPEN FRAME EQUIPMENT RACK
Open frame, 19 in. equipment rack, 7 foot 6 in. overall height with flange base, mounting rails drilled front and back and tapped to EIA standards, and a front-rack mountable 10 outlet multiple outlet electrical strip or 42u enclosed glazed.

22. EQUIPMENT RACKS/CABINETS
Specification Note: Use 19 in. or change to 23 in. as required. If using wall-mounted racks or cabinets, add required specifications here. Add and delete features as required.
a. The 19 in. equipment rack shall have the following minimum requirements:
- 77 in. (44 rack spaces) of panel space
- Welded frame construction
- Locking front and rear doors
- Adjustable front and back equipment mounting rails drilled and tapped to EIA standards
- 10 position electrical outlet strip
- Removable side panels
- Top mounted, thermostatically controlled exhaust fan
- Smoked acrylic front door.

23. LISTED BUILDING ENTRANCE PROTECTORS

Use when copper cables are run outside of building.
Use appropriate protector modules.
Building entrance terminal utilizing a two (2) foot fuse link between the outside cable plant splice and the protector module with IDC type input and output terminals, 100-pair capacity and female mounting base, equipped with 230-volt solid state protector modules. Provide sufficient protector modules to completely populate all building entrance terminals.

24. SPLICE HOUSING

Use this or something else. Delete splice modules if used for optical fiber cables.

a. Encapsulated, re-enterable splice housing, sized as required with bonding straps, accessories, end caps and encapsulant as required
b. Splice modules (such as 710 series or MS^2) for use within splice housing

25. SPARES

Change quantities to suit job size. Edit to match that which is actually specified.
a. Furnish the following spare equipment and parts:

Terminal block connectors, if required
Test set cords, if required
Install one test cord set in each telecommunications closet
Five (5) percent of base bid quantity of each type of jack shall be provided
Five (5) percent of base bid quantity of each type of outlet

Five thousand (5000) ft of each type of station cable
One thousand (1000) ft of one-pair cross-connect wire for each telecommunications closet
One thousand (1000) ft of two-pair cross-connect wire for each telecommunications closet
Five (5) percent of base bid quantity of protector modules

EXECUTION

1. PRE-INSTALLATION SITE SURVEY

a. Prior to start of systems installation, meet at the project site with the P.M and representatives of trades performing related work to coordinate efforts. Review areas of potential interference and resolve conflicts before proceeding with the work. Facilitation with the Client will be necessary to plan the crucial scheduled completions of the equipment room and telecommunications closets.
b. Examine areas and conditions under which the system is to be installed. Do not proceed with the work until satisfactory conditions have been achieved.

2. HANDLING AND PROTECTION OF EQUIPMENT AND MATERIALS

a. Be responsible for safekeeping of your own, such as equipment and materials, on the job site. The client assumes no responsibility for protection of above named property against fire, theft, and environmental conditions.

3. PROTECTION OF OWNER'S FACILITIES

a. Effectively protect the client's facilities, equipment, and materials from dust, dirt, and damage during construction.

b. Remove protection at completion of the work.

4. INSTALLATION

Receive, check, unload, handle, store, and adequately protect equipment and materials to be installed as part of the contract. Store in areas as directed by the owner's representative. Include delivery, unloading, setting in place, fastening to walls, floors, ceilings, or other structures where required, interconnecting wiring of system components, equipment alignment and adjustment, and other related work whether or not expressly defined herein.

Install materials and equipment in accordance with applicable standards, codes, requirements, and recommendations of national, state, and local authorities having jurisdiction, and *National Electrical Code®* (NEC) and with manufacturer's printed instructions.

Adhere to manufacturer's published specifications for pulling tension, minimum bend radii, and sidewall pressure when installing cables.

1) Where manufacturer does not provide bending radii information, minimum-bending radius shall be 15 times cable diameter. Arrange and mount equipment and materials in a manner acceptable to the P.M and the client.

e. Penetrations through floor and fire-rated walls shall utilize intermediate metallic conduit (IMC) or galvanized rigid conduit (GRC) sleeves and shall be fire stopped after installation and testing, utilizing a fire stopping assembly approved for that application.

f. Install station cabling to the nearest telecommunications room (TR), unless otherwise noted.

g. Installation shall conform to the following basic guidelines:

1) Use of approved wire, cable, and wiring devices
2) Neat and uncluttered wire termination

h. Attach cables to permanent structure with suitable attachments at intervals of 1200-1500mm. Support cables installed above removable ceilings.

i. Install adequate support structures for 10 foot of service slack at each TR.

j. Support riser cables every floor and at top of run with cable grips.

1) Limit number of four-pair data riser cables per grip to fifty (50)

k. Install cables in one continuous piece. Splices shall not be allowed except as indicated on the drawings or noted below:

l. Provide over voltage protection on both ends of cabling exposed to lightning or accidental contact with power conductors.

Specification Note: *Insert any other specific installation requirements here, such as hook and latch fasteners instead of cable ties, etc.*

5. GROUNDING

a. Grounding shall conform to ANSI/TIA/EIA 607(A) - *Commercial Building Grounding and Bonding Requirements for Telecommunications, National Electrical Code*®, ANSI/NECA/BICSI-568 and manufacturer's grounding requirements as minimum.

b. Bond and ground equipment racks, housings, messenger cables, and raceways.

c. Connect cabinets, racks, and frames to single-point ground which is connected to building ground system via #6 AWG green insulated copper grounding conductor.

6. LABELING

Use 6d if the type of termination block permits labels. Otherwise use 6e.
Use 6g if the owner does not have a standard for outlet numbering.
Use 6h if required. Alter time as requested.

Labeling shall conform to ANSI/TIA/EIA-606(A) standards. In addition, provide the following:

a. Label each outlet with permanent self-adhesive label with minimum 3/16 in. high characters.

b. Label each cable with permanent self-adhesive label with minimum, 1/8 in. high characters, in the following locations:

1) Inside receptacle box at the work area.
2) Behind the communication closet patch panel or punch block.

c. Use labels on face of data patch panels. Provide facility assignment records in a protective cover at each telecommunications closet location that is specific to the facilities terminated therein.

d. Use color-coded labels for each termination field that conforms to ANSI/TIA/EIA-606(A) standard color codes for termination blocks.

e. Mount termination blocks on color-coded backboards.

f. Labels shall be machine-printed. Hand-lettered labels shall not be acceptable.

g. Label cables, outlets, patch panels, and punch blocks with room number in which outlet is located, followed by a single letter suffix to indicate particular outlet within room, i.e., S2107A, S2107B. Indicate riser cables by an R then pair or cable number.

h. Mark up floor plans showing outlet locations, type, and cable marking of cables. Turn these drawings over to the owner two (2) weeks prior to move in to allow the owner's personnel to connect and test owner-provided equipment in a timely fashion.

i. Three (3) sets of as-built drawing shall be delivered to the owner within four (4) weeks of acceptance of project by the owner. A set of as-built drawings shall be provided to the owner in magnetic media form (3.5" floppy disks) and utilizing CAD software that is acceptable to the owner. The magnetic media shall be delivered to the owner within six (6) weeks of acceptance of project by owner.

7. TESTING

Testing shall conform to ANSI/TIA/EIA-568-B.1 standard. Testing shall be accomplished using level III or higher field testers.

Test each pair and shield of each cable for opens, shorts, grounds, and pair reversal. Correct grounded, and reversed pairs. Examine open and shorted pairs to determine if problem is caused by improper termination. If termination is proper, tag bad pairs at both ends and note on termination sheets.

1) Perform testing of copper cables with tester meeting ANSI/TIA/EIA-568-B.1 requirements.
2) If copper backbone cable contains more than one (1) percent bad pairs, remove and replace entire cable.

Use 2 or 3 as required.

3) If copper cables contain more than the following quantity of bad pairs, or if outer sheath damage is cause of bad pairs, remove and replace the entire cable:

CABLE SIZE	MAXIMUM BAD PAIRS
<100	1
101 to 300	1 – 3
301 to 600	3 – 6
>601	6

4) If horizontal cable contains bad conductors or shield, remove and replace cable. Initially test optical cable with a light source and power meter utilizing procedures as stated in ANSI/TIA/EIA-526-14A: *OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant* and ANSI/TIA/EIA-526-7 *Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant*. Measured results shall be plus/minus 1 dB of submitted loss budget calculations. If loss figures are outside this range, test cable with optical time domain reflectometer to determine cause of variation. Correct improper splices and replace damaged cables at no charge to the owner.

1) Cables shall be tested at 850 and 1300 nm for multimode optical fiber cables. Cables shall be tested at 1310 and 1550 nm for single mode optical fibers.
2) Testing procedures shall utilize "Method B" – One jumper reference.
3) Bi-directional testing of optical fibers is required.

d. Perform optical time domain reflectometer (OTDR) testing on each fiber optic conductor. Measured results shall be plus/minus 1 dB of submitted loss budget calculations.

1) Submit printout for each cable tested.
2) Submit 3.5 in. disks with test results and program to view results.

e. Where any portion of system does not meet the specifications, correct deviation and repeat applicable testing at no additional cost.

FIELD QUALITY CONTROL

a. Employ job superintendent during the course of the installation to provide coordination of work of this specification and of other trades, and provide technical information when requested by other trades. This person shall maintain current RCDD® (Registered Communications Distribution Designer) registration and shall be responsible for quality control during installation, equipment set-up, and testing.

b. At least 30 percent of installation personnel shall be *BICSI Registered Telecommunications Installers*. Of that number, at least 15 percent shall be registered at the *Technician Level*, at least 40 percent shall be registered at the *Installer Level 2*, and the balance shall be registered at the *Installer Level 1*.
Specification Note: Use this or insert manufacturer's requirements for installer qualifications to meet extended warranty program requirements.
c. Installation personnel shall meet manufacturer's training and education requirements for implementation of extended warranty program.

B. PARTICULAR SPECIFICATIONS FOR STRUCTURED CABLING WORKS

1.0 SITE LOCATION

The site of the proposed works is located **in Mandera County.**

2.0 DESCRIPTION OF THE PROJECT

The works to be carried out comprise the following;

i) Proposed supply, installation, testing and commissioning of a structured cabling system to cater for computer data points and telephone points.
ii) Configure and set up the structured cabling system to be used on LAN,
iii) Produce test result, warranty certification, reports and as installed drawings. The Network will be capable of supporting approximately 300 data/voice points.
iv) Supply, install telephone cables to interconnect the data cabinets to the IP-PABX to be located in the Server Room. The works shall include inter-wiring, programming and activating all voice points.

3.0 REGULATIONS

The contractor shall, in execution and completion of the works in the detailed design for which he is responsible, comply with the provisions of the following as necessary and relevant;

a) ISO/IEC, CCK, ATM CENELEC 11801
b) ANSI/EIA/TIA 56
c) Latest Edition of IEE Regulation
d) Kenya Bureau of Standards
e) Electric Power Act and Rules made there under.

4.0 WORKING DRAWINGS

The Contractor shall submit to the Project Manager working drawings for the proposed system for approval. The drawings will show the locations of and identifiers for all cable

routing and terminations, telecommunication outlets/connectors. Location of core switch and Edge switches.

5.0 NETWORK CABINETS

a) To be located on each floor in designated rooms as indicated in the electrical drawings.

b) Must be metallic (appropriately sized as specified in the BQ) with a front clear glass, freestanding, complete with lock and key and the following accessories;

- Cable Management channel rack
- Cable support hooks
- Cable support rings and straps
- Cable duct cover
- Feed through cable panels
- Vented equipment shelving
- Blank filler panels
- Hinged wall mounted brackets
- Glass viewing window
- Colored Designation strips
- Management lock and key
- Cooling extractor fans
- Caster wheels
- Inbuilt 2-gang power socket outlet

6.0 ACTIVE CONTROL EQUIPMENTS AT THE NETWORK CORE

The active control equipment at the core should have the following features:

a. 9-Slot Chassis capable of delivering up to 2 terabits per second of system bandwidth capacity and 80 Gbps per-slot for all slots and capable of scaling to 4 terabits per second with a Virtual Switching System with redundant supervisor engine.
b. Support for at least ONE 16-port 10Gbe 10GBASE-T modules, at least TWO 8-port 10 Gigabit Ethernet Module with an equivalent number of Long Range X2 Modules, at least ONE 24-port SFP module and ONE 48-port 10/100/1000 module and a Network Analysis Module.
c. Forwarding of IPV6 in hardware without the addition of special modules to achieve that forwarding.
d. VRF-lite in hardware without the addition of special modules to achieve that forwarding
e. Ability to adjust a PoE device's power allocation if its actual power requirement is lower than the IEEE 802.3af classification requirement.
f. Layer 2/3 virtualization without affecting forwarding performance.
g. VPLS and L2omGRE
h. Ability to combine two physical switches into one virtual switch.
i. Redundant Layer 2 topology without the need for FHRPs such as HSRP, VRRP and GLBP.
j. Virtualization of Layer 4 through Layer 7 services.
k. QoS mechanisms to help regulate traffic flow through the network.
l. MPLS in hardware without the addition of special modules to achieve that forwarding.

7.0 ACTIVE CONTROL EQUIPMENTS AT THE LAN EDGE

Active control equipment at the LAN Edge should have the following features

a. At least 24 10/100/1000 POE + with support for a mandatory 10G Network Module.
b. Dual 10G and 40G uplink connections to 2 redundant Core Switches.
c. At least 24 10/100/1000 POE + with support for 1/10G Network Module.
d. Media Access Control Security (MACsec) hardware-based encryption.
e. Measurement of actual power consumption of PoE devices, reporting, and reducing energy consumption across the network.
f. Stackable and support Stateful Switchover (SSO) when switching over from Active to Standby switch in a Stack.
g. Support 802.1d, 802.1s, 802.1w Spanning-Tree & its Enhancement.
h. Port security.
i. Support DHCP snooping.
j. Support Dynamic ARP inspection (DAI.
k. Support IP source guard.
l. Support flexible & multiple authentication mechanism, including 802.1X, MAC authentication bypass, and web authentication.
m. The Switch should support Advanced Modular Wired QoS Policies.
n. The Switch should be capable of Downloading Downloadable Access List from network security engine based on user identity.
o. Active equipment at the LAN Edge should be quoted with a minimum of **One year of warranty** covering free replacement of parts and units.

F1/14

8.0 NTU Specifications

Type:	HDSL
Max Data Transfer Rate:	2Mbps
Mode of Operation:	DCE
Connector:	DB37
Interface Cable:	DB37-DB15

9.0 NETWORK MANAGEMENT SYSTEM

Bidders must propose the manufacturers Network Management system for centralized configuration, maintenance and troubleshooting of active equipments. 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.

10.0 CABLES

10.1) UTP CABLE

The UTP cable must be category 6A compliant UTP cable, with the following specifications;

a) 4-pair cables with 100-ohm impedance.
b) Compliant to standards such as TIA/EIA – 268-B. 2-1 and IEC 61156-5
c) Made of polyethylene insulation
d) Pulling force should support up to 50N/mm2
e) Low Smoke Zero Halogen outer sheath

10.2) OPTICAL FIBRE CABLE

The fibre cable must be 8 core multimode fibre with the following specifications: -

a) Cable size: 8 core.
b) Termination: SC Duplex connectors.
c) Graded Index: Nominal 62.5/125 micro.

11.0 CAT 6 PATCH PANELS

The Contractor shall provide factory made patch panels, Cat 6a complete with cable management and front designation strips, 110 PCB mounted connectors and integral RJ mounted jack sockets.

12.0 FIBER PATCH PANELS

All Backbone Fiber links to individual floors should be terminated on Fiber Patch Panels. Connector interfaces should support ST, Sc simplex, Sc duplex, FC, LC or MT-RJ.

13.0 BACK BONE

Backbone cabling inclusive of switches and all necessary accessories shall be carried out in readiness for the termination of edge switches.
The Backbone cabling shall be flexible and allow for easy 'add on's' for future expansions. Hence enough capacity shall be allowed for future expansion.

14.0 EDGE/FLOOR SWITCHES

These shall be per floor/wing and have enough capacity for expansion

15.0 COMPLETION COMMISSIONING OF STRUCTURED CABLING WORKS

15.1 Upon completion of the installation, all cabling links must be tested for the following parameters, using Level Three testers: -

a) Category 6A Cable Tests

1. Wire Map
2. Length
3. Insertion Loss (Attenuation)
4. NEXT Loss
5. PSNEXT Loss
6. ELFEXT Loss, pair-to-pair
7. PSELFEXT Loss
8. Return Loss
9. ACR (Attenuation to crosstalk ratio)
10. PSACR
11. Propagation Delay
12. Delay Skew

b) Fibre Optic Cable Tests

1. Link attenuation (insertion loss)
2. Length

Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements.

The results should be recorded in one or several measure books showing test results of the cable components. In addition, the measurements must be recorded on two soft copies (CD-ROM / USB FLASH DISCs).

15.2 All components must be tested and a Completion Certificate issued stating the following:

a. Number of outlets

b. Type of cable

c. Date completed

d. Type of Warranty

In addition, an "as-built" package must be submitted with the following information

a. Updated floor plans

b. Wire/cable routing schematic

c. Facility assignment records

d. Horizontal cable test results

e. Fibre Backbone test results

16.0 Documentation

The contractor shall avail documentation (2 copies) detailing the layout and devices or components of the system and must include all information for maintenance technicians to run, service, extend or maintain the network. In particular, the documentation must be structured and contain the following:

a. Synopsis of the cabling (primary and secondary)

b. Charts of the distribution highlighting the details of the elements that have been installed

c. Detailed map of socket layout (2 Soft copies on CD-ROM should be availed)

d. Reports on measurements (2 Soft copies on CD-ROM should be availed)

The CD-ROMs provided shall include the software tools required to view, inspect and print any selection of test reports.

17.0 Warranty and Support

3.1 The Contractor will be required to give a per link warranty of at least fifteen (15) years for the structured cabling infrastructure and must provide a site certification certificate from the manufacturer of the cabling infrastructure not more than 30 days after completion of tests.

3.2 In the event of failure of the core switch, the contractor will be required to deliver any necessary parts on the next business day after determining that parts replacement is required, during the standard work week (8 hours a day, 5 days a week). This support will be carried out by a field engineer and will run for a period of Twenty Four months from the date of commissioning of the LAN.

3.3 The contractor will be required to provide a sixty months warranty on the edge switches from the date of commissioning of the LAN.

18.0 ADDITIONAL NOTES

Tenderers should take note of the following

a) The network should be capable of carrying data, voice and video. QOS should be considered as part of installation and configuration of the network.

b) All active LAN equipments should be from the same manufacturer for seamless integration, management and maintenance.
c) Each floor should have a telecommunication Closet to house the necessary structured cabling components and active equipments.

19.0 BROCHURES AND TECHNICAL LITERATURE

Tenderers should preferably enclose together with their submitted bids brochures detailing technical Literature and specifications of the active components of the structured cabling system. The brochures shall be used to evaluate the suitability of these components.

PART 2/1: PARTICULAR AND TECHNICAL SPECIFICATIONS – IP-PABX EQUIPMENT

CLAUSE	*DESCRIPTION*
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PART 2/1

1.00 PARTICULAR SPECIFICATIONS – IP-PABX EQUIPMENT

1.01 DESCRIPTION OF THE SITE

The site of the proposed works is located in **Mandera County.**

1.02 DESCRIPTION OF THE PROJECT

The works comprise the Installation, Testing and Commissioning of existing IP-PABX Equipment, Supply, Installation and Testing of new Telephone Instruments and the associated cabling works as listed in the Bills of Quantities.

1.03 CLIMATIC CONDITIONS

The following climatic conditions apply at the site of the Contract Works and the equipment, materials and installations shall be suitable for these conditions:

Mean Maximum Temperatures 37°c

Mean Minimum Temperature 25°c

Range of Relative humidity 50% - 60%

Salt in the atmosphere 0.08%

Altitude 231M above sea level

Latitude	03° 56' 15N
Longitude	41° 50' 55E
Solar radiation, June	2.79 mean max. Langleys

Heavy rains fall at certain periods of the year and the contractor shall be deemed to have taken account of this factor both in his prices and his planning of the execution of the contract works.

Equipment de-rating factors for the temperature and altitude shall be stated.

1.04 BOND FOR PABX WITH PROVISIONAL TYPE APPROVAL

Where the IP-PABX offered for this tender does not possess full type approval from C.A.K but has provisional type approval, the tenderer will be required to submit the name of a separate surety who will be willing to be bound to the Kenya Government in an amount equal to the full value of the PABX project for a period of 18 months from the date the IP-PABX is commissioned into service. The surety will be subject to the approval of the government.

1.05 REGULATIONS

The contractor shall, in the execution and completion of the works in the detailed design for which he is responsible comply with the provisions of the following as necessary and relevant:

- Communication Authority of Kenya *(formerly CCK)*
- The Kenya Communications Act
- The Electronic Power Act and the Rules made there under.
- The Kenya Power and Lighting Company Limited's Bye-Laws.
- The current edition of the "Regulations for the Electric Equipment of Buildings" issued by the Institution of Electrical Engineers.
- The requirements of the Chief Inspector of Factories for the Kenya Government.
- Kenya Bureau of Standards (KEBS) Standard Specifications and Codes of Practice, or other equal and approved standard specifications and codes.
- The Bye-Laws of the Local Authority.
- Any other regulations applicable to Electric and Electronic Installations or Communications systems in Kenya.
- The Employer's Safety Regulations.

1.06 POSITION OF SERVICES AND EQUIPMENT

The route services and approximate positions of apparatus are shown on the contract drawings but their exact positions shall be determined by approved dimensional details on working drawings or on site by the P.M.

The contractor shall ascertain on site that his work will not foil other services or furniture and all services through the ducts must be readily accessible for maintenance and arranged to allow maximum access along the ducts. Any work which has to be redone due to negligence in this respect will be the contractor's responsibility.

1.07 SETTING TO WORK AND REGULATING SYSTEMS

The contractor shall carry out such tests of the contract works as are required by KEBS Standard Specifications and Codes of Practice, I.E.E Regulations or equal and approved codes, or the competent Authority.

No testing or commissioning shall be under taken except in the presence of and to the satisfaction of the P.M. unless approved otherwise by him (contractor's own preliminary and proving tests are exempted).
The contractor shall include in his tender for the costs for testing and commissioning the contract works as herein described. He shall submit for approval to the P.M. a suitable programme for testing and commissioning. The P.M. and the Employer shall be given ample warning as to the dates on which testing and commissioning will take place.

The proving of any system of plant or equipment as to compliance with the specification shall not be approved by the P.M. except at his discretion until tests have been carried out under operating conditions appertaining to the most onerous conditions specified except where the time taken to obtain such conditions is unreasonable or exceeds 12 months after practical completion of the contract works.

1.08 IDENTIFICATION OF PLANT AND COMPONENTS

The contractor shall supply and install identification labels to all plant and to all switches and items of control equipment with, where no excessive heating is involved, white Traffolyte or equal labels engraved in block lettering denoting the name/function and/or section controlled. Where heating is likely to distort Traffolyte, approved aluminum labels with stamped or engraved lettering shall be used.

The labels shall be mounted on equipment and in most suitable positions. They shall be in English or in internationally understood symbols capable of being read without difficulty. The labels shall conform to descriptions used on record drawing. Details of the lettering of the labels and the method of mounts or supporting shall be forwarded to the P.M. for approval prior to manufacture.

1.09 WORKING DRAWINGS

The contractor shall prepare such working Drawings as may be necessary. The working Drawings shall be completed in such details not only that the contract works can be executed on site but also that the P.M can approve the contractor's designs and intentions in execution of the contract works.

Approved working drawings shall not be departed from except where provided for. Approval by the P.M. of working Drawings shall neither relieve the contractor of any of his obligations under the contract nor relieve him from correcting any errors found subsequently in the approved working Drawings or elsewhere associated therewith or with the works.

1.10 RECORD DRAWINGS

During the execution of works on site the contractor shall, in a manner approved by the P.M. record on working or other Drawings at site all information necessary for preparing Record Drawings of the installed contract Works. Marked-up working or other Drawings and other documents shall be made available to the P.M. as he may require for inspection and checking.

Record Drawing shall include but are not restricted to the following drawings or information: -

- Working Drawings amended as necessary but titled "Record Drawings" and certified as a true record of the as installed" contract works.
- Fully dimensioned drawings of all plant and apparatus.
- System Schematic and trunking diagrams showing all salient information relating to control and instrumentation.
- Wiring diagrams of individual plant, apparatus and switch and control boards. These diagrams to include these particular to individual plant or apparatus and elsewhere applicable those applicable to system operation as a whole.

One reproducible copy of the Record Drawings of the contract works and Schematic Diagrams shall be provided not later that one month afterwards.

Notwithstanding the contractor's obligation referred to above, if the contractor fails to produce to the P.M.'s approval of the Record Drawings, within one month of partial or Practical Completion the Employer shall be at liberty to have these drawings produced by others. The cost of obtaining the necessary information shall be deducted from the out-standing payments due to the contractor.

1.11 TESTS

Both on completion of his work and at the end of the guarantee period the contractor shall carry out such tests as may be required in the presence of the P.M. or his representative, or the competent Authority and shall provide all necessary Instruments, labour and materials to do so. The Contractor shall pay such charges related to such tests if any.

1.12 QUALITY OF MATERIALS

Materials and apparatus required for the complete installation as called for in the specifications or Contract Drawings shall be supplied by the contractor unless specified otherwise.

Unless otherwise specified all materials (including equipment, fittings, cables) shall be new, of the best quality and approved origin.

1.13. TRAINING

In the direction and to the satisfaction of the P.M. the contractor shall arrange for the training of the attendant console operators, users and the administrators at the site or the contractor's office on the workings of the IP-PABX. The cost of such training shall be included in the contractor's prices.

1.14 EQUIPMENT GUARANTEE

The contractor shall undertake in writing to rectify free of charge, all faults arising from faulty components, materials, design or workmanship by the manufacturer or contractor whichever is applicable. This liability shall be for a minimum period of one calendar year from the date of acceptance of the equipment. Twelve months limitation notwithstanding, the period of liability shall not end until all defects which appear during the liability period have been rectified.

1.15 PATENT RIGHTS

The contractor shall fully indemnify the Government of Kenya, against any action, claim or proceeding relating to infringement of any patent or design rights, and shall pay any royalties which may be payable in respect of any article or any part thereof which shall have been supplied by the contractor to the P.M. and in like manner the government of Kenya shall fully indemnify the contractor against any such action, claim on proceeding for infringement or alleged infringement under the works the design thereof which shall have been supplied by the P.M. to the contractor, but this indemnity shall apply to the works only, and any permission or request to manufacture to the order of the P.M. shall not relieve the contractor from liability should he manufacture for, or supply to other buyers.

PART 2/2

2.00 TECHNICAL SPECIFICATIONS

2.01 SCOPE OF THE WORKS

The contractor shall supply, deliver, unloaded, test, commission, and guarantee and be liable for defects, and be responsible for the initial maintenance, all as specified herein, of the new Telephone Instruments and accessories and all its associated cabling. The existing IP-PABX is entirely IP, ISDN native and with time multiplexing architecture.

The contractor shall supply and install associated items of plant and equipment other than those clearly stated to be supplied by others. He shall supply and install all accessories, whether described in the specification or not, essential to the completion of the works to the satisfaction of the P.M.

All equipment supplied shall be type approved by CAK and the installation shall be approved by the Communications Commission of Kenya (the competent Authority). The tenderer shall be responsible for all negotiations with and payments to the commission. He shall also pay all fees.

2.02 MINIMUM REQUIREMENTS

This specification defines minimum requirements, but bidders who offer superior facilities will be considered.

Any tender that does not comply with the minimum requirements will be rejected.

2.03 EQUIPMENT FINISH

The equipment finish shall be the responsibility of the contractor, who shall be responsible for its protection during erection and in the course of making good to the building finishes after equipment erection.

2.04 INTERFERENCE SUPPRESSION

The equipment and all its accessories shall be suppressed so as not to interfere with any communications, radio, T.V., Security or electro-medical equipment, recording or computer systems.

2.05 DOOR KEYS

The contractor shall keep the PABX suite locked at all times when his staff are not present and shall at the conclusion of the contract hand over all keys to the P.M.

2.06 EQUIPMENT HARDWARE

The tenderer shall quote for a multimedia application **fully IP-PABX**. The equipment must be 4U Industrial Grade Rack mountable Server, 4GB RAM, 500GB HDD, Core 2 Duo Processor configuration with duplicated components so that the PABX service will not be lost due to failure of a single component. The components to be duplicated should but not limited to:

- Power Supply Modules
- Main Control card
- Hard disc drives
- Memory storage expansion card

2.07 EQUIPMENT SOFTWARE

The equipment shall be preloaded with core software for driving it and giving it full operating flexibility. The list of features and services should be comprehensive and extensive and comprising the following:

- System features
- Operator features
- Standard telephone features
- Executive telephone features
- System administration features
- IP Network features
- Data features
- Special applications features

2.08 SYSTEM FEATURES

The system features shall include but not limited to the following facilities:

- Automated Attendant
- Black List
- Blind transfer
- Call Details Record.
- Call Forward on No Answer
- Call Forward Variable
- Call Monitoring
- Call Parking
- Call Queuing
- Call Recording
- Call Retrieval
- Call Routing (DID & ANI)
- Call Snooping
- Call Transfer Call Waiting
- Caller ID
- Caller ID on Call Waiting
- Database Store / Retrieve
- Database Integration
- Dial by Name
- Direct Inward System Access
- Distinctive Ring
- Distributed Universal Number Discovery (DUNDi™)
- Do Not Disturb
- Fax Transmit and Receive
- Music On Transfer
- Flexible Extension Logic
- Interactive Directory Listing
- Interactive Voice Response (IVR)
- Local and Remote Call Agents
- Music On Hold
- Caller ID Blocking
- Conference Bridging

2.09 WEB BASED COMPANY RECEPTIONIST (CALL QUEUE AND IVR (INTERACTIVE VOICE RESPONSE

- Calls in queue, pick which calls to answer.
- Active Calls Show the list of active calls and engaged extensions.
- Availability, IP Phone/soft phone status like off-hook, on-hook, ringing.
- Call Park.
- Drag and Drop call transfer.
- Voicemail transfer.
- Call Toggle – Allows the operator to shift between calls
- Music on Hold per queue.
- Caller Experience – Let the caller hear the phone ring instead of listening to music on hold.
- Ringing Options – Ring All, Round Robin, Fewest Calls, Least Recently Called, Random, and In Order.
- Extension Dialing – Allow the callers to dial an extension at any time.
- Send to Voice Mail.

2.10 CALL CONTROL

- Call Transfer – you can easily transfer incoming calls or active calls to another extension. Set the transfer rules for incoming calls so you can check the call list, then transfer, transfer without checking, or send the call straight to voicemail.
- Call Pick up – You can set up Call Pickup groups so some employees can pick up calls ringing on other extensions by dialing a short code on their own phones. You determine who has this permission and which calls they can pick up.
- Do not disturb.
- Hold – Put a call on Hold using the button on your IP phone, or from the Switchboard. You can customize the Music on Hold that plays until you resume the call.
- Call Parking – Put a call on Hold using the button on your IP phone, or from the Switchboard. You can customize the Music on Hold that plays until you resume the call.
- Parallel Ringing.
- Follow me.

2.11 VOICE MAIL & VOICE MAIL TO E-MAIL

- Voice Mail Set up.
- Voice Mail Access.
- Voice mail to email or to any email client.

2.12 VOICE RECORDING

Automatically record calls coming in, going out, or even internally, based on the settings you define.

2.13 CONFERENCING

1. 3 Way conferencing from the IP Phone.
2. Dial-in Conference.
3. Dial-out Conference

2.14 FAXING

1. Outgoing Fax.
2. Incoming Fax.

2.15 DISTRIBUTED OFFICE SETUP

Connects Multiple Offices through MPLS or VPN. Branch offices can be added to the IP server through an INTERNET connection.

2.16 PAGING/PAS

Dial a code to connect to a separate overhead paging and announcement system.
Dial a code and connect directly to a built-in one-way announcement speaker on one or more phones.

2.17 MULTI TRUNKING

Connect with PRI ISDN E1, T1. with Analog/PSTN/CO Lines. Connect with GSM Trunk.

2.18 SIP TRUNKING

- Ready to use the sip-trunking and as well the SIP Client
- Create Multiple VOIP accounts.

2.19 CALL ROUTING

- Location Based routing.
- Skill Based routing.
- DID Based Routing.

2.20 BARGE IN & LISTEN

Barge in: Barge in on both channels. The manager channel is joined onto the spied-on and bridged channel, and all parties can hear each other.
Listen: Monitor an agents call/ Extensions. The manager can hear both the spied-on and bridged channels, but they cannot hear the manager.

2.21 WHISPER

Whisper to the agent. The manager can hear both the spied-on and bridged channels, and the spied-on channel (agent) can also hear the manager, but not the bridged channel, hence "whisper."

2.22 REPORTS

Complete report on day to day, weekly reports, Monthly report, Extension wise report,

2.23 THIRD PARTY INTEGRATION

Connects any 3 party Integration Like, CRM.
ERP.
SMS.
Click to Call.

2.24 MULTI PHONES CONNECTIVITY

Connect with different Phones Like: IP PHONE.
Analog Phone
Soft Phone
Smart Phone (Mobiles).
DECT phones

2.25 ATTENDANT CONSOLE (PC Based)

One or more PC operator attendant consoles as indicated in the list of main requirements shall be supplied, together with two operators' handsets and two operators lightweight headsets per position. They shall be installed complete with suitable UPS and any other accessories necessary to complete their installation. Each console shall be equipped with all necessary facilities for controlling, connecting and monitoring the progress of calls and shall display alarms as necessary.

Night service facilities will normally be provided such that the operator can route in-coming calls to pre-selected extensions when the console in not manned.

Attendant consoles will be multiplex so that the connecting cable will comprise a minimum number of pairs, with little restriction on the sitting of the consoles and positions shall be so common that any operator can attend to any call.

Call presentation, chaining process, call back will be entirely managed by the IP-PABX. However, it will be possible to put certain call on individual hold, on keys, which have been reserved to that effect.

The information displayed on the terminal will give maximum details about the communication (normal call, urgent call, queue status, internal called-party, status of the terminal etc.).

GENERAL

1. These specifications describe the basic requirements for goods. Tenderers are requested to submit with their offers the detailed specifications, drawings, catalogues, etc. for the products they intend to supply.

2. Tenderers must indicate on the specifications sheets whether the equipment offered comply with each specified requirement.

3. All the dimensions and capacities of the equipment to be supplied shall not be less than those required in these specifications. Deviations from the basic requirements, if any, shall be explained in detail in writing with the offer, with supporting data such as calculation sheets, etc. The procuring entity reserves the right to reject the products, if such deviations shall be found critical to the use and operation of the products.

4. The tenderers are strongly advised to visit the site to ascertain various facilitates on the ground that are pertinent to delivery of this tender.

2.0 STRUCTURED NETWORK CABLING

2.1 OVERVIEW OF THE REQUIRED NETWORK

2.1.1 A structured cabling network is desired which will support secure transactions, scalability, reliability and simple network management. The entire network will have a consistent architecture to reduce the total cost of network ownership for on-going support and maintenance, component and interface management, scalability, relocations, security,

redundancy, and training. All the structured cabling sub system components for each solution must be from the same manufacturer

2.1.2 The cabling plant will support data, voice and video services

2.1.3 Bidders are advised to make site visits to establish for themselves the facilities available to support structured cabling and to make accurate measurements of the distances to be covered.

2.1.4 Static and/or dynamic IP addressing and sub-netting will be used to realize Virtual Local Area Networks (VLAN) within the LAN. All active components used in the network must be able to facilitate management of the network from a central as well as a remote location and must have integrated IOS software. All active components used and their accessories for each solution must be from the same manufacturer

2.2 SCOPE OF THE STRUCTURED NETWORK INSTALLATION

2.2.1 The installation will consist of a star topology horizontal UTP subsystem originating from switches and terminating at Data points with RJ45 sockets. For each data point, a patch cord of appropriate length with RJ45 connectors at both ends will be required to connect the Data point to the network

nterface adapter. Good cable management practice must be adhered to and proper labeling used for easy identification.

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2.2.2 The locations for the horizontal distribution cabinets for the building and floors by the contractor in consultation with Kenyatta University to decide the most economical positions, but must be in a secure rooms.

2.2.3 Where cables cannot be run in the building trunkings within the walls or floor, surface pathways using metal trunkings will be installed.

2.2.4 The Contractor will be responsible for the supply of all materials and components necessary to complete the installation of the structured cabling system.

2.2.5 The horizontal cabling will include outlets and consolidation or transition points, connectors, mechanical terminations and patch cords that compose horizontal cross-connect. The cables will be routed in existing wall ducts and terminated on patch panels and at data outlets.

2.2.6 The contractor will be responsible for pulling, terminating and testing all circuits installed and each cable shall be assigned a unique cable number

2.2.7 Metal trunking used (where applicable) will have dimensions of 50mm X 100mm with two compartments.

2.3 VARIATION OF THE SCOPE OF WORK

The client reserves the right at the time of the contract to vary the scope of the work, including amending the quantity of the data points, goods and materials. Such amendments should not result in any changes to any unit prices, other than where pricing was expressly specified to be subject to discount or other reduction on account of higher volume.

2.4 INSTALLATION PRACTICE

2.4.1 GENERAL

2.4.1.1 The Contractor will be required to install cabling in accordance with International Structured Cabling System designs. Each subsystem will be implemented using category 6 compliant components and be deployed according to ANSI/TIA/EIA-568-A and ISO/IEC 11801 standards.

2.4.1.2 All network components should be connected to the earth wire with the general specifications of this document, the local regulations in force and the manufacturer's recommendations.

2.4.1.3 All routing layout for cable paths must consider the cable minimum radius of curvature to be supported and the existing facilities, in order not to interfere with the access to maintenance activities.

2.4.1.4 All aspects of the cabling infrastructure should make provision for possible extensions.

2.4.1.5 All adapters must be compatible with the transmission capacities of the equipment to which they connect.

2.4.1.6 All cables and connectors must be labeled.

2.4.1.7 The contractor will be required to comply with the manufacturers recommended installation practices

2.4.1.8 The contractor will be required not to interfere with existing infrastructure

2.4.2 HORIZONTAL CABLING FOR THE LOCAL AREA NETWORK

2.4.2.1 The primary media for horizontal cabling will be 4-pair Unshielded Twisted Pair (UTP) which must meet or exceed ANSI/TIA/EIA 568-B.2-1 and ISO/IEC 11801:2002(E)

2.4.2.2 Unshielded Twisted Pair (UTP) Category 6 quality cable will be employed.

2.4.2.3 Each room to be networked shall have all plates installed and each outlet terminated with 8-pin modular jacks (RJ-45).

2.4.2.4 Each designated network interface will have capacity to support Gigabit Ethernet speed.

2.4.2.5 Cables will not be crushed using cable ties.

2.4.2.6 Cable conduits must not be overfilled.

2.4.2.7 All cables must pass through metal trunking and should not be visible from the outside

2.4.2.8 There shall be no splicing of any of the cables installed. Intermediate cross-connects and transition points are not allowed.

2.4.2.9 Data outlets shall be mounted on the trunking.

2.4.3 PATCH PANELS

2.4.3.1 Patch panels must be equipped with RJ45 contacts of category 6 sockets with a capacity of 24 and must be rack mountable.

2.4.3.2 All panels and racks must be earthed to provide electrical safety for users and screening to prevent electromagnetic radiation.

2.4.3.3 Except for the patch cords used to connect NICs to the RJ45 sockets, all patch cords must be labelled at each extremity with soft PVC support and indelible marking (stamping or similar method). For all other components, the label type should be of stiff plastic PVC type.

2.4.4 NETWORK CONTROL EQUIPMENT

2.4.4.1 Active devices used at the LAN edge will have 24 ports and 48 ports for connection to the horizontal cabling and uplink/cascade as may be appropriate and support Power-over-Ethernet, PoE and indicated in the specifications

2.4.4.2 The Wi-Fi devices (Ubiquity, 2.4 Ghz a/g/n) must also support pseudo PoE or full PoE.

2.4.4.3 Switches must be rack mountable in standard racks.

2.4.4.4 Active devices for horizontal cabling will support layer 2 switching and 10/100/1000 Mbps auto-sensing and for backbone cabling 1000Mbps and 10G capable.

2.4.4.5 Active devices used at the aggregation/distribution layer of the LAN must layer 3 switching.

2.4.5 EQUIPMENT CABINETS

2.4.5.1 All cabinets for active devices must conform to good practices specifications and with forced cooling.

2.4.5.2 The exact placing of the cabinets should be defined at the start of the works.

2.4.5.3 Equipment cabinets must provide enough space to accommodate the cabling, cabling management, equipment racks, panels and network control devices as required and the locations should provide for convenient access to operational personnel.

2.4.5.4 A rack mount UPS must be provided per cabinet as per the specifications.

2.4.5.5 Cabinets should have adequate room for additional components later and must have at least 3U space free.

Other requirements

Connection to service provider	
ITSP channels (SIP provider)	60 max. 8 SIP pro- vider
ISDN S0 (BRI)	20
ISDN S2M (PRI)	30
Max. number of trunk channels	250
Subscribers	
Analog subscribers	20
Digital subscribers	24
IP subscribers	500
Cordless/DECT (CMI)	64
Max. number of subscribers	500
Max. number of Mobility user	150
Smart Voicemail	320
Unified Communication (UC Suite)3	
UC Suite Voicemail	500[1]
Max. number of simultaneously active UC Suite Clients (total from myPortal for Desktop, @work, Outlook, etc.)	500[1]
OpenScape Business Attendant	8
Max. number of UC Mobility User	150[1]
Max. number of fax channels	8[1]
Max. number of fax subscribers	500[1]
Max. number of conference channels	20
Application Launcher User	250[1]

3. CCTV CAMERAS SPECIFICATIONS

1. Camera Lot 1

Key Features

- ✓ DHC/SDXC card slot, up to 128 GB
- ✓ 3-Axis adjustment
- ✓ 1/2.5" Progressive Scan CMOS
- ✓ 3840 × 2160 @15 fps
- ✓ 2.8/4 fixed lens
- ✓ Color: 0.01 lux @(F1.2, AGC ON), 0.028 lux @(F2.0, AGC ON), 0 lux with IR
- ✓ H.265+, H.265, H.264+, H.264
- ✓ Three streams
- ✓ 120dB WDR
- ✓ 4 Behavior analyses, and face detection K
- ✓ BLC/3D DNR/ROI/HLC
- ✓ IP67,IK10
- ✓ Built-in micro SD/SDHC/SDXC card slot

Specifications

Camera	
Image Sensor	1/2.5" Progressive Scan CMOS
Min. Illumination	Color: 0.01 lux @(F1.2, AGC ON), 0.028 lux @(F2.0, AGC ON), 0 lux with IR
Shutter Speed	1/3 s to 1/100,000 s
Slow Shutter	Yes
Auto-Iris	No
Day & Night	IR Cut Filter
Digital Noise Reduction	3D DNR
WDR	120dB
3-Axis Adjustment	Pan: 0° to 360°, tilt: 0° to 90°, rotate: 0° to 360°
Lens	
Focal Length	2.8/4/6/8 mm
Aperture	F2.0
Focus	Fixed
FOV	2.8 mm, horizontal FOV: 102°, vertical FOV: 53°, diagonal FOV: 124° 4 mm, horizontal FOV: 79°, vertical FOV: 42°, diagonal FOV: 95°
Lens Mount	M12

IR	
IR Range	Up to 50 m
Wavelength	850nm
Compression Standard	
Video Compression	Main stream: H.265/H.264 Sub-stream: H.265/H.264/MJPEG Third stream: H.265/H.264
H.264 Type	Main Profile/High Profile
H.264+	Main stream supports
H.265 Type	Main Profile
H.265+	Main stream supports
Video Bit Rate	32 Kbps to 16 Mbps
Smart Feature-set	
Behavior Analysis	Line crossing detection, intrusion detection, unattended baggage detection, object removal detection
Face Detection	Yes
Region of Interest	Support 1 fixed region for main stream and sub-stream
Image	
Max. Resolution	3840 × 2160
Main Stream	50Hz: 12.5 fps (3840 × 2160), 20fps (3072 × 1728), 25 fps (2560 × 1440, 1920 × 1080, 1280 × 720) 60Hz: 15 fps (3840 × 2160), 20fps (3072 × 1728), 30 fps (2560 × 1440, 1920 × 1080, 1280 × 720)
Sub-Stream	50Hz: 25fps (640 × 480, 640 × 360, 320 × 240) 60Hz: 30fps (640 × 480, 640 × 360, 320 × 240)
Third Stream	50Hz: 25fps (1280 × 720, 640 × 360, 352 × 288) 60Hz: 30fps (1280 × 720, 640 × 360, 352 × 240)
Image Enhancement	BLC/3D DNR/HLC
Image Settings	Saturation, brightness, contrast, sharpness and white balance adjustable by client software or web browser
Target Cropping	No
Day/Night Switch	Day/Night/Auto/Schedule

*Note: When the main stream resolution is 3840 × 2160, max frame rate is 12.5 fps (50Hz)/15 fps (60Hz) for all streams.
When the main stream resolution is 3072 × 1728, max frame rate is 20 fps for all streams.

Network	
Network Storage	Support Micro SD/SDHC/SDXC card (128G), local storage and NAS (NFS,SMB/CIFS), ANR
Alarm Trigger	Motion detection, video tampering, network disconnected, IP address conflict, illegal login, HDD full, HDD error
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
General Function	One-key reset, anti-flicker, three streams, heartbeat, mirror, password protection, privacy mask, watermark, IP address filter
Firmware Version	V5.5.80
API	ONVIF (PROFILE S, PROFILE G), ISAPI
Simultaneous Live View	Up to 6 channels
User/Host	Up to 32 users 3 levels: Administrator, Operator and User
Client	iVMS-4200, Hik-Connect, iVMS-5200, iVMS-4500

Web Browser	Plug-in required live view: IE8+, Chrome 41.0-44, Firefox 30.0-51, Safari 8.0-11 Plug-in free live view: Chrome 45.0+, Firefox 52.0+
Interface	
Video Output	No
Communication Interface	1 RJ45 10M/100M self-adaptive Ethernet port
On-board Storage	Built-in microSD/SDHC/SDXC slot, up to 128 GB
SVC	H.264 and H.265 encoding support
Reset Button	Yes
General	
Operating Conditions	-30 °C to +60 °C (-22 °F to +140 °F), humidity 95% or less (non-condensing)
Power Supply	12 VDC ± 25%, Φ 5.5 mm coaxial power plug PoE(802.3af, class 3)
Power Consumption and Current	12 VDC, 0.5 A, max. 6 W PoE: (802.3af, 36 V to 57 V), 0.2 A to 0.1 A, max. 7.5 W
Protection Level	IP67,IK10
Material	Metal
Dimensions	Camera: Φ 70 mm × 155 mm (Φ 2.8" × 6.1") Package: 216 × 121 × 118 mm (8.5" × 4.8" × 4.7")
Weight	Camera: approx. 410 g (0.9 lb.)

2. Camera Lot 2

Key Features

- ✓ 1/2.5" Progressive Scan CMOS
- ✓ 3840 × 2160 @15 fps
- ✓ 2.8 to 12 mm varifocal lens
- ✓ Color: 0.01 Lux @ (F1.2, AGC ON), 0.018 Lux @ (F1.6, AGC ON), 0 Lux with IR
- ✓ H.265+, H.265, H.264+, H.264
- ✓ 2 Behavior analyses
- ✓ 120dB WDR

Specifications

Camera	
Image Sensor	1/2.5" Progressive Scan CMOS
Min. Illumination	Color: 0.01 Lux @ (F1.2, AGC ON), 0 Lux with IR Color: 0.014 Lux @ (F1.4, AGC ON), 0 Lux with IR
Shutter Speed	1/3 s to 1/100,000 s
Slow Shutter	Support
Day & Night	IR Cut Filter

Digital Noise Reduction	3D DNR
WDR	120dB
3-Axis Adjustment	Pan: 0° to 360°, tilt: 0° to 90°, rotate: 0° to 360°
Lens	
Focal length	2.8 to 12 mm
Aperture	F1.4
FOV	Horizontal field of view: 115° to 35° Vertical field of view: 60° to 19° Diagonal field of view: 146° to 38.5°
Lens Mount	Φ14
IR	
IR Range	Up to 50 m
Wavelength	850nm
Compression Standard	
Video Compression	Main stream: H.265+/H.265/H.264+/H.264 Sub stream: H.265/H.264/MJPEG Third stream: H.265/H.264
H.264 Type	Main Profile/High Profile
H.265 Type	Main Profile
Video Bit Rate	32 Kbps to 16 Mbps
Audio Compression	G.711/G.722.1/G.726/MP2L2/PCM
Audio Bit Rate	64Kbps(G.711)/16Kbps(G.722.1)/16Kbps(G.726)/32-192Kbps(MP2L2)
Smart Feature-set	
Behavior Analysis	Line crossing detection, intrusion detection, unattended baggage detection, object removal detection
Face Detection	Support
Region of Interest	Support 1 fixed region for main stream and sub stream
Image	
Max. Resolution	3840 × 2160
Main Stream	50Hz: 20 fps (3840 × 2160), 25 fps (2944 × 1656, 2560 × 1440, 1920 × 1080, 1280 × 720) 60Hz: 20 fps (3840 × 2160), 30 fps (2944 × 1656, 2560 × 1440, 1920 × 1080, 1280 × 720)
Sub Stream	50Hz: 25fps (640 × 360, 352 × 288) 60Hz: 30fps (640 × 360, 352 × 240)
Third Stream	50Hz: 25fps (1280 ×720, 640 × 360, 352 × 288) 60Hz: 30fps (1280 ×720, 640 × 360, 352 × 240)
Image Enhancement	BLC/3D DNR
Image Setting	Rotate mode, saturation, brightness, contrast, sharpness adjustable by client software or web browser Auto/Schedule/Triggered by Alarm In
Network	
Network Storage	Support Micro SD/SDHC/SDXC card (128G), local storage and NAS (NFS,SMB/CIFS), ANR
Alarm Trigger	Motion detection, video tampering, network disconnected, IP address conflict, illegal login, HDD full, HDD error, Alarm output, Alarm input
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
General Function	One-key reset, anti-flicker, three streams, heartbeat, password protection, privacy mask,

	watermark, IP address filter
API	ONVIF (PROFILE S, PROFILE G), ISAPI
Simultaneous Live View	Up to 6 channels
User/Host	Up to 32 users 3 levels: Administrator, Operator and User
Client	iVMS-4200, Hik-Connect, iVMS-5200
Web Browser	IE8+, Chrome 31.0-44, Firefox 30.0-51, Safari 8.0+
Interface	
Audio	1 input (line in, 3.5 mm), 1 output(3.5 mm), mono sound
Communication Interface	1 RJ45 10M/100M self-adaptive Ethernet port
Alarm	1 input, 1 output (max. 12 VDC, 30 mA)
Video Output	1Vp-p composite output (75 Ω/BNC)
On-board storage	Built-in Micro SD/SDHC/SDXC slot, up to 128 GB
SVC	Support H.264 and H.265 encoding
Reset Button	Support
Audio	
Environment Noise Filtering	Support
Audio Sampling Rate	8kHz/16kHz/32kHz/44.1kHZ/48kHz
General	
Operating Conditions	-30 °C to +60 °C (-22 °F to +140 °F), Humidity 95% or less (non-condensing)
Power Supply	12 VDC ± 25%, PoE (802.3at) Terminal block for DC input
Power Consumption and Current	12 VDC, 1.5A, max. 17W PoE (802.3at, 42.5V to 57V), 0.5A to 0.1A, max. 19W
Protection Level	IP67, IK10 TVS 2000V Lightning Protection, Surge Protection and Voltage Transient Protection
Material	Metal
Dimensions	Φ144.13×332.73 mm (Φ5.67"× 13.10")
Weight	Camera: 1893 g (4.17 lb.)

3. Camera Lot 3

Key Features

- ✓ Up to 2.0 megapixel (1920 × 1080) high resolution
- ✓ Built-in Micro SD/SDHC/SDXC card slot, up to 128 GB
- ✓ Great performance and long lifespan Infrared LED, Approx. 20 to 30 meters IR range
- ✓ IR cut filter with auto switch
- ✓ DC12V & PoE
- ✓ The bit rate mode: CBR and VBR
- ✓ Wide Dynamic Range
- ✓ 3D Digital Noise Reduction
- ✓ Backlight Compensation
- ✓ Auto Electronic Shutter
- ✓ IP67 weather-proof protection

- ✓ IK10 vandal-proof protection
- ✓ Mobile Monitoring via Hik-Connect or iVMS-4500

Specifications

Camera	
Image Sensor	1/2.7" Progressive Scan CMOS
Min. Illumination	0.05Lux @ (F1.2, AGC ON) in color mode and 0.01Lux @ (F1.2, AGC ON) in black and white, 0 Lux with IR
Shutter Speed	1/3 s to 1/100,000 s
Lens	2.7-12mm @ F1.4, horizontal field of view: 104° to 24°
Lens Mount	Φ14
Day &Night	IR cut filter with auto switch
DNR	3D DNR
White balance	Automatic/Manual
Wide Dynamic Range	Wide Dynamic Range
3-Axis Adjustment	Pan: 0° to 355°, Tilt: 0° to 75°, Rotation: 0° to 355°
Compression Standard	
Video Compression	H.264/MJPEG
H.264 Type	Baseline Profile/Main Profile
Video Bit Rate	32 Kbps to 8 Mbps
Audio Compression	G.711/G.722.1/G.726/MP2L2
Audio Bit Rate	64Kbps(G.711)/16Kbps(G.722.1)/16Kbps(G.726)/32-128Kbps(MP2L2)
Dual Streams	Support
Image	
Max. Resolution	1920 × 1080
Frame Rate	50Hz: 25fps (1920 × 1080,1280 × 1024,1280 x 960,1280 × 720) 60Hz: 30fps (1920 × 1080,1280 × 1024, 1280 x 960,1280 × 720)
Sub Stream	50 Hz: 25 fps (320 x 240), 25 fps (352 x 288), 25 fps (640 x 480), 25fps(704 x 576) 60 Hz: 30 fps (320 x 240), 30 fps (352 x 240), 30 fps (640 x 480), 30fps(704 x 480)
Image Settings	Saturation, Brightness, Contrast, etc., adjustable by client software or web browser
Backlight Compensation	Support, zone optional
Region of Interest	Support one customized region for each stream
Network	
Storage	Support Micro SD/SDHC/SDXC card (up to 128 GB) local storage and NAS (NFS,SMB/CIFS)
Detection	Intrusion Detection, Line Crossing Detection, Motion Detection, Dynamic Analysis
Alarm Trigger	Video Tempering Detection, Network Disconnected, IP Address Conflicted, HDD Full, HDD Error
Protocols	IPV4 and IPV6, TCP/IP, UDP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, NTP, UPnP, SMTP, IGMP, 802.1X, QoS, IPv6, Bonjour, SSL, PPPoE, SNMP, ARP, filter IP

Standard	ONVIF (PROFILE S, PROFILE G), PSIA, CGI, ISAPI
General Function	Anti-Flicker, Mirror, Password Protection, Privacy Mask, Watermark, Heartbeat, AGC, log access and 10 simultaneous access
Interface	
Communication Interface	1 RJ45 10M/100M Ethernet port, base T
On-board Storage	Built-in Micro SD/SDHC/SDXC slot, up to 128GB

General

Operating Conditions	-30 °C to 60 °C (-22 °F to 140 °F), Humidity 95% or less (non-condensing)
Power Supply	DC12V ± 10%, PoE (802.3af)
Warranty	The device has 36 months of the warranty
Power Consumption	Max. 5.5 W with IR ON
IR Range	Approx. 20 to 30 meters with Smart IR
Protection Level	IP67, IK10
Dimensions	Φ141 × 99.9 mm (5.55” × 3.94”)
Weight	800g (1.76 lbs)

4. Camera Lot 4
Key Features

- ✓ 1/1.8" Progressive Scan CMOS
- ✓ 1920 × 1080 @ 60fps
- ✓ Ultra-low light
- ✓ Auto-iris
- ✓ 20dB WDR
- ✓ IP67
- ✓ R and white light, optional
- ✓ Capture rate > 99% (certain countries and regions)
- ✓ Recognition rate > 98% (certain countries and regions)

Functional Requirement

Vehicle Detection and LPR

✓ Support countries and regions of Mid-East, Africa, Asia-Pacific, America, Europe, Russian-speaking Countries.

✓ In European and Russian-speaking regions, capture rate exceeds 99%, recognition rate exceeds 98%.

Smart

✓ Smart recording

✓ support edge recording and dual-VCA

- ✓ Smart encoding:
- ✓ support low bit rate, low latency, ROI enhance encoding

Image

- ✓ 1920 × 1080 @60fps
- ✓ upport auto iris, DC-drive
- ✓ Support rotate mode, suitable for environment as corridor
- ✓ Support target cropping, details can be seen with low bandwidth
- ✓ Streaming smoothness setting for different requirements of image quality and fluency
- ✓ Support H.264+/H.264/MPEG4/MJPEG video compression, multi-level video quality configuration
- ✓ support Baseline Profile/Main Profile/High Profile H.264 encoding complexity. λ
- ✓ Multiple OSD color: Black & white self-adaptive; Custom
- ✓ 120dB WDR is supportable for backlight environment
- ✓ Support defog, BLC, EIS, 3D DNR

System

- ✓ Support ONVIF (profile S/profile G), CGI, PSIA, ISAPI protocol
- ✓ Support three streams, and support 20 channels live view at the same time
- ✓ Lightning protection, surge protection, voltage transient protection, anti-static protection

Interface

- ✓ Support standard 128G microSD/SDHC/SDXC card storage
- ✓ Support 10M/100M Ethernet port
- ✓ Support Audio I/O (-S) λ Support Alarm I/O (-S)
- ✓ Support CVBS analog output (4CIF resolution)

Security

- ✓ Support three-level user authentication management, user and password authorization, and IP address filtering
- ✓ Support security certificate as HTTPS
- ✓ Lock user IP after certain times failed login attempts

Specifications

Camera	
Image Sensor	1/1.8″ Progressive Scan CMOS
Min. Illumination	Color: 0.002 Lux @ (F1.2, AGC ON), 0.0027 Lux @ (F1.4, AGC ON), 0 Lux with IR
Shutter Speed	1 s to 1/100,000 s, supports slow shutter
Lens	2.8 mm to 12 mm, F1.4, horizontal field of view: 92° to 32° 8 mm to 32 mm, F1.6, horizontal field of view: 42° to 13.5°
Auto-iris	DC drive
Day & Night	IR cut filter with auto switch
Digital Noise Reduction	3D DNR
WDR	120dB
Compression Standard	
Video Compression	Main stream: H.264/MPEG4 Sub stream: H.264/MPEG4/MJPEG Third stream: H.264/MPEG4/MJPEG
H.264 Type	Baseline Profile/Main Profile/High Profile
H.264+	Support
Video Bit Rate	32 Kbps to 16 Mbps
Audio Compression (-S)	G.711/G.722.1/G.726/MP2L2
Audio Bit Rate (-S)	64Kbps (G.711) /16Kbps (G.722.1) /16Kbps (G.726) /32-160Kbps (MP2L2)
Image	
Max. Resolution	1920 × 1080
Main Stream Max. Frame Rate	50Hz: 50fps (1920 × 1080, 1280 × 960, 1280 × 720) 60Hz: 60fps (1920 × 1080, 1280 × 960, 1280 × 720)
Sub Stream Max. Frame Rate	50Hz: 25fps (704 × 576, 640 × 480, 352 × 288) 60Hz: 30fps (704 × 480, 640 × 480, 352 × 240)
Third Stream Max. Frame Rate	50Hz: 25fps (1920 × 1080, 1280 × 960, 1280 × 720, 704 × 576, 640 × 480, 352 × 288) 60Hz: 30fps (1920 × 1080, 1280 × 960, 1280 × 720, 704 × 480, 640 × 480, 352 × 240)
Image Enhancement	BLC /3D DNR/Defog/EIS
Image Setting	Rotate mode, saturation, brightness, contrast, sharpness adjustable by client software or web browser
Region of Interest	Support 4 fixed region for each stream, and dynamic tracking
Target Cropping	Support
Day/Night Switch	Auto/Schedule/Triggered by Alarm In (-S)
Picture Overlay	LOGO picture can be overlaid on video with 128 × 128 24bit bmp format
Road Traffic and Vehicle Detection	
Accuracy	**European and Russian-Speaking Regions:** Capture Rate > 99% Recognition Rate > 98%
Vehicle Speed	Support vehicle speed under 120 km/h (74.6 mi/h)
Line number	Up to 4 lines supported. Recommended to set 1 or 2 lines for best performance
Direction	Support capture and recognition of vehicles both approaching and leaving
Whitelist and Blacklist	Up to 2048
Network	

Network Storage	Support microSD/SDHC/SDXC card (128G), local storage and NAS (NFS,SMB/CIFS), ANR
Alarm Trigger	Road traffic, motion detection, video tampering alarm, network disconnected, IP address conflict, illegal login, HDD full, HDD error
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6
General Function	One-key reset, anti-flicker, three streams, heartbeat, password protection, privacy mask, watermark, IP address filter, mirror
Standard	ONVIF (profile S, profile G), PSIA, CGI, ISAPI
Interface	
Communication Interface	1 RJ45 10M/100M Ethernet port
Audio (-S)	With –S model: 1 audio input(line in/mic in), 1 audio output
Alarm (-S)	With –S model: 1 input, 1 output
Video Output	1Vp-p composite output (75 Ω/BNC)
On-board storage	Built-in microSD/SDHC/SDXC slot, up to 128 G
Reset Button	Yes
Audio (-S)	
Environment Noise Filtering	Support
Audio I/O	Support
Audio Sampling Rate	16kHz/32kHz/44.1kHz/48 kHz
General	
Operating Conditions	-IZS/P, -IZ/P, -LZS/P: -30 °C to +60 °C (-22 °F to +140 °F), Humidity 95% or less (non-condensing) -IZHS/P: -40 °C to +60 °C (-40 °F to +140°F), Humidity 95% or less (non-condensing)
Power Supply	12 VDC ± 10%, terminal block PoE (802.3at, class 4)
Power Consumption and Current	-(IZS)(IZ)/P: 12 VDC, max. 13.3 W, 1.2 A; PoE, max. 17.6 W, 0.3 A to 0.5 A -IZHS/P: 12 VDC, max. 14.5 W, 1.3 A; PoE, max. 19.2 W, 0.3 A to 0.5 A -LZS/P: 12 VDC, max. 18.1 W, 1.6 A; PoE, max. 24 W, 0.4 A to 0.6 A
IR	-IZ/P, -IZS/P, -IZHS/P: 850 nm IR wavelength, up to 50 meters for 2.8 to 12 mm lens, up to 100 m for 8 to 32 mm lens
White Light	-LZS/P: up to 50 meters for 2.8 to 12 mm lens, up to 100 m for 8 to 32 mm lens
Heater	-IZHS: support

5. Camera Lot 5

Key Features.

- ✓ 1/2.5" Progressive Scan CMOS
- ✓ 3840 × 2160 @15 fps

- ✓ 2.8 to 12 mm varifocal lens
- ✓ Color: 0.01 Lux @ (F1.2, AGC ON), 0.018 Lux @ (F1.6, AGC ON), 0 Lux with IR
- ✓ H.265+, H.265, H.264+, H.264
- ✓ 2 Behavior analyses
- ✓ 120dB WDR
- ✓ BLC/3D DNR/ROI
- ✓ IP67, IK10
- ✓ Built-in micro SD/SDHC/SDXC card slot, up to 128 GB

Specifications

Camera	
Image Sensor	1/2.5" Progressive Scan CMOS
Min. Illumination	Color: 0.01 Lux @ (F1.2, AGC ON), 0.018 Lux @ (F1.6, AGC ON), 0 Lux with IR
Shutter Speed	1/3 s to 1/100,000 s
Slow Shutter	Yes
Auto-Iris	No
Day & Night	IR Cut Filter
Digital Noise Reduction	3D DNR
WDR	120dB
3-Axis Adjustment	Pan: 0° to 355°, tilt: 0° to 75°, rotate: 0° to 355°
Lens	
Focal Length	2.8 to 12 mm
Aperture	F1.6
Focus	Auto
FOV	Horizontal field of view: 105° to 34.5° Vertical field of view: 55° to 19° Diagonal field of view: 125° to 40°
Lens Mount	Φ14
IR	
IR Range	Up to 30 m
Wavelength	850nm
Compression Standard	

Video Compression	Main stream: H.265/H.264 Sub-stream: H.265/H.264/MJPEG Third stream: H.265/H.264
H.264 Type	Main Profile/High Profile
H.264+	Main stream supports
H.265 Type	Main Profile
H.265+	Main stream supports
Video Bit Rate	32 Kbps to 16 Mbps
Audio Compression	G.711/G.722.1/G.726/MP2L2/PCM
Audio Bit Rate	64Kbps(G.711)/16Kbps(G.722.1)/16Kbps(G.726)/32-192Kbps(MP2L2)
Smart Feature-set	
Behavior Analysis	Line crossing detection, intrusion detection
Face Detection	Yes
Region of Interest	Support 1 fixed region for main stream and sub-stream
Image	
Max. Resolution	3840 × 2160
Main Stream	50Hz: 12.5 fps (3840 × 2160), 20fps (3072 × 1728), 25 fps (2560 × 1440, 1920 × 1080, 1280 × 720) 60Hz: 15 fps (3840 × 2160), 20fps (3072 × 1728), 30 fps (2560 × 1440, 1920 × 1080, 1280 × 720)
Sub-Stream	50Hz: 25fps (640 × 480, 640 × 360, 320 × 240) 60Hz: 30fps (640 × 480, 640 × 360, 320 × 240)
Third Stream	50Hz: 25fps (1280 ×720, 640 × 360, 352 × 288) 60Hz: 30fps (1280 × 720, 640 × 360, 352 × 240)
Image Enhancement	BLC/3D DNR
Image Settings	Rotate mode, saturation, brightness, contrast, sharpness adjustable by client software or web browser
Target Cropping	No
Day/Night Switch	Day/Night/Auto/Schedule/Triggered by Alarm In
Network	
Network Storage	Support Micro SD/SDHC/SDXC card (128G), local storage and NAS (NFS,SMB/CIFS), ANR
Alarm Trigger	Motion detection, video tampering, network disconnected, IP address conflict, illegal login, HDD full, HDD error
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
General Function	One-key reset, anti-flicker, three streams, heartbeat, mirror, password protection, privacy mask, watermark, IP address filter
Firmware Version	V5.5.3
API	ONVIF (PROFILE S, PROFILE G), ISAPI
Simultaneous Live View	Up to 6 channels
User/Host	Up to 32 users 3 levels: Administrator, Operator and User
Client	iVMS-4200, Hik-Connect, iVMS-5200
Web Browser	IE8+, Chrome 31.0-44, Firefox 30.0-51, Safari 8.0+
Interface	
Audio	1 input (line in, 3.5 mm), 1 output (line out, 3.5 mm), mono sound
Alarm	1 input, 1 output
Communication Interface	1 RJ45 10M/100M self-adaptive Ethernet port

Video Output	1Vp-p composite output (75 Ω/BNC) (For adjustment only)
On-board storage	Built-in Micro SD/SDHC/SDXC slot, up to 128 GB
SVC	H.264 and H.265 encoding support
Reset Button	Yes
Audio	
Environment Noise Filtering	Yes
Audio Sampling Rate	8kHz/16kHz/32kHz/44.1kHZ/48kHz
General	
Operating Conditions	-30 °C to +60 °C (-22 °F to +140 °F), Humidity 95% or less (non-condensing)
Power Supply	12 VDC ± 25%, Φ 5.5 mm coaxial power plug PoE (802.3af, class 3)
Power Consumption and Current	12 VDC, 0.8A, max. 10W PoE (802.3af, 36V to 57V), 0.4A to 0.2A, max. 12W
Protection Level	IP67, IK10
Material	Metal
Dimensions	Φ153.4 × 133.1 mm (Φ6" × 5.2")
Weight	Camera: 1287 g (2.8 lb.)

6. Camera Lot 6

Key Features

- ✓ 1/2.5" Progressive Scan CMOS
- ✓ 3840 × 2160 @15 fps
- ✓ 2.8/4/6/8 mm fixed lens
- ✓ Color: 0.01 lux @(F1.2, AGC ON), 0.028 lux @(F2.0, AGC ON), 0 lux with IR
- ✓ H.265+, H.265, H.264+, H.264
- ✓ 2 Behavior analyses
- ✓ 120dB WDR
- ✓ BLC/3D DNR/ROI/HLC
- ✓ IP67, IK10
- ✓ Built-in micro SD/SDHC/SDXC card slot, up to 128 GB

Specifications

Camera	
Image Sensor	1/2.5" Progressive Scan CMOS
Min. Illumination	Color: 0.01 lux @(F1.2, AGC ON), 0.028 lux @(F2.0, AGC ON), 0 lux with IR
Shutter Speed	1/3 s to 1/100,000 s
Slow Shutter	Yes
Day & Night	IR Cut Filter
Digital Noise Reduction	3D DNR
WDR	120dB
3-Axis Adjustment	Pan: 0° to 355°, tilt: 0° to 75°, rotate: 0° to 355°
Lens	
Focal Length	2.8/4/6/8 mm
Aperture	F2.0
Focus	Fixed
FOV	2.8 mm, horizontal FOV: 102°, vertical FOV: 53°, diagonal FOV: 124° 4 mm, horizontal FOV: 79°, vertical FOV: 42°, diagonal FOV: 95° 6 mm, horizontal FOV: 50°, vertical FOV: 28°, diagonal FOV: 59° 8 mm, horizontal FOV: 40°, vertical FOV: 25°, diagonal FOV: 53°
Lens Mount	M12
IR	
IR Range	Up to 30 m
Wavelength	850nm
Compression Standard	
Video Compression	Main stream: H.265/H.264 Sub-stream: H.265/H.264/MJPEG Third stream: H.265/H.264
H.264 Type	Main Profile/High Profile
H.264+	Main stream supports
H.265 Type	Main Profile
H.265+	Main stream supports
Video Bit Rate	32 Kbps to 16 Mbps
Audio Compression (-S)	G722.1/G.711/G726/MP2L2/PCM/MP3
Audio Bit Rate (-S)	64Kbps(G.711)/16Kbps(G.722.1)/16Kbps(G.726)/32-192Kbps(MP2L2)/8Kbps-320Kbps(MP3)
Smart Feature-set	
Smart Event	Line crossing detection, intrusion detection, face detection
Basic Event	Motion detection, video tampering alarm, exception (network disconnected, IP address conflict, illegal login, HDD full, HDD error)
Linkage Method	Trigger recording: memory card, network storage, pre-record and post-record Trigger captured pictures uploading: FTP, HTTP, NAS, Email Trigger notification: HTTP, ISAPI, alarm output (-S), Email
Region of Interest	Support 1 fixed region for main stream and sub-stream
Image	
Max. Resolution	3840 × 2160
Main Stream	50Hz: 12.5 fps (3840 × 2160), 20fps (3072 × 1728), 25 fps (2560 × 1440, 1920 × 1080, 1280 × 720)

	60Hz: 15 fps (3840 × 2160), 20fps (3072 × 1728), 30 fps (2560 × 1440, 1920 × 1080, 1280 × 720)
Sub-Stream	50Hz: 25fps (640 × 480, 640 × 360, 320 × 240) 60Hz: 30fps (640 × 480, 640 × 360, 320 × 240)
Third Stream	50Hz: 25fps (1280 × 720, 640 × 360, 352 × 288) 60Hz: 30fps (1280 × 720, 640 × 360, 352 × 240)
Image Enhancement	BLC/3D DNR/HLC
Image Setting	Saturation, brightness, contrast, sharpness, AGC, and white balance adjustable by client software or web browser
Target Cropping	No
Day/Night Switch	Day/Night/Auto/Schedule/Triggered by Alarm In (-S)

*Note: When the main stream resolution is 3840 × 2160, max frame rate is 12.5 fps (50Hz)/15 fps (60Hz) for all streams.
When the main stream resolution is 3072 × 1728, max frame rate is 20 fps for all streams.

Network	
Network Storage	Support Micro SD/SDHC/SDXC card (128G), local storage and NAS (NFS,SMB/CIFS), ANR
Protocols	TCP/IP, UDP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, UDP, Bonjour, SSL/TLS
General Function	Anti-flicker, three streams, heartbeat, mirror, privacy masks, password reset via e-mail, pixel counter, HTTP listening
API	ONVIF (PROFILE S, PROFILE G, PROFILE T), ISAPI, SDK
Security	Password protection, complicated password, HTTPS encryption, 802.1X authentication (EAP-TLS 1.2, EAP-LEAP, EAP-MD5), watermark, IP address filter, basic and digest authentication for HTTP/HTTPS, WSSE and digest authentication for ONVIF, TLS1.2
Simultaneous Live View	Up to 6 channels
User/Host	Up to 32 users 3 levels: Administrator, Operator and User
Client	iVMS-4200, Hik-Connect, Hik-Central
Web Browser	Plug-in required live view: IE8+ Plug-in free live view: Chrome 57.0+, Firefox 52.0+, Safari 11+ Local Service: Chrome 41.0+, Firefox 30.0+
Interface	
Audio (-S)	1 input (line in/mic in), 1 output (line out), terminal block, mono sound
Alarm (-S)	1 input, 1 output (max. 12 VDC, 30 mA), terminal block
Video Output	No
Communication Interface	1 RJ45 10M/100M self-adaptive Ethernet port
On-board Storage	Built-in microSD/SDHC/SDXC slot, up to 128 GB
SVC	H.264 and H.265 encoding support
Reset Button	Yes
Audio	
Environment Noise Filtering	Yes
Audio Sampling Rate	8 kHz/16 kHz/32 kHz/44.1 kHz/48 kHz
General	
Operating Conditions	-30 °C to +60 °C (-22 °F to +140 °F), humidity 95% or less (non-condensing)
Web Client Language	32 languages English, Russian, Estonian, Bulgarian, Hungarian, Greek, German, Italian, Czech, Slovak, French, Polish, Dutch, Portuguese, Spanish, Romanian, Danish, Swedish, Norwegian, Finnish, Croatian, Slovenian, Serbian,

	Turkish, Korean, Traditional Chinese, Thai, Vietnamese, Japanese, Latvian, Lithuanian, Portuguese (Brazil)
Power Supply	12 VDC ± 25%, Φ 5.5 mm coaxial power plug PoE(802.3af, class 3)
Power Consumption and	DC: 12 V, 0.6 A, max. 7.5 W
Current	PoE: (802.3af, 36 V to 57 V), 0.3 A to 0.2 A, max. 9 W
Protection Level	IP67, IK10
Material	Camera body: metal, bubble: plastic
Dimensions	Camera: Φ 111 mm × 82.4 mm (Φ 4.4" × 3.2") Package: 134 × 134 × 108 mm (5.3" × 5.3" × 4.3")
Weight	Camera: approx. 500 g (1.1 lb.)

7. Camera Lot 7

Key Features

- ✓ 1/3” Progressive Scan CMOS
- ✓ Up to 4 megapixel resolution
- ✓ 120dB WDR
- ✓ 3D DNR
- ✓ Motorized lens 2.8-12mm (-Z)
- ✓ Up to 30 meters IR range
- ✓ Built-in Micro SD/SDHC/SDXC card slot, up to 128 GB
- ✓ Audio/alarm I/O (-S)
- ✓ Mobile Monitoring via EZVIZ P2P or iVMS-4500
- ✓ 12V DC±10% & PoE(802.3af)
- ✓ Support H.264+
- ✓ IP66

Specifications

Camera	
Image Sensor	1/3’’ Progressive Scan CMOS
Min. Illumination	0.01Lux @(F1.2,AGC ON), 0.014 Lux @(F1.4,AGC ON), 0 Lux with IR
Shutter Speed	1/3 s ~ 1/10,000 s
Slow Shutter	Support
Lens	2.8 - 12 mm @ F1.4, motorized lens (-Z)
Lens Mount	Φ14
Day & Night	IR cut filter with auto switch

WDR	120dB
Compression Standard	
Video Compression	H.264/MJPEG/H.264+
H.264 Type	Main Profile
Video Bit Rate	32 Kbps – 16 Mbps
Audio (-S)	G.711/G.722.1/G.726/MP2L2 64Kbps(G.711) / 16Kbps(G.722.1) / 16Kbps(G.726) / 32-128Kbps(MP2L2)
Image	
Max. Resolution	2688×1520
Frame Rate	50Hz: 20fps (2688×1520), 25fps(1920×1080), 25fps(1280×720) 60Hz: 20fps (2688×1520), 30fps (1920×1080), 30fps(1280×720)
Image Enhancement	BLC/3D DNR/ROI
Image Setting	Rotate Mode, Saturation, Brightness, Contrast, Sharpness adjustable by client software or web browser
Day/Night Switch	Auto/Schedule/Triggered by Alarm In
Network	
Network Storage	NAS (Support NFS,SMB/CIFS); ANR, Built-in Micro SD/SDHC/SDXC card slot, up to 128 GB
Alarm Trigger	Intrusion detection, Line crossing detection, Motion detection, Dynamic analysis, Tampering alarm, Network disconnect, IP address conflict, Storage exception
Protocols	TCP/IP, UDP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
Security	One-key reset, flash-prevention, dual stream, heartbeat, mirror, password protection, privacy mask, watermark, IP address filtering, anonymous access
Standard	ONVIF (PROFILE S, PROFILE G), PSIA, CGI, ISAPI
General	
Interface	1 RJ45 10M/100M Ethernet interface
Operating Conditions	-30 °C – 60 °C (-22 °F – 140 °F), Humidity 95% or less (non-condensing)
Power Supply	12V DC±10%, PoE (802.3af)
Power Consumption	Max. 5.5 W (Max. 7.5 W with IR cut filter on)
Ingress Protection	IP66
IR Range	20~30 meters
Dimensions	95×105×258.6 mm (3.74” × 4.13” × 10.18”)
Weight	1200g (2.65 lbs)

8. Network Video Recorder

Features and Functions

Professional and Reliable

- ✓ Dual-OS design to ensure high reliability of system running
- ✓ ANR technology to enhance the storage reliability when the network is disconnected
- ✓ HDD hot swap with RAID0, RAID1, RAID5, RAID6 and RAID10 storage scheme configurable

Configurable normal or hot spare working mode to constitute an N+1 hot spare system
Video Input and Transmission

- ✓ Up to 64-ch 12 MP IP cameras can be connected
- ✓ Connectable to the third-party network cameras

Compression and Recording

- ✓ H.264+ compression effectively reduces the storage space and costs by up to 50%
- ✓ Full channel recording at up to 12MP resolution

HD Video Output

- ✓ HDMI1/VGA1 and HDMI2/VGA2 outputs provided
- ✓ HDMI1 Video output at up to 4K (3840 × 2160) resolution

Storage and Playback

- ✓ Up to 8 SATA interfaces and 1 eSATA interface connectable for recording and backup
- ✓ Smart search for efficient playback.
- ✓ 8/16-ch synchronous playback at up to 1080p resolution

Smart &POS Function

- ✓ Supports multiple VCA (Video Content Analytics) events
- ✓ Smart search for the selected area in the video; and smart playback to improve the playback efficiency
- ✓ Supports VCA search for fire/ship/temperature/temperature difference detection triggered video files
- ✓ POS information overlay on live view and playback
- ✓ POS triggered recording and alarm

Network & Ethernet Access

- ✓ Hik Cloud P2P & HiDDNS (Dynamic Domain Name System) for easy network management
- ✓ 2 Gigabit Ethernet network interfaces; Host and user authentication (up to 20 users)

Specifications

input		Up to 12 MP resolution
	Two-way audio	1-ch, RCA (2.0 Vp-p, 1 k Ω)
Network		or 200 Mbps (when RAID is enabled)
	Outgoing bandwidth	256 Mbps, or 200 Mbps (when RAID is enabled)
	Remote connection	128
	Recording resolution	12 MP/8 MP/6 MP/5 MP/4 MP/3 MP/1080p/UXGA/720p/VGA/4CIF/DCIF /2CIF/CIF/QCI

		F
	CVBS output (Optional)	1-ch, BNC (1.0 Vp-p, 75 Ω), resolution: PAL: 704 × 576, NTSC: 704 × 480
Video/Audio output	**VGA1 /HDMI1 output resolution**	HDMI1: 4K (3840 × 2160)/60Hz, 4K (3840 × 2160)/30Hz, 2K (2560 × 1440)/60Hz, 1920 × 1080p/60Hz, 1600 × 1200/60Hz, 1280 × 1024/60Hz, 1280 × 720/60Hz, 1024 × 768/60Hz
		VGA1: 2K (2560 × 1440)/60Hz, 1920 × 1080p/60Hz, 1600 × 1200/60Hz, 1280 × 1024/60Hz, 1280 × 720/60Hz, 1024 × 768/60Hz
	VGA2 /HDMI2 output resolution	1920 × 1080p/60Hz, 1280 × 1024/60Hz, 1280 × 720/60Hz, 1024 × 768/60Hz
	Audio output	2-ch, RCA (2.0Vp-p, 1 KΩ)
Decoding	**Decoding format**	H.265/H.265+/H.264/H.264+/MPEG4/MJPEG
	Live view/Playback resolution	12 MP/8 MP/6 MP/5 MP/4 MP/3 MP/1080p/UXGA/720p/VGA/4CIF/DCIF /2CIF/CIF/QCIF
	Synchronous playback	8-ch / 16-ch
	Capability	4-ch @ 4K or 16-ch @ 1080p
Network management	**Network protocols**	TCP/IP, DHCP, HIK Cloud P2P, DNS, DDNS, NTP, SADP, SMTP, NFS, iSCSI, UPnP™, HTTPS, RTP, UDP/IP, HTTP, FTP, SNMP
Hard disk	**SATA**	8 SATA interfaces – NAS storage DS-A81024D HOT PLUG 24HDD SATA (6TB each) is optional
	eSATA	1 eSATA interface
	Capacity	Up to 6TB capacity for each HDD
Disk array	**Array type**	RAID0, RAID1, RAID5, RAID6, RAID10
	Number of arrays	4
External interface	**Network interface**	2, RJ-45 10/100/1000 Mbps self-adaptive Ethernet interface
	Serial interface	RS-232; RS-485; Keyboard
	USB interface	Front panel: 2 × USB 2.0; Rear panel: 1 × USB 3.0
	Alarm in/out	16/4
	Power supply	100 to 240 VAC, 50 to 60 Hz
	Max. Power	200 W
	Consumption (without hard	≤30W

General	**disk)**	
	Working temperature	-10 to +55º C (+14 to +131º F)
	Working humidity	10 to 90 %
	Chassis	19-inch rack-mounted 2U chassis
	Dimensions(W × D × H)	445 × 470 ×90 mm (17.5"× 18.5" × 3.5")
	Weight (without hard disk)	≤ 10 kg (22 lb)

9. Core Switch Specifications

Minimum Requirements

Short Description	Switch: L3 managed, 16 x 10GE SFP+ 2 x 10GE combo, rack-mountable, 8 x 10GE
Device type	Switch: 10G, 24 ports, L3 managed
Enclosure type	Rack-mountable, 1RU
Ports	16 10GE SFP+ slots + 2 10GE copper/SFP+ combo plus 1 GE OOB management
Power over Ethernet (PoE)	None
Switching capacity	480 Gbps
Forwarding performance (64-byte packets)	357.12 Mpps
MAC address table size	32,000 entries
Capacity (active VLANS)	4000
Routing protocol	Static IPv4 /IPv6 routing

Remote management protocol	SNMP1, RMON1, RMON2, RMON3, RMON9, Telnet, SNMPv3, SNMPv2c, HTTP, HTTPS, SSH, CLI
Features	Stacking, flow control, Layer 2 switching, Layer 3 switching, VLAN support, IPv6 support, Spanning Tree Protocol (STP) support, Rapid Spanning Tree Protocol (RSTP) support, Multiple Spanning Tree Protocol (MSTP) support, access control list (ACL) support, quality of service (QoS), reset button, LACP support, Energy Efficient Ethernet, dynamic VLAN support (GVRP), advanced threat protection, IPv6 first-hop security, static routing, sFlow, RSPAN
Compliant standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.1D, IEEE 802.1Q, IEEE 802.3ab,
	IEEE 802.3ae, IEEE 802.3an, IEEE 802.1p, IEEE 802.3x, IEEE 802.3ad (LACP), IEEE 802.1w, IEEE 802.1x, IEEE 802.1s, IEEE 802.3az
RAM	512 MB
Flash memory	256 MB
Status indicators	System, Master, Fan, Stack ID, Link/Speed per port
Expansion and Connectivity	**Expansion and Connectivity**
Interfaces	22 x 10GE SFP+ slots , 2 x 10GBase-T/SFP+ combo, 1 x GE OOB port , 1 x console - RJ45
Power	**Power**
Power supply	Internal
Voltage required	AC 120/230V (50/60 Hz)
Width	17.3 in. (440 mm)
Depth	13.8 in. (350 mm)
Height	1.73 in. (44 mm)
Weight	9.17 lb (4.16 kg)
Cables included	1 x console cable
Compliance standards	UL 60950, FCC Part 15 A, CSA 22.2
Manufacturer Warranty	**Manufacturer Warranty**
Service and support	Enhanced limited lifetime warranty
Service and support details	Next business day hardware replacement. Software updates. 1-year complimentary telephone and online technical support.
Minimum operating temperature	32°F (0°C)
Maximum operating temperature	122°F (50°C)
Humidity range operating	10-90% (noncondensing)

Minimum storage temperature	-4°F (-20°C)
Maximum storage temperature	158°F (70°C)
Humidity range storage	10-90% (noncondensing)

10. Access Switch

Minimum Specifications

Layer 2 Switching	
Spanning Tree Protocol (STP)	Standard 802.1d Spanning Tree support Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default 8 instances are supported Multiple Spanning Tree instances using 802.1s (MSTP)
Port grouping	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) Up to 8 groups Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation
VLAN	Support for up to 4096 VLANs simultaneously Port-based and 802.1Q tag-based VLANs MAC-based VLAN Management VLAN Private VLAN Edge (PVE), also known as protected ports, with multiple uplinks Guest VLAN Unauthenticated VLAN Dynamic VLAN assignment via Radius server along with 802.1x client authentication CPE VLAN
Voice VLAN	Voice traffic is automatically assigned to a voice-specific VLAN and treated with appropriate levels of QoS. Auto voice capabilities deliver network-wide zero touch deployment of voice endpoints and call control devices.
Multicast TV VLAN	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (Also known as MVR)

Q-in-Q VLAN	VLANs transparently cross a service provider network while isolating traffic among customers	
Generic VLAN Registration Protocol (GVRP)/Generic Attribute Registration Protocol (GARP)	Protocols for automatically propagating and configuring VLANs in a bridged domain	
Unidirectional Link Detection (UDLD)	UDLD monitors physical connection to detect unidirectional links caused by incorrect wiring or cable/port faults to prevent forwarding loops and blackholing of traffic in switched networks	
Dynamic Host Configuration Protocol (DHCP) Relay at Layer 2	Relay of DHCP traffic to DHCP server in different VLAN. Works with DHCP Option 82	
Internet Group Management Protocol (IGMP) versions 1, 2, and 3 snooping	IGMP limits bandwidth-intensive multicast traffic to only the requesters; supports 1K multicast groups (source-specific multicasting is also supported)	
IGMP Querier	IGMP querier is used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router	
Head-of-line (HOL) blocking	HOL blocking prevention	
Jumbo Frames	Up to 9K (9216) bytes	
Layer 3		
IPv4 routing	Wirespeed routing of IPv4 packets Up to 512 static routes and up to 128 IP interfaces	
Classless Inter-Domain Routing (CIDR)	Support for CIDR	
Layer 3 Interface	Configuration of layer 3 interface on physical port, LAG, VLAN interface or Loopback interface	
DHCP relay at Layer 3	Relay of DHCP traffic across IP domains	
User Datagram Protocol (UDP) relay	Relay of broadcast information across Layer 3 domains for application discovery or relaying of BootP/DHCP packets	
DHCP Server	Switch functions as an IPv4 DHCP Server serving IP addresses for multiple DHCP pools/scopes Support for DHCP options	
Security		
Secure Shell (SSH) Protocol	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported	
Secure Sockets Layer (SSL)	SSL support: Encrypts all HTTPS traffic, allowing highly secure access to the browser-based management GUI in the switch	

IEEE 802.1X (Authenticator role)	802.1X: RADIUS authentication and accounting, MD5 hash; guest VLAN; unauthenticated VLAN, single/multiple host mode and single/multiple sessions Supports time-based 802.1X Dynamic VLAN assignment	
Web Based Authentication	Web based authentication provides network admission control through web browser to any host devices and operating systems.	
STP Bridge Protocol Data Unit (BPDU) Guard	A security mechanism to protect the network from invalid configurations. A port enabled for BPDU Guard is shut down if a BPDU message is received on that port.	
STP Root Guard	This prevents edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes.	
DHCP snooping	Filters out DHCP messages with unregistered IP addresses and/or from unexpected or untrusted interfaces. This prevents rogue devices from behaving as a DHCP Server.	
IP Source Guard (IPSG)	When IP Source Guard is enabled at a port, the switch filters out IP packets received from the port if the source IP addresses of the packets have not been statically configured or dynamically learned from DHCP snooping. This prevents IP Address Spoofing.	
Dynamic ARP Inspection (DAI)	The switch discards ARP packets from a port if there is no static or dynamic IP/MAC bindings or if there is a discrepancy between the source or destination address in the ARP packet. This prevents man-in-the-middle attacks.	
IP/Mac/Port Binding (IPMB)	The features (DHCP Snooping, IP Source Guard, and Dynamic ARP Inspection) above work together to prevent DOS attacks in the network, thereby increasing network availability.	
Secure Core Technology (SCT)	Ensures that the switch will receive and process management and protocol traffic no matter how much traffic is received.	
Secure Sensitive Data (SSD)	A mechanism to manage sensitive data (such as passwords, keys, etc) securely on the switch, populating this data to other devices, and secure autoconfig. Access to view the sensitive data as plaintext or encrypted is provided according to the user configured access level and the access method of the user.	
Layer 2 isolation Private VLAN Edge (PVE) with community VLAN	PVE (also known as protected ports) provides Layer 2 isolation between devices in the same VLAN, supports multiple uplinks.	
Port security	The ability to lock Source MAC addresses to ports, and limits the number of learned MAC addresses.	
RADIUS/TACACS+	Supports RADIUS and TACACS authentication. Switch functions as a client.	
Storm control	Broadcast, multicast, and unknown unicast	
RADIUS accounting	The RADIUS accounting functions allow data to be sent at the start and end of services, indicating the amount of resources (such as time, packets, bytes, and so on) used during the session.	

DoS prevention	Denial-of-Service (DOS) attack prevention	
ACLs	Support for up to 512 rules Drop or rate limit based on source and destination MAC, VLAN ID or IP address, protocol, port, differentiated services code point (DSCP)/IP precedence, TCP/UDP source and destination ports, 802.1p priority, Ethernet type, Internet Control Message Protocol (ICMP) packets, IGMP packets, TCP flag, Time-based ACLs supported.	
Quality of Service		
Priority levels	4 hardware queues	
Scheduling	Strict priority and weighted round-robin (WRR) Queue assignment based on DSCP and class of service (802.1p/CoS)	
Class of service	Port based; 802.1p VLAN priority based; IPv4/v6 IP precedence/type of service (ToS)/DSCP based; Differentiated Services (DiffServ); classification and re-marking ACLs, trusted QoS.	
Rate limiting	Ingress policer; egress shaping and rate control; per VLAN, per port, and flow based.	
Congestion avoidance	A TCP congestion avoidance algorithm is required to minimize and prevent global TCP loss synchronization.	
Standards		
Standards	IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Fast Ethernet, IEEE 802.3ab 1000BASE-T Gigabit Ethernet, IEEE 802.3ad LACP, IEEE 802.3z Gigabit Ethernet, IEEE 802.3x Flow Control, IEEE 802.1D (STP, GARP, and GVRP),IEEE 802.1Q/p VLAN, IEEE 802.1w RSTP, IEEE 802.1s Multiple STP, IEEE 802.1X Port Access Authentication, IEEE 802.3af, IEEE 802.3at, RFC 768, RFC 783, RFC 791, RFC 792, RFC 793, RFC 813, RFC 879, RFC 896, RFC 826, RFC 854, RFC 855, RFC 856, RFC 858, RFC 894, RFC 919, RFC 922, RFC 920, RFC 950, RFC 1042, RFC 1071, RFC 1123, RFC 1141, RFC 1155, RFC 1157, RFC 1350, RFC 1533, RFC 1541, RFC 1624, RFC 1700, RFC 1867, RFC 2030, RFC 2616, RFC 2131, RFC 2132, RFC 3164, RFC 3411, RFC 3412, RFC 3413, RFC 3414, RFC 3415, RFC 2576, RFC 4330, RFC 1213, RFC 1215, RFC 1286, RFC 1442, RFC 1451, RFC 1493, RFC 1573, RFC 1643, RFC 1757, RFC 1907, RFC 2011, RFC 2012, RFC 2013, RFC 2233, RFC 2618, RFC 2665, RFC 2666, RFC 2674, RFC 2737, RFC 2819, RFC 2863, RFC 1157, RFC 1493, RFC 1215, RFC 3416	
IPv6		
IPv6	IPv6 host mode IPv6 over Ethernet Dual IPv6/IPv4 stack IPv6 neighbor and router discovery (ND) IPv6 stateless address	

	auto-configuration Path maximum transmission unit (MTU) discovery Duplicate address detection (DAD) ICMP version 6 IPv6 over IPv4 network with Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) support USGv6 and IPv6 Gold Logo certified	
IPv6 QoS	Prioritize IPv6 packets in hardware	
IPv6 ACL	Drop or rate limit IPv6 packets in hardware	
IPv6 First Hop Security	RA guard ND inspection DHCPv6 guard Neighbor binding table (Snooping and static entries) Neighbor binding integrity check	
Multicast Listener Discovery (MLD v1/2) snooping	Deliver IPv6 multicast packets only to the required receivers	
IPv6 applications	Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, Telnet Client, DHCP Client, DHCP Autoconfig, IPv6 DHCP Relay, TACACS	
IPv6 RFCs supported	RFC 4443 (which obsoletes RFC2463) – ICMP version 6 RFC 4291 (which obsoletes RFC 3513) – IPv6 address architecture RFC 4291 – IPv6 addressing architecture RFC 2460 – IPv6 specification RFC 4861 (which obsoletes RFC 2461) – Neighbor discovery for IPv6 RFC 4862 (which obsoletes RFC 2462) – IPv6 stateless address auto-configuration RFC 1981 – Path MTU discovery RFC 4007 – IPv6 scoped address architecture RFC 3484 – Default address selection mechanism RFC 5214 (which obsoletes RFC 4214) – ISATAP tunneling RFC 4293 – MIB IPv6: Textual conventions and general group RFC 3595 – Textual conventions for IPv6 flow label	
Management		
Web user interface	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring.	
SNMP	SNMP versions 1, 2c, and 3 with support for traps, and SNMP version 3 user-based security model (USM)	
Standard MIBs	draft-ietf-bridge-8021x-MIB draft-ietf-bridge-rstpmib-04-MIB draft-ietf-hubmib-etherif-MIB-v3-00-MIB draft-ietf-syslog-device-MIB	rfc2012-MIB rfc2011-MIB draft-ietf-entmib-sensor-MIB lldp-MIB lldpextdot1-MIB lldpextdot3-MIB

	ianaaddrfamnumbers-MIB ianaifty-MIB ianaprot-MIB inet-address-MIB ip-forward-MIB ip-MIB RFC1155-SMI RFC1213-MIB	lldpextmed-MIB p-bridge-MIB q-bridge-MIB rfc1389-MIB rfc1493-MIB rfc1611-MIB rfc1612-MIB rfc1850-MIB	
Standard MIBs (continued)	SNMPv2-MIB SNMPv2-SMI SNMPv2-TM RMON-MIB.my dcb-raj-DCBX-MIB-1108-MIB rfc1724-MIB RFC-1212.my_for_MG-Soft rfc1213-MIB rfc1757-MIB RFC-1215.my SNMPv2-CONF.my SNMPv2-TC.my rfc2674-MIB rfc2575-MIB rfc2573-MIB rfc2233-MIB rfc2013-MIB	rfc1907-MIB rfc2571-MIB rfc2572-MIB rfc2574-MIB rfc2576-MIB rfc2613-MIB rfc2665-MIB rfc2668-MIB rfc2737-MIB rfc2925-MIB rfc3621-MIB rfc4668-MIB rfc4670-MIB trunk-MIB tunnel-MIB udp-MIB	
Private MIBs	CISCOSB-lldp-MIB CISCOSB-brgmulticast-MIB CISCOSB-bridgemibobjects-MIB CISCOSB-bonjour-MIB CISCOSB-dhcpcl-MIB CISCOSB-MIB CISCOSB-wrandomtaildrop-MIB CISCOSB-traceroute-MIB CISCOSB-telnet-MIB CISCOSB-stormctrl-MIB CISCOSB-ssh-MIB CISCOSB-socket-MIB CISCOSB-sntp-MIB CISCOSB-smon-MIB CISCOSB-phy-MIB CISCOSB-multisessionterminal-MIB CISCOSB-mri-MIB CISCOSB-jumboframes-MIB CISCOSB-gvrp-MIB CISCOSB-endofmib-MIB CISCOSB-dot1x-MIB CISCOSB-deviceparams-MIB CISCOSB-cli-MIB CISCOSB-cdb-MIB CISCOSB-brgmacswitch-MIB CISCOSB-3sw2swtables-MIB CISCOSB-smartPorts-MIB	CISCOSB-ip-MIB CISCOSB-iprouter-MIB CISCOSB-ipv6-MIB CISCOSB-mnginf-MIB CISCOSB-lcli-MIB CISCOSB-localization-MIB CISCOSB-mcmngr-MIB CISCOSB-mng-MIB CISCOSB-physdescription-MIB CISCOSB-Poe-MIB CISCOSB-protectedport-MIB CISCOSB-rmon-MIB CISCOSB-rs232-MIB CISCOSB-SecuritySuite-MIB CISCOSB-snmp-MIB CISCOSB-specialbpdu-MIB CISCOSB-banner-MIB CISCOSB-syslog-MIB CISCOSB-TcpSession-MIB CISCOSB-traps-MIB CISCOSB-trunk-MIB CISCOSB-tuning-MIB CISCOSB-tunnel-MIB CISCOSB-udp-MIB CISCOSB-vlan-MIB CISCOSB-ipstdacl-MIB CISCO-SMI-MIB	

	CISCOSB-tbi-MIB CISCOSB-macbaseprio-MIB CISCOSB-policy-MIB CISCOSB-env_mib CISCOSB-sensor-MIB CISCOSB-aaa-MIB CISCOSB-application-MIB CISCOSB-bridgesecurity-MIB CISCOSB-copy-MIB CISCOSB-CpuCounters-MIB CISCOSB-Custom1BonjourService-MIB	CISCOSB-DebugCapabilities-MIB CISCOSB-CDP-MIB CISCOSB-vlanVoice-MIB CISCOSB-EVENTS-MIB CISCOSB-sysmng-MIB CISCOSB-sct-MIB CISCO-TC-MIB CISCO-VTP-MIB CISCO-CDP-MIB CISCOSB-eee-MIB CISCOSB-ssl-MIB
Private MIBs (continued)	CISCOSB-dhcp-MIB CISCOSB-dlf-MIB CISCOSB-dnscl-MIB CISCOSB-embweb-MIB CISCOSB-fft-MIB CISCOSB-file-MIB CISCOSB-greeneth-MIB CISCOSB-interfaces-MIB CISCOSB-interfaces_recovery-MIB	CISCOSB-qosclimib-MIB CISCOSB-digitalkeymanage-MIB CISCOSB-tbp-MIB CISCOSMB-MIB CISCOSB-secsd-MIB CISCOSB-draft-ietf-entmib-sensor-MIB CISCOSB-draft-ietf-syslog-device-MIB CISCOSB-rfc2925-MIB
Remote Monitoring (RMON)	Embedded RMON software agent supports 4 RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis	
IPv4 and IPv6 dual stack	Coexistence of both protocol stacks to ease migration	
Firmware upgrade	• Web browser upgrade (HTTP/HTTPS) and TFTP and upgrade over SCP running over SSH • Upgrade can be initiated through console port as well • Dual images for resilient firmware upgrades	
Port mirroring	Traffic on a port can be mirrored to another port for analysis with a network analyzer or RMON probe. Up to 8 source ports can be mirrored to one destination port. A single session is supported.	
VLAN mirroring	Traffic from a VLAN can be mirrored to a port for analysis with a network analyzer or RMON probe. Up to 8 source VLANs can be mirrored to one destination port. A single session is supported.	
DHCP (Options 12, 66, 67, 82, 129, and 150)	DHCP Options facilitate tighter control from a central point (DHCP server) to obtain IP address, auto-configuration (with configuration file download), DHCP relay, and hostname.	
Secure Copy (SCP)	Securely transfer files to and from the switch	
Autoconfiguration with Secure Copy (SCP) file download	Enables secure mass deployment with protection of sensitive data	
Text-editable config files	Config files can be edited with a text editor and downloaded to	

	another switch, facilitating easier mass deployment	
Smartports	Simplified configuration of QoS and security capabilities	
Auto Smartports	Applies the intelligence delivered through the Smartport roles and applies it automatically to the port based on the devices discovered over CDP or LLDP-MED. This facilitates zero touch deployments.	
Textview CLI	Scriptable command-line interface. A full CLI as well as a menu-based CLI is supported. User privilege levels 1, 7, and 15 is supported for the CLI.	
Cloud services	Support for Cisco Small Business FindIT Network and Cisco OnPlus	
Localization	Localization of GUI and documentation into multiple languages	
Other management	Traceroute; single IP management; HTTP/HTTPS; SSH; RADIUS; port mirroring; TFTP upgrade; DHCP client; BOOTP; SNTP; Xmodem upgrade; cable diagnostics; ping; syslog; Telnet client (SSH secure support)	
Time-based port operation	Link up or down based on user-defined schedule (when the port is administratively up)	
Login banner	Configurable multiple banners for web as well as CLI	
Power Efficiency		
EEE Compliant (802.3az)	Supports 802.3az on all copper ports (SG300 models)	
Energy Detect	Automatically turns off power off on Gigabit Ethernet and 10/100 RJ-45 port when detecting link down Active mode is resumed without loss of any packets when the switch detects the link up	
Cable length detection	Adjusts the signal strength based on the cable length for Gigabit Ethernet models. Reduces the power consumption for cables shorter than 10m.	
Disable port LEDs	LEDs can be manually turned off to save on Energy	
General		
Jumbo frames	Frame sizes up to 9K (9216) bytes supported on 10/100 and Gigabit interfaces	
MAC table	Up to 16K (16384) MAC addresses	
Discovery		
Bonjour	The switch advertises itself using the Bonjour protocol.	

Link Layer Discovery Protocol (LLDP) (802.1ab) with LLDP-MED extensions	LLDP allows the switch to advertise its identification, configuration, and capabilities to neighboring devices that store the data in a MIB. LLDP-MED is an enhancement to LLDP that adds the extensions needed for IP phones.
Cisco Discovery Protocol (CDP)	The switch advertises itself using the Cisco Discovery Protocol. It also learns the connected device and its characteristics via CDP.

11. Access Control

Display	2.4-inch TFT LCD Color Screen
Fingerprint Capacity	3000
Card Capacity	5000(Optional) ID /Mifare/HID card
Transaction Capacity	30,000
Sensor	ZK Optical Sensor
Algorithm Version	ZK Finger V9.0&10.0
Communication	RS232/485, TCP/IP, USB-host
Access Control Interface	3rd Party Electric Lock, Door Sensor, Exit Button, Alarm, Doorbell
Wiegand Signal	Input, Output,SRB
Functions	DST, Record Query, Anti-passback, External RS485 fingerprint reader, Printer(Optional)
Power Supply	12V DC, 3A
Operating Temperature	0 °C- 45 °C
Operating Humidity	20%-80%
SDK and Software	Standalone SDK,ZKAccess3.5 software
Dimension(WxDxH)	80×183×42mm

BILL OF QUANTITIES FOR THE INSTALLATION OF CCTV CAMERAS, IP PBX AND LAN CABLING AT NEW COUNTY HEADQUARTERS

	Material Supply	Unit	Quantity	Price	Amount
1.1	24 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination as Siemon or its equal and approved equivalent.	Pcs	12		

1.2	1M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords as Siemon or its equal and approved equivalent to be used in cabinet	Pcs	150		
1.3	3M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords as Siemon or its equal and approved equivalent for use at workstation area for data outlets.	M	200		
1.4	Cat 6A, UTP 4-pair cable as Siemon or its equal and approved equivalent pulled between cabinet and outlet plates	M	27,000		
1.5	1U WM series rack mount cable managers as Siemon or its equal and approved equivalent	Pcs	12		
1.6	Metal trunking, 50x200mm (HxW), 2.4 m length, single layer, with cover plate and installation accessories	M	1250		
1.7	Galvanized Cable trays 50mm by 300mm	M	600		
1.8	Horizontal bending metal trunking (inside), 50x200mm (HxW), two directions, single layer, with cover plate and installation accessories	Pcs	10		
1.9	Supply of end plates for trunking 50*200mm (H*W)	Pcs	20		
1.10	Horizontal bending metal trunking (outside), 50x200mm (HxW), two directions, single layer, with cover plate and installation accessories	Pcs	10		
1.11	Tee metal trunking, 50x200mm (HxW), three directions, single layer, with cover plate and installation accessories.	Pcs	20		
1.12	Supply of Knockout / outlet (single) for Faceplates and modules	Pcs	150		
1.13	Supply of Faceplates (double) preferably Siemon or it's equivalent	Pcs	150		
1.14	Supply of cat 6A modules preferably Siemens or it's equivalent	Pcs	300		
1.15	Supply of Cable Ties and Self Adhesive Labels for Cable Labelling (Packets of 200 Labels each)	Pcs	4		
1.16	Supply of 1000BASE X 8-Core Armored Fibre Optic Cable as data backbone to Server Room complete with connectors and all terminations to active components.	M	1200		
1.17	Supply of 1000Base-SX Multicore SFP fibre modules as Cisco **or approved equivalent**	Pcs	16		
1.18	Supply of 8 TB Hard Disk	Pcs	6		

1.19	Supply and delivery of IP Camera Bullet 8MP as specified in **technical specifications. (Camera Lot 1).**	Pcs	12		
1.20	**Supply and delivery of IP Camera Bullet 8MP Vari-focal as specified in** technical specifications. (**Camera Lot 2**).	Pcs	12		
1.21	Supply and delivery of IP Camera Dome 2MP as specified in technical specifications. (**Camera Lot 3**).	Pcs	12		
1.22	Supply and delivery of IP Camera as specified in the technical specifications. (**Camera Lot 4**)	Pcs	2		
1.23	**Supply and delivery of Dome 8MP Camera as specified in technical specifications. (Camera Lot 5)**	Pcs	12		
1.24	Supply and delivery of IP Camera Dome as specified in the technical specifications. (**Camera Lot 6**)	Pcs	4		
1.25	Supply and delivery of Network Video Recorder 64 Channel as specified in the technical specifications	Pcs	2		
1.26	Supply and delivery of IP Camera Bullet 4MP Vari-focal as specified in the technical specifications. (**Camera Lot 7**)	Pcs	12		
1.27	Supply of Hikvision cat 6 cable 305M (Box)	Pcs	10		
1.28	Supply and delivery Switch (P.O.E) switches 48P as specified in the particulars specifications document – **Access Switch**	Pcs	6		
1.29	Supply and delivery (P.O.E) switches 24P as specified in the particulars specifications document – **Access Switch**	Pcs	6		
1.30	Supply, install and configure wall mounted Wireless Indoor 300mW 802.11n long range Access Point with Wi-Fi 802.11n high power wireless technology and virtual management controller software package and is PoE as Cisco Access Point to cover 25M radius complete with antennae, power adaptor and all accessories **or an approved equivalent**	Pcs	8		
1.31	Supply of fiber patch cord LC/LC 5M SM	Pcs	10		
1.32	Supply and delivery of IP PBX as specified in the technical specifications.	Pcs	1		
1.33	Supply of 42U Free standing equipment and server cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension c	Pcs	1		
1.34	Supply of GSM Module IP PBX for 2 GSM Cards	Pcs	1		

1.35	9U Wall mount cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet).	Pcs	6		
1.36	240V, 50Hz, 3000VA, Rack Mountable APC Smart-UPS RM SMT3000 RM 2U (240V) Uninterrupted Power Supply unit (UPS) with USB and Serial Port or an approved equivalent.	Pcs	2		
1.37	Supply and delivery of **Core switch** as specified in the technical specifications	Pcs	1		
1.38	Supply and delivery of **access control** with all accessories as specified in the technical specifications	Pcs	6		
	Subtotal				
2	**Services**				
2.1	Field Detailed survey & design	m	27000		
2.2	Engineering Measurement	m	27000		
2.3	Install Indoor Cat.6, 4-Pair UTP Cable	m	27000		
2.4	Install Outdoor Cat.6, 4-Pair UTP Cable	m	910		
2.5	CAT6 cable Termination and Test	pcs	160		
2.6	Install Flexible corrugated PVC pipe 25mm with accessories	m	0		
2.7	Install metal Trunking size 50x150mm with accessories	m	1350		
2.9	50x150mm hole drilling on wall (concrete)	pcs	21		
2.10	50x150mm hole drilling on wall (brick)	pcs	300		
2.11	Drill a 50x150mm hole on the ceiling	pcs	0		
2.12	Install 24-port Cat.6, 19 inch Patch Panel(with modules)	pcs	2		
2.13	Install 19 inch cable manager,1U	pcs	2		
2.14	Install Cat.6, 4-Pair UTP modular cord,1m	pcs	48		
2.14	Install cctv cameras	Pcs	64		
2.15	Install NVR 64 Channel	pcs	2		

2.16	Install Cisco Switch	Pcs	12		
2.17	Installation, testing and commissioning of IP PBX Unify OpenScape business x3	Lot	1		
2.18	Fluke test for all termination ports	Lot	1		
2.19	Installation of Access Controls	Pcs	6		
3.0	**Provisional Sum**				
3.1	Allow a Contingency Sum of Kshs. One Million and Five Hundred Thousand(Kshs.1,500,000.00) to be used at the discretion of the Project Manager	**Lot**		**1,500,000**	**1,500,000**
3.2	**Labelling**: Allow for Labelling of all Telecommunication Cables, Active Devices and Telecommunications Points and all necessary documentation	**Lot**			
3.3	**Training.** Allow for training of ICT officers on **OpenScape business x3**	**Lot**			
3.4	Accessories (Earthing cable, power cables, earth rod etc, rj45).	**Lot**		**100,000**	**100,000**
3.5	Refurbishment of ICT server room (Cable Management, Installation of AC, Installation of Access Controls)	**Lot**		**300,000**	**300,000**
				Sub Total	
				Subtotal (Material Supply) + Subtotal (Services)	
				Add 16% V.A.T	
				Grand Total	

In words Kenya Shillings
……

Contractor: ……

VAT Registration No: ……

Pin No: ……

Address: ……

Signature: …….. Date: ……

Witness: ……

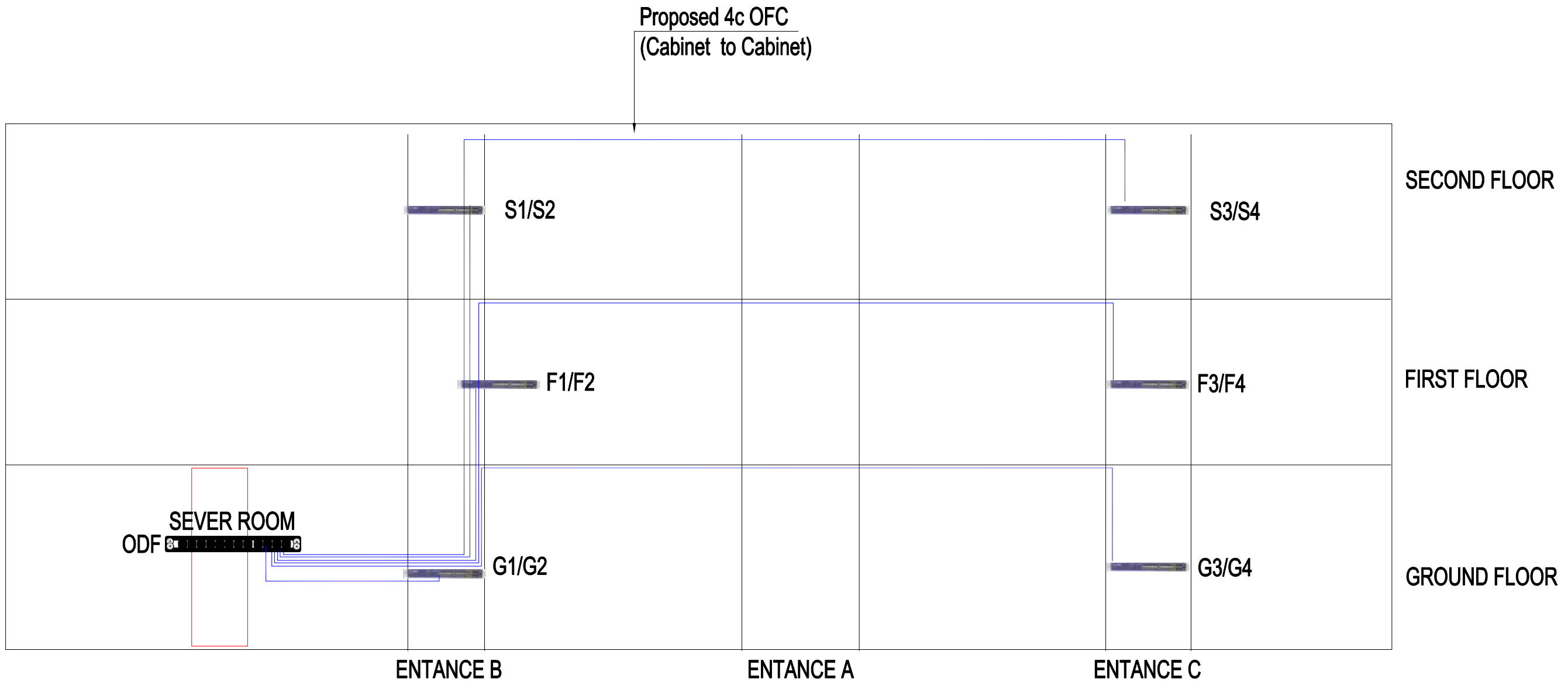
Address: ……

Signature: …….. Date: ……

PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES

Ministry of Information Communication and Technology		The County Government Of Mandera		LODESTAR ENTERPRISE		DRAWING NAME: COVER PAGE			
M.O.I.C.T	APPROVED BY		APPROVED BY	LODESTAR ENTERPRISES	CHECKED BY	DRAWN BY		DATE	08/08/2020
	DATE		DATE		DATE	CHECKED BY		DATE	08/08/2020
						PAGE NO.01	PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES		

OVERALL NETWORK TOPOLOGY

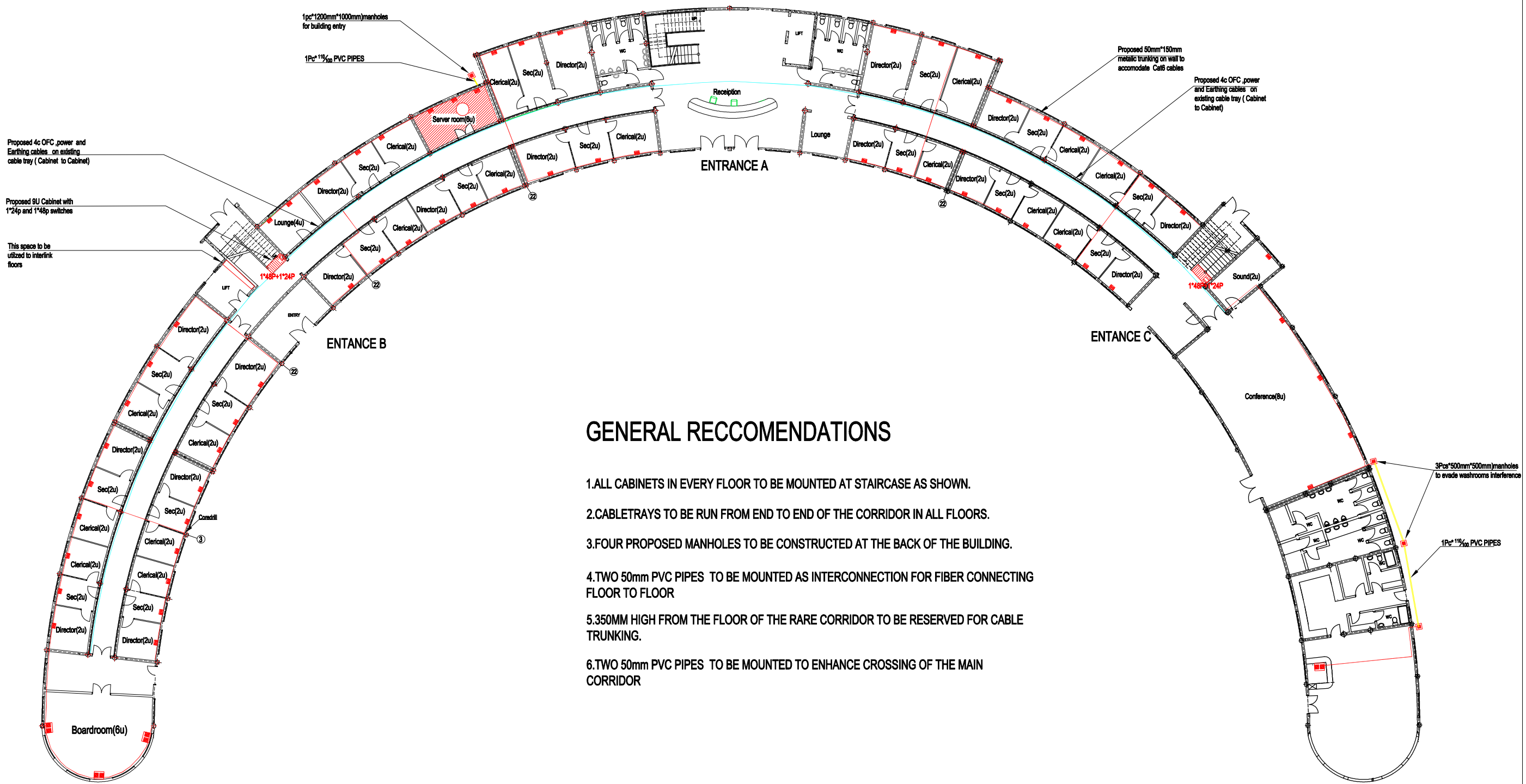


KEY:

Switches

FOC

Ministry of Information Communication and Technology		The County Government Of Mandera		LODESTAR ENTERPRISE		DRAWING NAME: COVER PAGE	
M.O.I.C.T	APPROVED BY		APPROVED BY		CHECKED BY	DRAWN BY	DATE 08/08/2020
	DATE		DATE	LODESTAR ENTERPRISES	DATE	CHECKED BY	DATE 08/08/2020
						PAGE NO.02	OVERALL NETWORK TOPOLOGY



GENERAL RECCOMENDATIONS

1.ALL CABINETS IN EVERY FLOOR TO BE MOUNTED AT STAIRCASE AS SHOWN.

2.CABLETRAYS TO BE RUN FROM END TO END OF THE CORRIDOR IN ALL FLOORS.

3.FOUR PROPOSED MANHOLES TO BE CONSTRUCTED AT THE BACK OF THE BUILDING.

4.TWO 50mm PVC PIPES TO BE MOUNTED AS INTERCONNECTION FOR FIBER CONNECTING FLOOR TO FLOOR

5.350MM HIGH FROM THE FLOOR OF THE RARE CORRIDOR TO BE RESERVED FOR CABLE TRUNKING.

6.TWO 50mm PVC PIPES TO BE MOUNTED TO ENHANCE CROSSING OF THE MAIN CORRIDOR

Main Workload

Route surve (m)	CAT6a 4 pair UTP cable(m)		Flexible currogated pvc pipe 25/50mm(m)	Trunking (m)		Dilling (pcs)		
	Indoor	Outdoor		50x100mm	50x150mm	Concrete	Brick	Ceiling
450	0	9520	0	0	450	100	0	0

LEGEND

New Cabinet	Existing Cabinet	New 50*100mm trunking	New 50*150mm trunking
1*CAT6 Cable	2*CAT6 Cable	Existing Cabletray	Ø110mm HDPE
LAN Switch	1U 1 unit CAT6 cable	Flexible currogated pvc pipe Ø25mm	

NOTE:

1.The trunking should be installed 200mm from the surface of the floor.

2.The trunking should be installed on the wall vertivally or horizontally.

3.Confirmation of the power cable,water pipe on the wall must be done before installing LAN trunking or drilling the wall.

4..Use one plastic tie for LAN cable fastening after every 5m horizontally and 1.5m vertcally.

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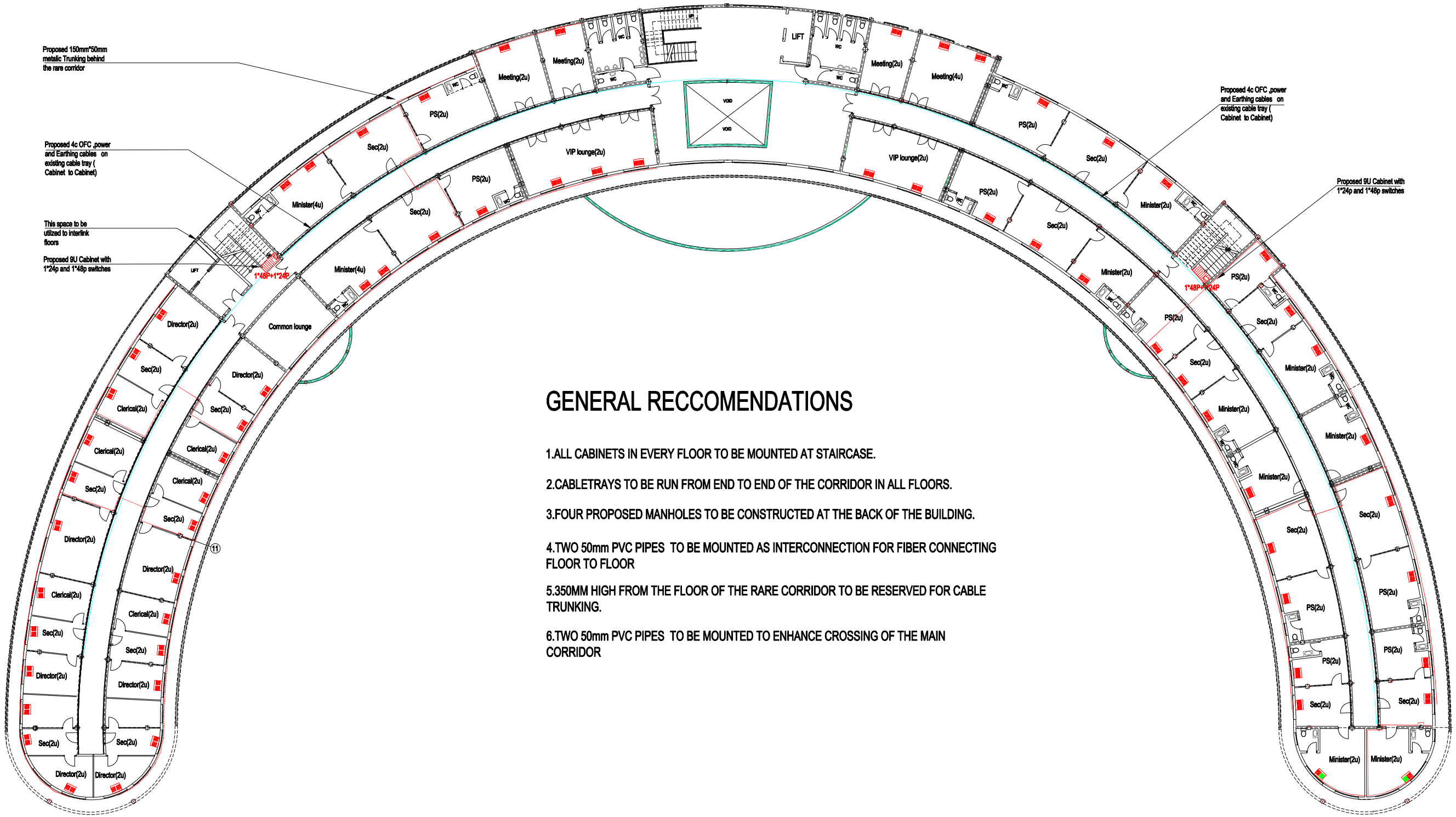
M.O.I.C.T	APPROVED BY		APPROVED BY	LODESTAR ENTERPRISES	CHECKED BY	DRAWN BY	DATE	08/08/2020
	DATE		DATE		DATE	CHECKED BY	DATE	08/08/2020
						PAGE NO.03	PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES	



GENERAL RECCOMENDATIONS

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2.CABLETRAYS TO BE RUN FROM END TO END OF THE CORRIDOR IN ALL FLOORS.

3.FOUR PROPOSED MANHOLES TO BE CONSTRUCTED AT THE BACK OF THE BUILDING.

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Main Workload

Route surve (m)	CAT6a 4 pair UTP cable(m)		Flexible currogated pvc pipe 25/50mm(m)	Trunking (m)		Dilling (pcs)		
	Indoor	Outdoor		50x100mm	50x150mm	Concrete	Brick	Ceiling
450	0	9100	0	0	450	100	0	0

LEGEND

- New Cabinet
- 1*CAT6 Cable
- LAN Switch
- Existing Cabinet
- 2*CAT6 Cable
- 1U 1 unit CAT6 cable
- New 50*100mm trunking
- New 50*150mm trunking
- Existing Cabletray
- Ø110mm HDPE
- Flexible currogated pvc pipe Ø25mm

NOTE:

1.The trunking should be installed 200mm from the surface of the floor.

2.The trunking should be installed on the wall vertivally or horizontally.

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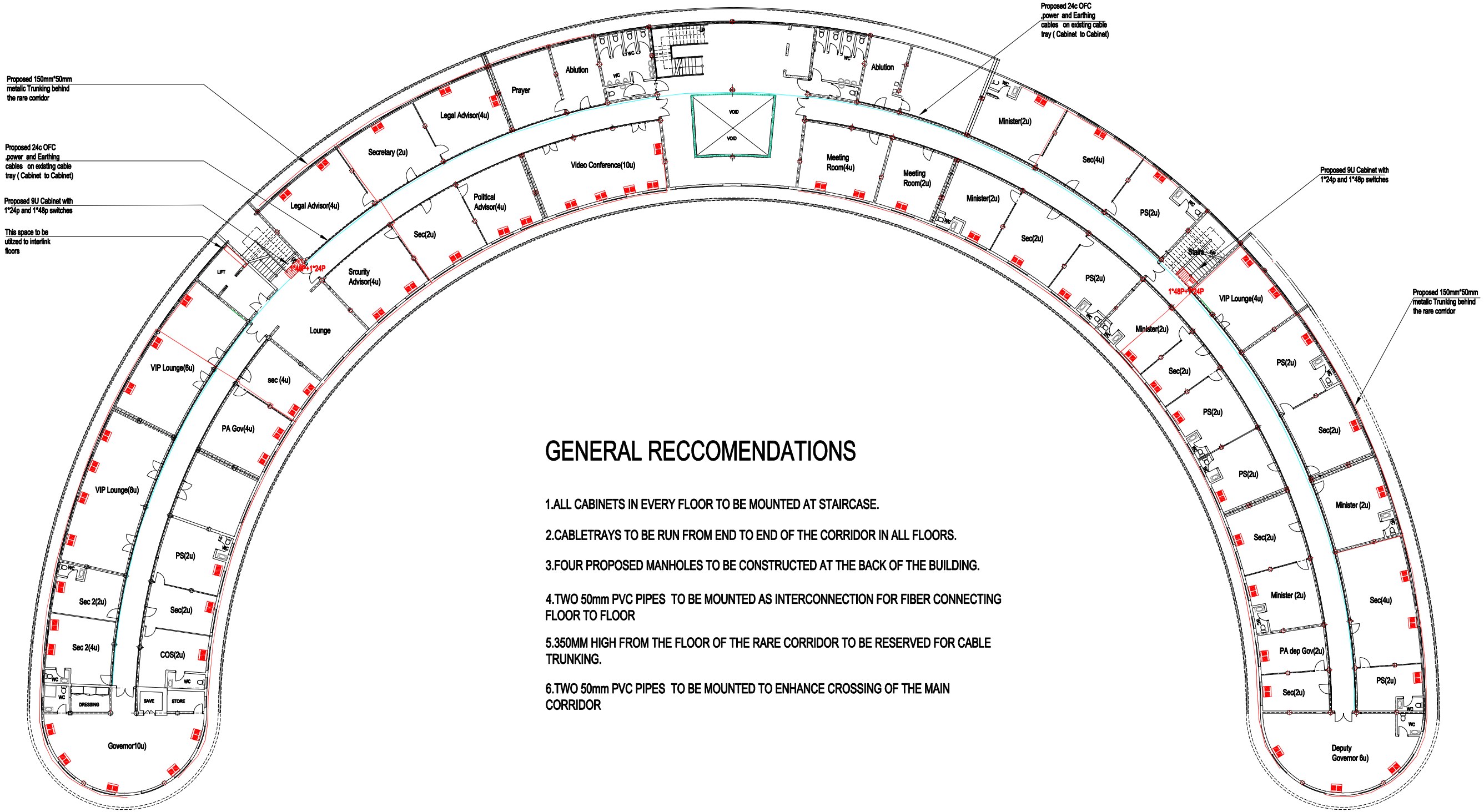
M.O.I.C.T	APPROVED BY		APPROVED BY	LODESTAR ENTERPRISES	CHECKED BY	DRAWN BY	DATE	08/08/2020
	DATE		DATE		DATE	CHECKED BY	DATE	08/08/2020
						PAGE NO.04	PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES	



GENERAL RECCOMENDATIONS

1.ALL CABINETS IN EVERY FLOOR TO BE MOUNTED AT STAIRCASE.

2.CABLETRAYS TO BE RUN FROM END TO END OF THE CORRIDOR IN ALL FLOORS.

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6.TWO 50mm PVC PIPES TO BE MOUNTED TO ENHANCE CROSSING OF THE MAIN CORRIDOR

Main Workload

Route surve (m)	CAT6a 4 pair UTP cable(m)		Flexible currogated pvc pipe 25/50mm(m)	Trunking (m)		Dilling (pcs)		
	Indoor	Outdoor		50x100mm	50x150mm	Concrete	Brick	Ceiling
450	0	9240	0	0	450	100	0	0

LEGEND

- New Cabinet
- 1*CAT6 Cable
- LAN Switch
- Existing Cabinet
- 2*CAT6 Cable
- 1U 1 unit CAT6 cable
- New 50*100mm trunking
- New 50*150mm trunking
- Existing Cabletray
- Ø110mm HDPE
- Flexible currogated pvc pipe Ø25mm

NOTE:

1.The trunking should be installed 200mm from the surface of the floor.

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Ministry of Information Communication and Technology		The County Government Of Mandera		LODESTAR ENTERPRISE		DRAWING NAME: PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES -2F		
M.O.I.C.T	APPROVED BY		APPROVED BY	LODESTAR ENTERPRISES	CHECKED BY	DRAWN BY	DATE	08/08/2020
	DATE		DATE		DATE	CHECKED BY	DATE	08/08/2020
						PAGE NO.05	PROPOSED LAN FOR NEW MANDERA COUNTY OFFICES	