

# PROPOSED MODERN ASSEMBLY CHAMBERS

FOR

## COUNTY ASSEMBLY OF NAKURU

SUPPLY, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF  
HANSARD SYSTEM, AUDIO-VISUAL AND STRUCTURED CABLING  
INSTALLATION WORKS

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# TENDER SPECIFICATIONS AND BILLS OF QUANTITIES

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TENDER NAME: PROPOSED MODERN ASSEMBLY CHAMBERS

TENDER NUMBER: CAN/T/03/2019/2020- HANSARD SYSTEM, AUDIO-VISUAL AND STRUCTURED  
CABLING INSTALLATION WORKS

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SEPTEMBER 2019

**SECTION D**  
**GENERAL SPECIFICATIONS**  
**OF**  
**MATERIALS AND WORKS**

## GENERAL SPECIFICATIONS OF MATERIALS AND WORKS

- 2.1 General
- 2.2 Standard of Materials
- 2.3 Workmanship
- 2.4 Procurement of Materials
- 2.5 Record Drawings
- 2.6 Regulations and Standards
- 2.7 Setting out Works
- 2.8 Testing on Site
- 2.9 **Factory Inspection**

## **2.1 GENERAL**

This specification is to be read in conjunction with any other information herein issued with it. Bills of quantities and schedule of unit rates shall be the basis of all additions and omissions during the progress of the works.

## **2.2 STANDARD OF MATERIALS**

Where the material and equipment are specifically described and named in the Specification followed by approved equal, they are so named or described for the purpose of establishing a standard to which the contractor shall adhere.

Should the contractor install any material not specified herein before receiving approval from the proper authorities, the Engineer shall direct the contractor to remove the material in question immediately. The fact that this material has been installed shall have no bearing or influence on the decision by the Engineer.

All materials condemned by the Engineer as not approved for use, are to be removed from the premises and suitable materials delivered and installed in their place at the expense of the Contractor. All materials required for the works shall be from branded manufacturers, and shall be new and the best of the respective kind and shall be of a uniform pattern.

## **2.3 WORKMANSHIP**

The workmanship and method of installation shall conform to the best standard practice. All work shall be performed by a skilled tradesman and to the satisfaction of the Engineer. Helpers shall have qualified supervision.

Any work that does not in the opinion of the Engineer conform to the best standard practice will be removed and reinstated at the contractor's expense.

Permits, Certificates or Licenses must be held by all tradesmen for the type of work; in which they are involved where such permits, certificates or licenses exist under Government legislation.

## **2.4 PROCUREMENT OF MATERIALS**

The contractor is advised that no assistance can be given in the procurement or allotment of any materials or products to be used in and necessary for the construction and completion of the work.

Contractors are warned that they must make their own arrangements for the supply of materials and/or products specified or required. Where necessary, advance payment shall be granted as stipulated in the Appendix to Instruction to Tenderers clause 9 page A/17

## **2.5 RECORD DRAWINGS**

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

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

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

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

## **2.6 REGULATIONS AND STANDARDS**

All work executed by the contractor shall comply with the current edition of the "Regulations" for the Electrical Equipment of Buildings, issued by the Institution of Electrical Engineers, Electric Power Act, Kenya Bureau of Standards (KBS), Institution of Electrical Engineers (I.E.E) Wiring Regulations, Current recommendation of CCITT and CCIR, and with the Regulations of the Local Electricity Authority and the Communications Commission of Kenya (CAK)

Where the sets of regulations appear to conflict, they shall be clarified with the Engineer.

## **2.7 SETTING OUT WORK**

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

## **2.8 TESTING ON SITE**

The contractor shall conduct during and at the completion of the installation and, if required, again at the expiration of the maintenance period, tests in accordance with the relevant section of the current edition of the Regulations for the electrical equipment of buildings issued by the I.E.E of Great Britain, the Government Electrical Specifications No. 1 and No.2, Electric Supply Company's By-Laws, Communications Authority of Kenya (CA) requirements or any other supplementary Regulations as may be produced by the engineer.

Any faults, defects or omissions or faulty workmanship, incorrectly positioned or installed parts of the installation shall be rectified by the contractor at his own expense.

## 2.9 FACTORY INSECTION

18.1 The employer shall be entitled to have the quantity and quality of the imported Hansard, Conferencing & Security system equipment & materials inspected by two number (2No.) representatives of the Project Manager, and two number (2No.) representatives for the Employer and (2No.) representatives of the Contractor

18.2 The said inspection shall be carried out at the factory of manufacture of the Hansard, Conferencing & Security system equipment & materials during normal working hours and the successful tenderer shall give written notice to the Project Manager at the latest thirty (30) calendar days in advance of the date that the lifts materials are ready for inspection.

18.3 Travel (including ground, air travel and airport passage taxes) and full board accommodation expenses in at least a Four (4) star hotel incurred by the representatives appointed by the Project Manager and the Employer shall be borne by the contractor. The contractor shall also meet out of pocket expenses for the officers at Government of Kenya rates for the duration of the factory inspection. The costs incurred shall be re-imbursed to the contractor from the provisional sum allowed in page (H/30) of the Bills of Quantities.

18.4 The inspection period shall be Seven (7) working days excluding travelling time.

18.5 If as a result of the inspection any of the equipment & materials are found to be defective, the successful tenderer shall replace the defective equipment & materials and determine a new date as when a new inspection shall be performed at the expense of the contractor.

18.6 The successful tenderer shall only ship the equipment & materials after the said factory inspection.

## **SECTION E**

### **SCHEDULE OF CONTRACT DRAWINGS**

## SCHEDULE OF CONTRACT DRAWINGS

- 1.0 Location of the equipment shall be identified on site with the help of the Electrical Engineer.

## **SECTION F**

**PARTICULAR AND TECHNICAL SPECIFICATIONS OF MATERIALS AND  
WORKS FOR HANSARD SYSTEM, AUDIO-VISUAL AND  
STRUCTURED CABLING INSTALLATION WORKS**

## **A. PARTICULAR SPECIFICATIONS FOR HANSARD & CONFERENCING SYSTEM**

### **1.0 Location of Site**

The site of the proposed works is located at Nakuru Town, Nakuru County.

### **1.1 Scope of Works**

The sub-contract works shall comprise the supply, installation and commissioning of a functioning modern Hansard Reporting & Conferencing System for County Assembly Chamber, facilities and public address system. The sub-contract also includes an aspect of training for the users of equipment and maintenance staff.

### **1.2 Climactic Conditions**

Mean Maximum Temperatures 27.4°C

Mean Minimum Temperature 8.9°C

Range of Relative humidity 39% - 97%

Salt in the atmosphere 0.02%

Altitude 1850 M above sea level

Latitude /Longitude 36° N/08° E

Solar Radiation, February Mean Max 543 Langleys

### **1.3 FUNCTIONAL REQUIREMENTS**

The system to be as follows as follows: -

#### **1.31 CONTROL UNIT**

There shall be 1No. Central control unit. The control unit shall be required to control a minimum of 120 contribution delegate units respectively such as delegate and chairman units audio and multi-purpose interface units. The Central Control Units (C.C.U.) should be able to function with or without a central operator using a PC.

#### **1.32 POWER SUPPLIES**

The system should have a provision for:-

- a) Extension power supply for additional contribution units.
- b) Power supply for audio media interface for connecting analogue equipment.

#### **1.33 EXTENSION CARDS**

The system shall have: -

- a) PC network card for PC to communicate with the Digital Congress Network.
- b) Data distribution board for communication with hall displays, camera systems and both audio and video recorders.

#### **1.34 CONTROL UNIT ACCESSORIES**

For easier transportation and storage, custom built suitcases to accommodate the central control unit, audio media interface and extension cables should be provided.

### 1.35 PERSONAL COMPUTER

To cater for the requirements of a modern conference facility the system should incorporate a standard PC together with a Digital Congress Network Card and a wide range of relevant application software modules to enable the PC to carry out all necessary functions to satisfy the demands of virtually any conference situation.

It should be possible to make a hard copy of conference information by connecting a laser printer and program delegate chip cards via a chip-card encoder.

The minimum software and hardware requirements for the Digital Congress Network control software modules are as follows: -

- a) Pentium processor
- b) 16MB Random Access Memory (RAM)
- c) 256 KByte cache memory
- d) Floppy disk drive, 3½" 1.44MB
- e) USB drive
- f) Video card: SVGA resolution 640 x 480 pixels x 256 colours
- g) 1MB Video memory
- h) Spare slot for PC card for a MCCU system LBB 3511/00
- i) 1 COM port and 1 parallel port
- j) 420 MB Hard Disk with a data access time < 14ms
- k) OS/2 ® version 2.11 or higher
- l) Serial 2-button mouse
- m) Local bus mouse port
- n) Keyboard
- o) Monitor

### 1.36 DELEGATE UNIT

The table top conference units should have facilities for speaking, registering a request to speak, registering a request to respond, listening, voting, selecting language channels, chip-card reading and displaying conference and user-related information. The controls and indicators should be such that the following are displayed on the graphic LCD screen: -

- a) Softkey description
- b) Multi-lingual user instructions
- c) Information on the number of current speakers
- d) Request-to-speak information and confirmation
- e) Voting results
- f) Remaining/elapsed speech time
- g) Public and personal messages
- h) Additional user information

### 1.37 DUAL AUDIO INTERFACE

The interface units should enable various types of microphones, as well as line in sources, to be connected to the Digital Congress Network system. It should be able to create a chairman position or and ambient microphone input. The unit should be such that it can be free standing on a table top, mounted to a wall or discreetly mounted into a table-top or chair arm rest.

### **1.38 ALPHANUMERIC HALL DISPLAY**

This shall be of at least 100mm x 200mm, a dot matrix display with an in-built power supply unit. It should be able to display both numbers and text, and be able to be used for showing microphone information (speakers list or request-to-speak list), voting results and motion information and messages. This information should be generated in the hall display via the Text/Status Display software module. The recommended number of lines is 10 and the number of characters per line is 33. The Alphanumeric Hall Display should include an installed Data Distribution Board.

### **1.39 CONTROL AND APPLICATION SOFTWARE**

A comprehensive range of a soft-ware modules to run the Digital Congress Network system must be provided. The modules should be run on a system-connected PC in Microsoft Windows, and integrate conference preparation, management and control. It should be possible to load any combination of modules according to specific system requirements. Additional modules should be easily added to the system if required, i.e. when new hardware is added or when the conference changes from multi-lingual to uni-lingual.

The software should be able to cope with:

- a) Startup of the system
- b) Microphone management
- c) Synoptic microphone control
- d) Simultaneous interpretation
- e) Intercom
- f) Parliamentary Voting
- g) Multi-voting
- h) Attendance registration and access control
- i) Delegate database i.e. storage of delegate data and conference database management
- j) ID-card encoder
- k) Message Distribution
- l) Text/Status display
- m) Video Display
- n) System installation
- o) Multi-CCU control software
- p) Open interface
- q) Camera control with control PC
- r) Stand-alone camera control

### 1.39.1 Microphone Management

The startup screen should be active whenever DCN software modules are used for controlling and monitoring conference procedures. It should be a platform from which other modules are selected. The user should be able to specify any combination of modules for automatic startup. It should be able to: -

- Set operator headphone and master volume levels, and select the channel for the operator to monitor
- Open, close and delete installation files and file names
- Configure the startup program to automatically load selected DCN modules
- Access, acknowledge and print error messages

### 1.39.2 Microphone Management

The Microphone Management software module should provide the user with a powerful easy-to-use tool that brings all aspects of microphone management to a single point of control. It should have the following features: -

- Single point control of all microphone units
- Various microphone control options
- Extensive range of options for microphone related parameters
- Output to printer and/or external equipment such as cameras
- On-screen help facility

The user should be able to select microphones for the speaker list or prepare a speaker request list from which the order of delegates can be altered at any time before or during the conference. A search facility should be available that allows the operator to locate specific delegates.

The system software must enable notebook status to delegates to allow for VIP (Very Important Persons) status for certain delegates so that they can enjoy certain privileges not granted to other delegates. The chairman's unit should be recognized for notebook status automatically irrespective of how a conference proceeds.

For a full-scale international conference, the operator should be able to specify whether one two. Three or four normal delegate microphones can be active simultaneously. A single click on a delegate name should enable the operator to wither insert, delete or replace the delegate from the request-to-speak list.

### 1.39.3 Synoptic Microphone Control

This software module should be able to give a graphical representation of the conference venue fro which microphone status of delegates can be controlled. It should have the following features included: -

- Easily created synoptic environment layout used for microphone control
- Single point control of all microphone units
- Various microphone control options
- Output to printer and/or external equipment such as cameras
- On-screen help facility

Each item of contribution equipment (delegate unit, chairman unit, podium or lavalier microphone, etc) should be graphically represented by an icon on the layout mode of operation of this module.

The synoptic layout mode generated will become a control panel in control mode. The icons in the layout become functional, and are used as status indicators or buttons to initiate actions for the contribution unit the icon represents.

#### **1.39.4 Simultaneous Interpretation**

This program should be able to support the preparation of simultaneous interpretation facilities and the monitoring of interpreter activities during a conference. It should be able to: -

- Accommodate up to 6 interpreter desks
- Have on-line monitoring of interpretation activities
- Facilitate normal and relay interpretations
- Microphone mode options
- On-screen help facility

The software should enable the operator to establish microphone interlocks, between booths and within booths, with or without using an override facility.

#### **1.39.5 Intercom**

This software module should allow conference participants to hold two-way private conversations. It is to provide a means of setting up and controlling intercom calls between delegates, chairmen, interpreters and other PC-users during the conference. It should have the following features: -

- Enabling of private two-way conversations between delegates and chairmen, interpreters and other users
- Search facility to locate delegates
- Allow up to 23 simultaneous conversations
- Simple menus for ease of control
- On-screen help facility

#### **1.39.6 Voting**

This software module is to control and monitor conferences and discussion units using the Digital Congress Network contribution equipment. It should contain the following features: -

- Allow complete operator control of parliamentary voting sessions
- Extensive motion preparation facilities
- Output voting results to disk, hall displays and printers
- Have a range of voter-related parameter options
- On-screen help facility

#### **1.39.7 Multi-Voting**

This software module is to provide the user with the means to select and control six different kinds of conference voting, including parliamentary voting. The voting types that should be implemented include: -

- Parliamentary
- Audience response
- Multiple choice
- Opinion poll
- Rating
- For/Against

In each case the program should allow the user to prepare for voting, specify vote-related parameters, display and print voting results and start and control voting.

An on-screen help facility should be available.

#### **1.39.8 Attendance Registration and Access Control**

This software module should allow:-

- Registration using chip-card with or without PIN-code or present key
- Access control facilities
- All data instantly available to operator
- Print facility to reproduce data in several formats
- On-screen help facility

Entrance requirements for registration can be specified for conference participants before entering the conference room. This should be done by inserting a chip-card in a chip-card reader. One should be able to register at a contribution unit by means of pressing a 'Present' key. Settings specified for registration should be used for access purposes. This means that although participants can enter the conference venue, they cannot use any of the contribution facilities without first satisfying the requirements.

#### **1.39.9 Delegate Database**

This software module should allow the user to compile a comprehensive database of information relating to participants at a conference or meeting. The delegate information should be classified as either 'conference related' or 'persona'. Features include:-

- Comprehensive database creation for all delegates
- Facility for configuring 'screen line' and 'card label'
- Facility for printing labels and chip-card production
- Dedicated fields for ease-of-use
- On-screen help facility

All delegate data to be input via the main window. For some entries (first name, last name) the only restriction should be the number of characters entered. For other entries (country, group, etc) the input should be selected from a list of options that the system presents when the user activates that particular field.

#### **1.39.10 ID-Card Encoder**

This software module should be used in combination with the Delegate Database software as a software driver for the production of ID-cards. These ID-Cards will be used to identify delegates during a conference and contain information specified using Delegate Database.

#### **1.39.11 Message Distribution**

This software module should allow the operator to originate messages which can be sent via the Digital Congress Network to individual delegates, groups of delegates and other participants to view on their units. Features will include: -

- Message distribution to personal or hall displays
- Easy message generation procedure
- Archiving facility allows messages to be retrieved and re-used
- Automatic message removal option
- On-screen help facility

#### **1.39.12 Text/Status Display**

This software module should provide a means of displaying conference-related information on character displays located in the conference venue. The information displayed can be generated by other Digital Congress Network modules. It should be possible to specify the length of the speakers list and the request-to-speak list. Features include: -

- Support of numeric, alphanumeric and geographic display
- Displays voting, message and microphone information
- Automatic priority system for displays
- Accepts information from other Digital Congress Network software modules
- On-screen help facility

#### **1.39.13 Video Display**

This software module should interface the Digital Congress Network software with the video display. It should provide a means of displaying conference-related information on video displays located in the conference venue. All information displayed should be generated by other Digital Congress Network modules which will not be able to be altered. A Video Display (VD) Client application needs to be provided to enable the use of Video Display.

Features of this software include: -

- Interface to monitors, video projectors and Vidiwalls
- Display of voting, message and microphone information
- Import facility for graphics such as logos and backgrounds
- Accept information from other Digital Congress Network software modules

#### **1.39.14 System Installation**

This software module should provide a means to assign seat numbers to microphone units and to specify the number of audio channels dedicated to interpretation, floor and intercom facilities.

Features should include: -

- Single-point control of system installation
- Facilities for assigning functions to audio channels
- Automatic seat numbering
- Facility for downloading font sets
- In-conference warning message when installation configuration changes
- On-screen help facility

#### **1.39.15 Multi-CCU Control Software**

This program should allow the user to set up and monitor the congress system that uses more than one Multi-Central Control Unit (CCU). The following possibilities should be available with the Multi-CCU software: -

- Specifying which CCUs will be required for a conference before the conference begins
- Loading, preparing and editing configuration files
- Monitoring Multi-CCU behavior

### 1.39.16 Open Interface Software

It should allow the remote control of selected DCN functions via third party equipment and control software. Control data exchange between Digital Congress network and the remote control device or system should be carried out via an RS232 port on the CCU. Possible Digital Congress Network functions for remote control are: -

- System configuration
- System installation
- Microphone management
- Parliamentary voting
- Attendance registration

### 1.39.17 DCN Automatic Camera Control

This software should be able to interface Digital Congress Network congress systems with video control switchers. It will select fixed or pre-positioned cameras to be activated to display the current active speaker at a conference.

## 1.40 TABLET SPECIFICATIONS

### Display

**Display Type** IPS

**Size** -10.5 in (inches) or larger

**Resolution** - 2224 x 1668 pixels

**Display Colors** - 16.7M Colors

**Pixel Density** - 265 ppi (pixels per inch)

**Touch Screen** - Yes Multi Touch Support

**Display Protection** - Scratch resistant

**Features** – Capacitive, Multi-touch, Scratch resistant, Retina display. True Tone display, 500 cd/m<sup>2</sup>, Antireflective coating, Oleophobic (lipophobic) coating, Wide Color display (P3)

### Hardware

- **CPU** - 2x 2.5 GHz Vortex, 4x 1.59 GHz Tempest, Cores: 6
- **GPU** - 1100 MHz, Cores: 4
- **RAM (Memory)** - 2 GB or higher
- **Internal Storage** - 256 GB
- **Sensors** Proximity Light, Accelerometer, Compass, Gyroscope, Barometer, Fingerprint

## **Software**

- **Operating System** -
- **User Interface** - Yes

## **Camera**

- **Rear Camera** - 7.99 MP (megapixels) or higher
- **Image** - 3264 x 2448 pixels or higher
- **Video** - 1920 x 1080 pixels or higher
- **Flash** - No
- **Front Camera** - 7.15 MP (megapixels) or higher

## **Connectivity**

- **Wi-fi** - a, b, g, n, n 5GHz, Dual band, Wi-Fi Hotspot, Wi-Fi Direct
- **USB** - 2.0, Micro USB
- **GPS** - GPS, A-GPS, GLONASS
- **NFC**
- **Wireless Charging** - No
- **Headphone Jack**

## **Battery**

- **Capacity** - Li-Ion
- **Placement** - Non-Removable

**B: PARTICULAR AND TECHNICAL SPECIFICATIONS OF MATERIALS AND WORKS FOR AUDIO VISUAL SYSTEM**

**1.0 SCOPE OF WORKS**

The contract works shall comprise the supply, installation and commissioning of a functioning modern digital Audio Visual System that can be integrated with the public address system and comprising:

- a) LCD Projectors
- b) Screens
- c) Amplifier unit
- d) Wireless Microphones
- e) Speakers
- f) VHF Receiver
- g) Cabling and all the other necessary accessories
- h) Testing and commissioning

The sub-contract also includes an aspect of training for the users of equipment and maintenance staff.

**2.0 CLIMACTIC CONDITIONS**

Mean Maximum Temperatures 25°c  
Mean Minimum Temperature 15.4°c  
Range of Relative humidity 39% - 97%  
Salt in the atmosphere 0.02%  
Altitude 1406M above sea level  
Latitude /Longitude 2.3355° N/37.9943° E  
Solar Radiation, February Mean Max 630 Langleys

**3.0 MULTIMEDIA NETWORK READY LCD PROJECTORS**

**a) LCD Projectors**

**Minimum of 3,000 lumens**

<b>Resolution:</b>	XGA (1024 x 768)
<b>Brightness:</b>	At least 3000 ANSI Lumens
<b>Uniformity:</b>	85% (corner to center)
<b>LCD Panel System:</b>	0.63" TFT Poly x 3
<b>Number of Pixels:</b>	2,359,296 (786,432 x 3)
<b>Contrast Ratio:</b>	450:1(Lamp Mode "Auto", Image Mode "Dynamic")
<b>Image Size (diagonal):</b>	40" – 300"
<b>Aspect Ratio:</b>	4:3
<b>Throw Distance:</b>	4.6' – 41.3'
<b>Zoom/Focus:</b>	Automatic
<b>Zoom Ratio:</b>	1:1.2
<b>Up/Down Ratio:</b>	9:1
<b>Digital Keystone Correction:</b>	Vertical: +/- 20

**Projection System:** Polarized Beam Splitter optical system  
**Projection Lens:** F1.65-1.81 / F0.89"-1.06"  
**Lens Throw Ratio:** 1.72 - 2.07:1  
**Projection Lamp:** 220W UHP  
**Scanning Frequency:** H Sync: 15-100kHz, V Sync: 50-100Hz  
**Dot Clock:** 140MHz  
**Color System:** PAL/PAL-M/PAL-N/SECAM/NTSC/NTSC4.43  
**Computer Compatibility:** UXGA, WXGA, SXGA, XGA, SVGA, VGA, MAC  
**Sound Output:** One-piece, 1-watt Mono  
**Voltage:** 240V AC (auto Voltage) ; 50Hz  
**dB Rating:** 29 dB (Eco mode)  
**Dimensions (WxHxD):** 13.2" x 3.1" x 9.4" (not including Adjustable Feet)  
**PC Input Terminals:** D-Sub15 x 2 (1 switch able in/monitor out)  
 Audio x 1 (Stereo mini-jack : common)  
**Video Input Terminals:** Composite Video (RCA x 1)  
 S-Video (Mini-DIN 4-pin)  
 R & L/mono audio (RCA x 2)  
 Component Video (D-Sub15 input w/optional cable)  
 Audio for Component Video  
 (stereo mini-jack : common)  
**Output Terminals:** D-Sub15 x 1 (switchable In/monitor out)  
 Variable Audio (stereo mini-jack)  
**Service Port:** Mini DIN 8-pin  
**Warranty:** Three years parts and labor; 90 days original lamp; Quick Repair  
 Program under warranty  
**Included Accessories:** I/R Remote Control; 2 AA Batteries; Owner's Manual(CD-ROM & Quick  
 Reference Guide)  
 VGA Cable; Lens Cap; PIN Code Label  
 AC Power Supply Cord  
 VGA/Component Video Cable  
 Presentation Kit (Remote Control w/USB Infrared Receiver)  
 Soft Carrying Bag  
 Replacement Lamp  
**Regulatory Approvals:** Complies with all relevant worldwide EMC, EMI and safety standards.  
 The product should comply with FCC Class A, CSA C22.2 No. 950,  
 UL 1950, cUL and IEC950 (EN60950) European Norm.

Other features to include:

- Network Capable RJ45
- 3LCD Technology
- Flexible installation-ceiling; 90 degrees upwards/downward tilts
- Dynamic detail enhancer – generates high quality images of outstanding clarity.
- Digital keystone adjustment
- Whisper quiet operation
- Horizontal/vertical picture shift
- Include Anti Theft Projector Ceiling Mount
- Provide 200m VGA Cable

1. **Enhanced Feature Set**

- Progressive scan video reproduction
- 3D digital noise reduction
- User-selectable 4 or 2 lamp mode
- Motorized zoom and focus
- Motorized lens shifts (up and down, left and right)

- Picture freeze function
  - "No-show" mode function
  - Presentation timer
  - Power management function
  - Audio mute
2. **Control/Networking**
- Automatic Multi-Scanning Set-up system (AMSS) (phase/tracking/position)
  - USB type B
  - Remote control jack
  - RS232-C control port and loop-through via 9-pin D-sub terminal (in/out)
  - Wired remote control
  - IR remote keypad with mouse and laser pointer
  - Front and rear IR receivers
  - Remote mouse control
3. **Graphical User Interface**
- Easy set-up and intuitive multi-language on-screen displays (OSD) (English, German, French, Spanish, Italian, Portuguese, Dutch, Swedish, Chinese, Korean, Japanese)
  - Direct-key status function
  - Blue back display
  - Standby on-screen logo display
  - Picture reverse scans function (left/right, top/bottom) for front, rear and inverted projection

#### 4.0 PROJECTION SCREEN

- Electric type – Motor Driven
- Wall/Ceiling mountable
- Matte white surface
- Black/white border
- Wall mount switch
- Optional wireless remote control

#### 6.0 LASER MOUSE

The Laser Mouse is to aid in presentations when using the digital projector. It should be a combination of a Laser Pointer and Radio Mouse in a compact design

The Laser Mouse should have: -

- Laser pointer and Mouse control in one device
- Wireless connection to the PC
- Small design
- Scrolling during presentations with Microsoft PowerPoint via right and left mouse key
- Plug & Play compatible, no special drivers necessary
- Laser pointer
- Control of the mouse cursor with the thumb
- Right and left mouse key as well as a special function key
- Ultra compact USB-radio receiver with power supply via USB port

### Technical data

Frequency: 433.92 MHz

Range: 10 m

USB port, compatible with Microsoft Windows 98, Me, XP and 2000

Power supply: USB receiver directly via PC, remote unit via battery (Type CR2032 DV 3V)

Dimensions: Remote unit 12.5 x 3.6 x 1.98 cm (LxWxH),

Receiver 5.75 x 2.0 x 1.0 cm (LxWxH)

Supplied with: Laser mouse, USB receiver, Battery for Laser mouse, Installation and User Manual

## 7.0 CEILING LOUDSPEAKERS

1. Enclosure: Bass reflex
2. Rated output: 60W
3. Impedance: 8 Ohm
4. Wattage: 24/36W
5. Sensitivity: 90dB
6. Frequency response: 190 – 18,000 HZ
7. Ceiling mounted

## 8.0 PUBLIC ADDRESS AND MONITOR LOUDSPEAKER SYSTEM

Item	Active bi-amped Public Address and Monitor	Minimum Technical specification and
1.1	Power supply	100-260AC 60/50HZ
1.2	Power capacity	160 watts
1.3	Construction	Extremely light and steady enclosure
1.4	Handles	Custom horn ergonomic caring handles
1.5	Adapter	Adapter built into cabin
1.6	Design and shapes	Ideal for use in all professional audio application systems
		Asymmetrical profile use as a stage monitor
1.7	Controls	Unimpeded access to control in all application condition
1.8	2 way bi amped systems	Two in depended processors
1.9	Woofer	400watts rms (pwm) "pulse width modulation" Technology
1.10	HF drivers/horns	100watts rms class AB power amps
1.11	LF drives	64mm coil and a powerful ultra light neodymium magnet
1.12	HF Compression	Advance dynamic active protection of the drivers
1.14	Optimization of the acoustic response	Assuring total reliability under extreme condition (ensuring prolonged acoustic feedback)
1.15	Active electronic filters	24dB /oct
1.16	Professional control panel with	XLR/Jack input combine Neutrik
1.17	Three band equalizer	High-mid –low Preamp gain control and Master control
1.18	Impedence	8 ohms
1.19	Frequency response	40hz-----20khz
1.20	Electronics crossover	1.8
1.21	Sensitivity	98
1.22	Maximum SPL	125
1.23	Built in Power amplifier	2 mos Fet class AB with 2 independent Processors
1.24	Input impedance/Sensitivity	Mic 40dB/2 ohms Line 0 dB /20kohms
1.25	Connections	Combined XLR and ¼" Jack balanced Microphone /Line input and XLR for the link output
1.26	Accessories: Speaker stands	

**9.0 RADIO MICROPHONE SYSTEMS**  
**A. HAND HELD TRANSMITTERS (DYNAMIC CARDIOIDS)**

Item	Hand held Transmitters (Dynamic cardioids)
	<b>Minimum Technical specification and features</b>
2.1	<b>Each system should comprise of;</b>
2.2	UHF Hand-held (vocal) wireless microphone/transmitter
2.3	64 or more selectable channel frequencies
2.4	Maximum input level; 145dB SPL
2.5	Input sensitivity control
2.6	ON /OFF Switch designed to prevent accidental activation
2.7	LED Low battery indicator
2.8	Dynamic Microphone unit cardioid
2.9	Frequency range 822—866 MHz UHF
2.10	RF Carrier power; less than 50mw
2.11	PLL Synthesizer
2.12	Maximum deviation: $\pm$ 40khz
2.13	Battery; 6LR61(9V ONE) or equivalent
2.14	Battery Life; more than 10 hours (Alkaline)
2.15	Power/Battery indicator
2.16	Antenna, 1/λ helical Antenna
2.17	Ambient temperature 10° C to 50° c.
2.18	Finish: Resin rubber coating
2.19	Accessories: Stand adopters, storage case

**B. UHF WIRELESS TUNER (RECEIVER)**

ITEM	UHF WIRELESS TUNER (RECEIVER)-
	<b>Minimum Technical specification and features</b>
3.1	Power: AC MAINS (using AC-DC Adapter)
3.2	Power: Consumption 250 mA (12 V DC)
3.3	Receiving Frequency: 822 –870 MHz UHF
3.4	64 channels selectable frequencies.
3.5	Receiving System: Double supper heterodyne.
3.6	Audio Output: MIC – 60 dB/ Line - 20 dB 600Ω ¼” phone jack (unbalanced), XLR-3-31 type connector (balanced)
3.7	Mixing input: 20 dB 10KΩ ¼” phone jack (unbalanced) XLR-3-31 type connector (balanced)
3.8	Antenna Input: 75Ω BNC (Phantom powering for antenna)- 9V DC.
3.9	Receiving sensitivity: Better than 80 dB.
3.10	Indication: Audio (11 steps) RF (11 steps) ANT A/B Audio (peak).
3.11	Channel check: usable frequencies scanning.
3.12	Digital Control I/O: Usable frequencies reading, frequencies input.
3.13	Frequency response: 100 – 12 000 HZ $\pm$ 3dB.
3.14	Accessories: Rack mounting brackets.
3.15	And sets of recommended spare parts

**10: 2-IN/24-OUT AUDIO PRESS FEED (MIC/LINE SWITCHES ON 12-OUTPUTS)**

<b>B</b>	<b>.AUDIO PRESS FEED- 2-in/24-out Audio</b>
<b>Item</b>	<b>Minimum technical specification and features Description-</b>
5.1	Audio Press Feed of high quality versatile unit for conferences, meetings, courtrooms, auditoriums, etc.
5.2	A portable unit mounted in a Halliburton aluminum case.
	<i>Specifications</i>
5.3	Audio: Two Balanced microphone (switch able to line inputs at 10k-ohms)
5.4	Gain controls
5.5	VU Meter
	<i>Outputs:</i>
5.6	16 Separate Outputs Each One:
5.7	Transformer Isolated
5.8	"XLR", 1/4" Phone Jack, RCA & 3.5mm Jack
5.9	Mic/Line Switch
5.10	+18 dbm Output capability
5.11	Ground floating (Does not require ground lift)
5.12	50 Hz - 15 KHz (-2 db)
5.13	50 db Channel isolation
	<i>Power:</i>
5.14	100-260v, 50-60 Hz, 5 Watts
5.15	AC & Rechargeable internal Battery
	Size: 10" x 12" x 5" Deep "Halliburton" Aluminium Case Weight: 8 lbs or less.

**11: SPECIFICATIONS FOR WIRE-CONFERENCE/WIRELESS SYSTEM**

**A: System overview**

- Microphone with fixed gooseneck, illuminated ring
- Loudspeaker
- Microphone button with led, to indicate request to speak or on/off status
- Fixed connecting cables with 15- pin sub – D plug or wireless
- Documentation output ( Mini jack socket 3.5mm)
- To include Connection to recorders etc this should be compatibles to MCS100

**B: Technical specification**

- AF – Frequency response - 80 HZ-19KHZ
- Interface-RS-232 - 9-pin sub –socket for external PC or media control systems
- Two USB Interface - For external PC Connection
- Switch- Button - ON/OFF – Switch.
- Reset button for user specific adjustment
- master reset button for manufacturer specific adjustment
- AF- Output ---- XLR -Male ,Balance, Ungrounded 1.55V (+6dBm)
- AF-Input AUX,XLR FEMALE,250mv -40Db- balanced
- Audi output record- XLR male balanced
- Limiter – compensates variation in speaking distance
- Microphone – SHM 21/8 – 400 gooseneck microphones fixed with illuminated ring.
- Loud speaker wideband –integrated loud speaker with volume control
- Speaker out 0dB—20dB.

### **C: Chairman Microphone**

- One microphone with the following (Three Buttons)
- Priority button
- Microphone button
- Clear button.

#### **Connections:**

- i. 1x3 long cable with 15-pin sub D plug microphones lines or wireless
- ii. -1x15 -pin sub -D socket. Microphone lines or wireless
- iii. -1x mini -jack (3.5) documentation output.
- iv. Approximate dimensions (without microphone)
- v. Length; 180mm, width 150; Height 50mm
- vi. Approximate weight (without microphone)
- vii. Colour - stone grey or grey.

- ✓ Unidirectional microphone
- ✓ auto microphone switch - off 30sec without speech
- ✓ Built in protection circuitry
- ✓ Delegate voting capability
- ✓ Total Harmonics
- ✓ at nominal input level < 0.5%
- ✓ at maximum input level < 1%
- ✓ Temperature: +5°C to + 45°C
- ✓ compatible with a wide range of equipment.
- ✓ Possible-to-speak indicator(white LED)
- ✓ Microphone on indicator
- ✓ Light ring indicator on microphone stem(red when on)
- ✓ Temporary or Permanent muting of delegate microphone.

### **D: Delegate Microphone**

- AF- Frequency Response -80 Hz—19 kHz
  - AF- output (+6dBm) balanced, microphone line
  - AF- output (-10dBm) unbalance, mini -jack (3.5)
  - Limiter -Compensate variation in speaking distance, cannot be switched off
  - Speaker – wide band, integrated loud speaker
- 
- ✓ Unidirectional microphone
  - ✓ auto microphone switch - off 30sec without speech
  - ✓ Built in protection circuitry
  - ✓ Delegate voting capability
  - ✓ Total Harmonics
  - ✓ at nominal input level < 0.5%
  - ✓ at maximum input level < 1%

- ✓ Temperature: +5°C to + 45°C
- ✓ compatible with a wide range of equipment.
- ✓ Possible-to-speak indicator(white LED)
- ✓ Microphone on indicator
  - Light ring indicator on microphone stem(red when on)

**E: Volume control for loud speaker output (0db - 20db)**

- One button- microphone.
- Dual color LED microphone;
- Green- microphone on
- Red – request to speak
- 5 DIP switches (No. 1-5) address of the microphone units (Binary code)

**F: Mixer Amplifier**

- ~ At least 4 microphone inputs
- ~ 120w Amplifier
- ~ Individual Volume Controls for each mic/aux input
- ~ Master volume control
- ~ Table top type
- ~ Power surge – AC mains 50/60HZ
- ~ Frequency response – 50-20,000 Hz
- ~ 5 input – 4XLR/Jack input
- ~ 4RCA Pinjack – record speaker- 100V line

**G: Loudspeakers**

- ~ Wall mounted
- ~ 100w Rated input
- ~ Wall bracket
- ~ Impedence – 100v//70 Volt Line
- ~ Sensitivity – 90db
- ~ Vented 2 way bass reflex type
- ~ CD-Horn for large directivity angle of 60° x 40°
- ~ Durable low foam polypropylene enclosure with superb acoustics
- ~ Overload protection circuitry
- ~ Parallel input push in terminals with ¼” phone jacks

## **H: Wireless Microphones – Lapel/Handheld**

- ~ UHF type
- ~ Electret Condenser unit – condenser
- ~ Frequency range 690 – 750 MHz UHF
- ~ 16ch selectable channels
- ~ Battery type – AA

## **I: Digital Modular Mixer**

Fully modular digital mixer featuring a 12 input; 8bus, 8 output ch configuration (12 x 8 matrix) with easy operation that can be expanded as applications require

- ~ all in one design
- ~ build in feedback suppressor
- ~ automatic mixing function
- ~ sound processing
- ~ ease of Control from front panel
- ~ LCD Display
- ~ Digital buttons for control/operation

## **J: Power Amplifier**

- ~ 32ch stereo Power Amplifier – rack mountable
- ~ 2 x 200w Rated input @8 ohms
- ~ Built in protection circuitry
- ~ Selectable stereo, bridge or parallel operation
- ~ Forced air – cooling system with variable speed
- ~ Rotary volume controls

## **K: SOFTWARE**

### **1. Configuration Menu**

- User interface:
- Selection of desktop picture (load bit map), play back video signal or create video signal using the built-in drawing program (designer).
- Displaying of participants' fields: microphone unit inactive, microphone unit active, registration and speaker's time expired.
- Can be loaded externally as bitmap file or created with designer program.
- Grid size for drag or drop of participants' fields on the screen.
- Designer for the design of user interface and participants' field.

### **2. File Option**

- Load/save of new user configuration.
- Password configuration

### 3. Participants

- Participants' name entry/credit
- Functions statues participants, such as manual self-assignment, Registration ban on speaking

### 4. Microphone unit option

- Entry of speaker's time for all participants or specifically for each participant.
- What happens after a speaker has run out of time: mute microphone unit or display event in participants' field.
- Entry of conference time.

### 5. General:

- Interface configuration
- NON: maximum number of open microphones
- Design of partial windows as part of the overall user interface
- Entry f conference time

### 6. Records

- Displaying of speaker's time for all participants (single/overall time, save, print, load)
- Help utility with detailed description of program and functions

## 12.0 GENERAL SPECIFICATIONS

### CABLES AND CONNECTORS

All the cabling shall be carried out in trunking. Basically, cables carrying video signal between cameras and TV monitoring via video control multiplexer equipment shall be Cat 6 cables. Connectors shall be RJ-45 jacks as appropriate.

### WIRING AND CONNECTION DIAGRAMS

It shall be the responsibility of the contractor to provide wiring connection diagrams for approval by the Project Manager before commencing the works.

### UN-INTERRUPTIBLE POWER SUPPLY

This shall be an online un-interruptible power supply with output rating of 3KVA, 415V, 50Hz single phase supply. It shall provide power to the camera system for 8hrs operation in the event of a mains power failure.

It shall be microprocessor-based so that both output voltage and frequency are closely regulated and continuously monitored and also provide system diagnostic and shut down protection functions. It shall feature maintenance by-pass to enable normal routine maintenance operations to be performed without interruptions to the system.

It shall be fitted with both visual and audible alarms to indicate change in equipment status such as:

- Input power problems
- UPS faults
- UPS overload
- Battery discharging

## 13.0 MATERIALS FOR THE WORKS

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

## 14.0 QUALITY OF WORKS

The works shall be of high quality and standards.

The contractor shall carry out his work with due care so as not to disturb the structure of the existing building. Any building structure damaged due to contractor professional carelessness shall be repaired at his own expense.

## 15.0 URGENCY OF THE WORKS

The Contractor is notified that these works are urgent and **MUST** be completed within the stipulated contract period.

The Contractor shall allow in his rates, for any costs he deems he may incur by having to complete the works within the stipulated contract period.

## 16.0 CO-ORDINATION WITH OTHER CONTRACTORS

The Contractor is requested, when carrying out his works, to properly co-ordinate with the Main Contractor and other contractors who shall be in the same site carrying out other works.

PART 3

1.00. TECHNICAL SPECIFICATIONS FOR COMPUTERS AND ACCESSORIES

1.01) SPECIFICATIONS FOR DESKTOP COMPUTERS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
A	<b>GENERAL SPECIFICATIONS</b>		
1	Make	<b>BRANDED</b>	
2	Model		
3	Country of Origin		
4	Manufacturer's brochure and specifications	Must be supplied	
B	<b>TECHNICAL SPECIFICATIONS</b>		
5	Processor	Intel® Core™ i7-4790 with Intel HD Graphics 4600 (3.6 GHz, 8 MB cache, 4 cores)	
6	System Memory	16 GB 1600 MHz DDR3 SDRAM (1 x 4 GB)	
7	Disk cache	Integrated <b>8MB L2 cache</b> Bus Speed <b>2700 MHz</b>	
8	Storage sub system	<b>1 TB 7200 rpm SATA SSD</b>	
9		DVD / CD-Writer Drive Memory Card Reader	
10	Display/Graphics	<b>21" TFT Screen</b> (Free standing-Adjustable)	
11	Keyboard	PS/2 Enhanced keyboard	
12	Pointing device	PS/2 Compatible <b>Optical mouse</b>	
13	Audio/ Graphics Systems	❖ PCI 3D audio/video cards ❖ TV/FM cards ❖ Amplified speakers (External)	
14	Communication Interface	❖ 10/100/1000Gbs fast ethernet, RJ 45 jack ❖ 56K ITU V.90 data/fax modern, wake-on-ring ready	
15	<b>Operating System Pre-load plus CDs</b>	Windows 10 Professional 64	
16	<b>Application Software, pre-installed, registered and CDs supplied</b>	MS OFFICE (Latest Version)	
17	Power sub- system	220-240V ac, 50HZ	
18	Power extension cord	At least four outlets with surge protection	
C	<b>WARRANTY</b>	One year parts replacement warrant	

### 1.03 MEDIUM DUTY LASER PRINTER SPECIFICATIONS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
<b>A</b>	<b>GENERAL SPECIFICATIONS</b>		
1	Make	BRANDED	
2	Model		
3	Type	Desktop	
4	Country of Origin		
5	Manufacturer's brochure and specification	Must be supplied	
<b>B</b>	<b>TECHNICAL SPECIFICATIONS</b>		
6	Resolution	1200x1200 dpi	
7	Printing speed	19 ppm	
8	Memory	72 MB	
9	Languages	Enhanced HP PCL, postscript	
10	Maximum Media size	A4 paper	
11	Media types	Plain paper, envelopes, transparencies, labels, postcards	
12	Media input capacity	250 sheet input cassette	
13	Connectivity	❖ IEEE – 1284 compliant bi-directional parallel port ❖ 2.0 compliant USB port	
14	Duty cycle	60,000 pages per month	
15	Operating system support	All windows	
16	C P U	Power PC 405/200 MHZ	
17	Power Supply	240V ac, 50HZ	
18	Power connectivity	Power cable compatible with the printer and 13A socket outlet	
<b>C</b>	<b>WARRANTY</b>	One year parts replacement warrant	

### 1.03) SPECIFICATIONS FOR LIGHT DUTY UPS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
<b>A</b>	<b>GENERAL SPECIFICATIONS</b>		
1	Make	<b>BRANDED</b>	
2	Model		
3	Country of Origin		
4	Manufacturer's brochure and specification	Must be supplied	
<b>B</b>	<b>TECHNICAL SPECIFICATIONS</b>		
5	Rating	<b>650VA</b>	
6	Input voltage swing	220 – 270V ac	
7	Output voltage	220-240V ac	
8	Output frequency	50-60HZ auto-sensing	
9	Protection	❖ Output overload ❖ Input/output short circuit	
10	Communication Interface	Serial port communication support	
11	Design	❖ Automatic voltage regulation ❖ Mains isolation ❖ User replaceable batteries ❖ Static-automatic bypass ❖ Maintenance bypass	
12	Battery Module	❖ <b>25 minute backup time</b> ❖ <b>3 year lifetime</b> ❖ Sealed lead acid type preferred ❖ Automatic periodic battery tests ❖ Short recharge time (maximum 5 hours for 100% run time) ❖ Protection against excessive discharge	

Other Items to be supplied:

- 1) Power Supply extension cable complete with 13A 3pin plug and 4x13A switched socket outlets panel which is complete with inbuilt overcurrent/overvoltage/surge protection

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

### **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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\Omega$  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  $\mu\text{m}$  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  $\Omega$  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  $\Omega$  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  $\Omega$  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  $\mu\text{m}$  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  $\Omega$  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  $\mu\text{m}$  to 10  $\mu\text{m}$  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- $\mu\text{m}$  (*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- $\mu\text{m}$  (*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  $\mu\text{m}$  (*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<sup>2</sup>) 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

Edit as required.

- 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 AWC 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 IIe 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 at **Nakuru Town, Nakuru 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 180 data/voice points.
- iv) Supply, install telephone cables to interconnect the data cabinets to the 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. Backplane/switch fabric Bandwidth Capacity of 150 GBPS or more.
- b. IEEE 802.3 compliant for power over Ethernet
- c. IEEE 802.1 based security compliant
- d. SNMP compliant for security
- e. Layer 2/3/4 switch
- f. Should support Gigabit Ethernet to the desktop
- g. Should have at least 10-slots or higher chassis
- h. The core switches should have two links to each floor configured in active/active configuration. The links should deliver 2GBPS throughput when all ports are active.
- i. The core switch should have redundant power supply, redundant fan tray and redundant CPU/ supervisor engine installed
- j. Fiber cable linking stacks on each floor to the core should be connected to 1000Base X(GBIC) port on the core switch.
- k. Should be installed with the latest version of system software at the time of delivery.
- l. Should support Quality of service for various applications.

## 7.0 ACTIVE CONTROL EQUIPMENTS AT THE LAN EDGE

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

- a) Active control equipments at the LAN Edge should support 10/100/1000 MBPS on all ports (RJ45) and Gigabit to the desktop connectivity
- b) The equipments should have at least two 1000BaseXGigabit uplink ports for terminating backbone Fiber.
- c) The equipments should support layer 3 routing.
- d) Should support IEEE 802.1, SSH, SNMP.
- e) Switch Fabric forwarding Bandwidth of 64GBPS or more.
- f) More than 12,000MAC addresses should be available on each switch .
- g) The switches should have 24/48 ports of 10/100/1000 MBPS.
- h) Each stack on the edge will have two links of Fiber to the core switch, totaling two fiber terminations from the core switch to the stack.
- i) Should support Jumbo frames.
- j) Total stack throughput bandwidth of 64 GBPS or more.
- k) Active Equipments at the LAN Edge should be quoted with a minimum of **One year of warranty** covering free replacement of parts and units.

## 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/mm<sup>2</sup>
- 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. m

## 11.0 CAT 6 PATCH PANELS

The Contractor shall provide factory made patch panels, Cat 6 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 6 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).

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.

**PARTICULAR AND TECHNICAL SPECIFICATIONS – IP-PABX  
EQUIPMENT**

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CLAUSE	DESCRIPTION
<b>PART 1</b>	
1.00	Particular specifications
1.01	Site location
1.02	Scope of the works
1.03	Climatic conditions
1.04	Bond for IP-PABX with provisional type approval
1.05	Regulations
1.06	Position of Services and Equipment
1.07	Setting to work and Regulating Systems
1.08	Identification of Plant Components
1.09	Working Drawings
1.10	Record Drawings
1.11	Tests
1.12	Quality Materials
1.13	Training
1.14	Equipment Guarantee
1.15	Patent Rights
<b>PART 2</b>	
2.00	Technical Specifications for the IP-PABX
2.01	Scope of the Works
2.02	Minimum Requirements
2.03	Equipment Finish
2.04	Interference Suppression
2.05	Door Keys
2.06	Equipment Hardware
2.07	Equipment Software
2.08	System Features
2.09	Barring and route restriction
2.10	Class of service
2.11	Attendant Console (PC)
2.12	Telephone Instruments
2.13	Numbering System
2.14	Exchange Lines
2.15	ISDN Tie lines
2.16	System Maintenance
2.17	Power supply
2.18	List of Main Requirements for the IP-PABX
2.19	Other Minimum Requirements for the IP-PABX
2.20	Brochures and Technical Literature
2.21	Items to be Stated by the Tenderer.
2.22	Statement of Compliance.
2.23	Appendix to Particular and Technical Specifications.

## **1.00 PARTICULAR SPECIFICATIONS – IP-PABX EQUIPMENT**

### **1.01 DESCRIPTION OF THE SITE**

The site of the proposed works is located at **Nakuru Town, Nakuru County**.

### **1.02 DESCRIPTION OF THE PROJECT**

The works comprise the Supply, Installation, Testing and Commissioning of new IP-PABX Equipment, 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 25°C

Mean Minimum Temperature 15.4°C

Range of Relative humidity 39% - 97%

Salt in the atmosphere 0.02%

Altitude 1406M above sea level

Latitude /Longitude 2.3355° N/37.9943° E

Solar Radiation, February Mean Max 630 Langleys

Extremely 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 than 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 or 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

**IP-PABX** and all its associated Cabling, Telephone Instruments and accessories. The IP-PABX will be 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. Meet me conference- With a Meet Me Conference Center, each of your phone extensions can have its own conference room.
3. Dial-in Conference.
4. 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 incoming calls to pre-selected extensions when the console is not manned.

Attendant consoles will be multiplex so that the connecting cable will comprise a minimum number of pairs, with little restriction on the siting 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.).

## 2.26 TELEPHONE INSTRUMENTS

The acquiring of telephone instruments has been liberalized. However, they must be Type-approved by the CAK and the tenderer must obtain the necessary approval.

### EXECUTIVE IP TELEPHONE INSTRUMENTS

The executive telephone instruments shall be IP- type, keypad or touchpad dialing and shall have, but not limited to, the following operating characteristics: -

- Standard IP- telephone facilities
- Six-line x 16 character, liquid crystal display (LCD) and embedded softkeys for efficient call handling and easy message management
- Feature buttons for quick access to frequently used functions such as hold, mute, do not disturb, transfer, forward, conference page and more
- Message waiting lamp, adjustable base and wall mount
- Includes full-duplex speakerphone and dedicated headset support
- Red light emitting diodes (LEDs) to indicate a call is active, ringing or holding
- QoS and web-based programming
- Upgradeable through software
- Supports G.711 a-law, G.711 u-law, G.729a, and G.729a/b vocoders
- Supports centralized power over LAN (local area network) (IEEE compatible)
- Enables dynamic host configuration protocol (DHCP) or static IP addressing
- User configurable transmission control protocol (TCP) and user datagram protocol (UDP) port number
- Includes extra switch port
- Configurable in SIP mode
- Supports VLAN tagging, which eases management, improves call quality and increases security

### STANDARD IP TELEPHONE INSTRUMENTS

The standard level model design shall include:

- A minimum of 12 self-labeling programmable call/feature keys (but also be capable of supporting up to 24 if required);
- Several fixed feature keys, including such popular features/functions as Speaker, Headset, Conference, Transfer, Redial, Mute, Drop, Hold (Color Highlighted), and Volume Up & Down;
- An integrated full duplex speakerphone; an integrated large graphical backlit gray-scale display screen capable of supporting desktop productivity applications
- Customer programmable self-labeled soft key
- Embedded Web browser functionality  
Application keys, such as Call Log, Speed Dial and Web Browser; and hearing aid compatibility

## **2.27 NUMBERING SYSTEM**

The numbering scheme will be:

Level 0 Access to PABX Telephone Operator

- “9 Access to the main exchange
- “8 Night service
- “7 Spare for future ISDN tie line access
- “6 ISDN - Tie line access
- “5 Spare for extensions
- “4 Extensions
- “3 Intercom
- “2 Extensions
- “1 Spare for special facilities.
- “10 plus code for feature de-activation.
- “11 plus code for feature activation.

## **2.28 EXCHANGE LINES**

Exchange lines shall be arranged for first party release. The IP-PABX must be capable of processing the number of digits required for international calls in accordance with CCITT and CCIL recommendations.

A device shall be fitted to sense main exchange dial tone as there may be considerable delay in receiving this after the seizure of a free exchange line.

## **2.29 ISDN TIE LINES**

The lines will provide access to all extensions and the operator. They are to be for auto-auto working through signaling and first party release. Tones are to be returned over to tie lines.

Disconnect loop signaling is at present employed with a maximum loop resistance of 2000 ohms.

## **2.30 SYSTEM MAINTENANCE**

### **Test Equipment and Tools**

PABX routine test set and a set of maintenance tools are to be supplied. The tools and spare parts are to be listed in Appendices “A” and “B” of the Bills of Quantities.

### **Maintenance Features**

The IP-PABX shall have the following system maintenance features:

- Line status monitoring device
- Station message data recording port
- System Working report
- On site system administration using a compatible terminal and attendant console.
- Remote system administration capability
- Automatic on-line diagnostic testing

Maintenance diagnostic software programmes shall be provided which can be run as required whilst the IP-PABX is in normal service.

### **Maintenance and Operating Manuals**

On practical completion of the works, the contractor shall furnish two sets of copies in soft copy and hard copy forms each of maintenance and operating manuals relating to the IP-PABX installed. The hard copy manuals shall be legibly written in English and properly bound with hard cover.

They will include but not limited to the following:

- System description
- Fault finding procedure
- Maintenance and servicing periods and procedures
- Schematic and wiring diagrams of the equipment
- Record drawings

## **2.31 POWER SUPPLY**

### **Rectifier**

The IP-PABX shall be fed through an integrated rectifier and an AC –DC converter fed from 240V A.C. 50Hz power supply. The rectifier will be equipped with the following devices:

- Security device to monitor the minimum and maximum authorized values of the output voltage. When one of the thresholds is reached, the power supply to the IP- PABX must cut itself automatically “Floating” and automatic “Equalization” device with manual command of the “Equalization” mode and automatic switch back to “floating” mode once the battery is loaded.

The rectifier will be sized to supply power to the IP-PABX and simultaneously allow re-loading of the battery within 10 Hours maximum.

### **Battery**

A stationery battery is required to supply power during peak hours and mains supply failures and to provide smoothing for DC out put from the rectifier.

The battery shall be “Maintenance Free” and shall have sufficient capacity when fully charged to supply power to the IP -PABX in the event of mains supply failure for minimum of 8 hours. The minimum DC out put shall be 48V DC +/- 10% and its life expectancy shall be 10 years. Automotive or Traction battery will not be accepted.

### **UPS**

A UPS of suitable rating is required. It shall have a response time of NOT more than 0.1 seconds and a correction range from -12% to +12% with surge/spike protection.

### **Voltage Stabilizer**

A voltage stabilizer of suitable rating is required. It shall have a response time of NOT more than 0.1 seconds and a correction range from -12% to +12% with surge/spike protection.

### **Earthing**

An independent telecommunication earth shall be provided for the IP-PABX. The earth lead cable shall not be less than 6mm<sup>2</sup> and shall terminate to copper earth electrode(s) in a concrete manhole (300mm x 300mm) with a suitable concrete cover. The earth impedance shall not exceed 4 ohms.

**2.32 LIST OF MAIN REQUIREMENTS FOR THE PROPOSED IP-PABX.**

ITEM	FACILITY DESCRIPTION	INITIAL CAPACITY	ULTIMATE CAPACITY
1.	ISDN PRI-E1 of 30 Channels complete with a suitable Modem.	1No.	1No.
2.	No. of IP Extensions	48	64
3.	No. of Exchange Lines ( Trunks)	6	12
4.	(i) GSM lines (Safaricom, Airtel, Orange and YU) complete with lines.	4	6
	(ii) Wireless backup for the pilot exchange line.	1No.	1No.
5.	PC Based Operator Consoles	1	1
6.	Operator Head Sets	2	2
7.	Operator Hand Sets	2	2
8.	Branch Connectivity IP Telephony		

**2.33 OTHER MINIMUM REQUIREMENTS FOR THE IP-PABX**

The IP-PABX shall: -

1. be fully IP
2. be VOIP ready
3. be ready to connect to LAN and also support branch connectivity where WAN/internet service is available.
4. be ISDN ready
5. must be able to **support five digits** extensions numbering plan
6. have at least 50% power failure trunk transfer facility
7. must be capable of offering unified communication services (voice, video & data convergence)
8. be capable of connecting/transferring an incoming call to a mobile service when the extension user is not at his desk.
9. have a UPS of at least 8 hrs autonomy.
10. have direct inward dialing system access facilities and data communication services.
11. be of compact modular design with sub-lines pre-wired and easily removable
12. be equipped with flexible music on hold
13. have call forwarding automatic call transfer, three party conference among other standard features.
14. be equipped with mains power supply Anti-surge, over-voltage and under-voltage protection devices and lightning protectors for all cards.
15. Have on screen fault indication facility.

16. be supplied with telephone call management and information software based system with a memory capable of storing at least 20,000 calls, and be supplied complete with a PC and a printer for the telephone call management
17. be complete with a maintenance terminal facility.
18. be **type approved by the Communications Authority of Kenya**. The bidder is required to submit the CCK type approvals.
19. be **compatible** for connection to Telkom / Orange (Kenya) Ltd, Safaricom networks etc.

## **2.34 TELEPHONE MANAGEMENT SYSTEM**

### **Scope of Works**

The works to be carried out comprise supply, installation, testing and commissioning of the following:

- a) Telephone call management software
- b) 1 No. Desktop computer
- c) 1 No. Medium duty laser printer
- d) 1No. Medium duty UPS

### **Technical Specifications**

#### **1. Call Management Software**

##### **System Capabilities**

The software system shall be able to perform the following:

1. Telephone calls tracking
2. Telephone calls costing/billing
3. Telephone calls budgeting
4. The software system shall be fully window based and run as a background task
5. All telephone call costs shall be computed basing on the prevailing service provider's rates, or shall be customized for employer's own use.
6. The software system shall have the capability of automatically barring and unbarring exchange lines and level 9 lines that shall go beyond their budget allocation and automatically reinstate them on budget re-allocation.

It shall also have the capability of automatically barring and unbarring roaming PINS that shall go beyond their budget allocation and automatically reinstate them on budget re-allocation.

7. The software system shall be able to allocate password to the users.

## **Reports Generated**

The call management software shall be able to generate the following: -

1. Dates of calls
2. Duration of calls
3. Extension numbers where calls originate
4. Approximate cost of trunk calls
5. Time of calls
6. Detailed report on call transfers
7. Details of exchange lines used
8. Details of extension lines used
9. Detailed report of most frequently called numbers
10. Detailed report of longest calls for selected duration
11. Detailed report of mobile calls by extensions
12. Detail of most expensive calls within selected time
13. Graphical presentation of reports.

2.36 TECHNICAL SPECIFICATION FOR COMPUTER AND ACCESSORIES

A) SPECIFICATIONS FOR DESKTOP COMPUTERS

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	BIDDER'S SPECIFICATIONS
<b>A</b>	<b>GENERAL SPECIFICATIONS</b>		
1	Make	<b>BRANDED</b>	
2	Model	HP EliteDesk 800 G1 Desktop	
3	Country of Origin		
4	Manufacturer's brochure and specifications	Must be supplied	
<b>B</b>	<b>TECHNICAL SPECIFICATIONS</b>		
5	Processor	Intel® Core™ i7-4790 with Intel HD Graphics 4600 (3.6 GHz, 8 MB cache, 4 cores)	
6	System Memory	16 GB 1600 MHz DDR3 SDRAM (1 x 4 GB)	
7	Disk cache	Integrated <b>8MB L2 cache</b> Bus Speed <b>2700 MHz</b>	
8	Storage sub system	<b>1 TB 7200 rpm SATA SSD</b>	
9		DVD / CD-Writer Drive Memory Card Reader	
10	Display/Graphics	<b>21" TFT Screen</b> (Free standing-Adjustable)	
11	Keyboard	PS/2 Enhanced keyboard	
12	Pointing device	PS/2 Compatible <b>Optical mouse</b>	
13	Audio/ Graphics Systems	❖ PCI 3D audio/video cards ❖ TV/FM cards ❖ Amplified speakers (External)	
14	Communication Interface	❖ 10/100/1000Gbs fast ethernet, RJ 45 jack ❖ 56K ITU V.90 data/fax modern, wake-on-ring ready	
15	<b>Operating System Pre-load plus CDs</b>	Windows 10 Professional 64	
16	<b>Application Software, pre-installed, registered and CDs supplied</b>	MS OFFICE 2017 OR MS OFFICE XP PRO (2017 Version)	
17	Power sub- system	220-240V ac, 50HZ	
18	Power extension cord	At least four outlets with surge protection	
<b>C</b>	<b>WARRANTY</b>	One year parts replacement warrant	

**B) SPECIFICATIONS FOR MEDIUM DUTY LASER PRINTER**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>MINIMUM REQUIREMENTS</b>	<b>BIDDER'S SPECIFICATIONS</b>
<b>A</b>	<b>GENERAL SPECIFICATIONS</b>		
1	Make	BRANDED	
2	Model		
3	Type	Desktop	
4	Country of Origin		
5	Manufacturer's brochure and specification	Must be supplied	
<b>B</b>	<b>TECHNICAL SPECIFICATIONS</b>		
6	Resolution	1200x1200 dpi	
7	Printing speed	21 ppm	
8	Duplex function	Standard	
9	Memory	16 MB expandable to 72 MB	
10	Languages	Enhanced HP PCL, postscript	
11	Maximum Media size	A4 paper	
12	Media types	Plain paper, envelopes, transparencies, labels, postcards	
13	Media input capacity	250 sheet input cassette	
14	Connectivity	❖ IEEE – 1284 compliant bi-directional parallel port ❖ 2.0 compliant USB port	
15	Duty cycle	60,000 pages per month	
16	Operating system support	All MS windows/ Open Source	
17	C P U	Power PC 405/200 MHZ	
18	Power Supply	240V ac, 50HZ	
<b>C</b>	<b>WARRANTY</b>	One year parts replacement warranty	

**C) SPECIFICATIONS FOR LIGHT DUTY UPS**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>MINIMUM REQUIREMENTS</b>	<b>BIDDER'S SPECIFICATIONS</b>
<b>A</b>	<b>GENERAL SPECIFICATIONS</b>		
1	Make	<b>BRANDED</b>	
2	Model		
3	Country of Origin		
4	Manufacturer's brochure and specification	Must be supplied	
<b>B</b>	<b>TECHNICAL SPECIFICATIONS</b>		
5	Rating	<b>650VA</b>	
6	Input voltage swing	220 – 270V ac	
7	Output voltage	220-240V ac	
8	Output frequency	50-60HZ auto-sensing	
9	Protection	❖ Output overload ❖ Input/output short circuit	
10	Communication Interface	Serial port communication support	
11	Design	❖ Automatic voltage regulation ❖ Mains isolation ❖ User replaceable batteries ❖ Static-automatic bypass ❖ Maintenance bypass	
12	Battery Module	❖ <b>25 minute backup time</b> ❖ <b>3 year lifetime</b> ❖ Sealed lead acid type preferred ❖ Automatic periodic battery tests ❖ Short recharge time (maximum 5 hours for 100% run time) ❖ Protection against excessive discharge	

Other Items to be supplied:

- 1) Power Supply extension cable complete with 13A 3pin plug and 4x13A switched socket outlets panel which is complete with inbuilt overcurrent/overvoltage/surge protection

**2.37 ITEMS TO BE STATED BY THE TENDERER**

- Delivery period from date of award of contract..... weeks
- Period required for installation from receipt of equipment .....weeks
- What is the name and model number of the proposed IP-PABX for which you have tendered?  
.....
- In which countries is the PABX and it PCB's manufactured.....  
.....
- With what standards does the IP-PABX comply? .....
- Is a full stock of spares available in Kenya? .....
- For how many years is the continuity of spare parts guaranteed? (A minimum of 10 years is required) ..... years
- What is the busy hour traffic capacity of the IP-PABX assuming no delay in main exchange dial tone? .....
- What is the maximum ambient temperature in which the PABX will function satisfactorily?  
.....
- Is air conditioning required for the IP-PABX? .....
- Is protection against high transient line voltage incorporated? .....
- How many pairs are required per extension line? .....
- Is the operator's console suitable for a blind operator? .....
- What is the warranty period offered? .....  
**(Note: 12 months is the minimum)**
- Is an MDF incorporated in the PABX? .....
- Is the POE incorporated in the PABX? .....
- Capacity of the standby battery in A.H.....
- Output of charger in Amps .....
- Provide a comprehensive list of other places and contacts where the proposed IP-PABX is installed and working (a separate sheet may be used) .....  
.....  
.....
- Provide a list of branch offices and contacts for purposes of future maintenance when the proposed IP-PABX is installed and extended to the counties and sub- counties (a separate sheet may be used) .....  
.....  
.....

**PARTICULAR AND TECHNICAL SPECIFICATIONS OF MATERIALS AND WORKS  
FOR IP-CCTV SURVEILLANCE AND ACCESS CONTROL SYSTEMS INSTALLATION  
WORKS**

CLAUSE	DESCRIPTION
<b>PART 1</b>	
1.00	Particular specifications
1.16	Description of the Site
1.17	Description of the Project
<b>PART 2</b>	
2.00	Technical Specifications for the IP-CCTV Cameras System
2.24	Extent of Works for Security Surveillance System
2.25	Working Drawings
2.26	Minimum Allowable Technical Specifications for the IP-CCTV Cameras System
2.27	Minimum Requirements for Proposed IP-CCTV Cameras System
2.28	Mounting Brackets
2.29	Camera Housing
2.30	Color Video Monitors
2.31	Color Digital Network Video Multiplexing Recorder
2.32	CCTV Management Software
2.33	Uninterruptible Power Supply (UPS)
2.34	Cables and Connectors
2.35	Patch Panels
2.36	Network Control Equipment at the Network Core
2.37	Labelling
2.38	Network Cabinet
2.39	Ethernet Floor EDGE Switches
2.40	Optical Fibre Cable
2.41	Fibre Patch Panels
2.42	Backbone
2.43	Network Management System
2.44	Brochures and Technical Literature
<b>PART 3</b>	
3.00	Technical Specifications for the Access Control System Works
3.01	Extent of Works for Access Control System Installation Works
3.02	The IP Based Intelligent System Controller
3.03	Biometric (Finger) and Proximity Card Reader
3.04	Proximity Card
3.05	Magnetic Door Contacts
3.06	Door Access Controller
3.07	Magnet strip Card
3.08	Door Contacts
3.10	Uninterruptible Power Supply (UPS)
3.13	Access Control Server Controller
3.14	Biometric Clocking Machine
3.15	Under Vehicle Surveillance System
3.15	Brochures and Technical Literature
<b>PART 4</b>	
4.00	Technical Specifications for Computers and Accessories
4.01	Specifications for Desktop Computer
4.02	Specifications for Laptop Computer
4.03	Specifications for Medium Duty Laser Printer
4.04	Specifications for Light Duty UPS

## **PART 1**

### **1.00 PARTICULAR SPECIFICATIONS – IP-CCTV AND ACCESS CONTROL SYSTEMS INSTALLATION WORKS**

#### **1.02 DESCRIPTION OF THE SITE**

The site of the proposed works is located at **Nakuru Town, Nakuru County**.

#### **1.02 DESCRIPTION OF THE PROJECT**

The works comprise the Supply, Installation, Testing and Commissioning and leaving in servicing condition the IP Based Closed Circuit Television Cameras and Access Control Systems in the Proposed County Assembly Chambers for Nakuru County as herein described in the specifications. The works shall include but not limited to the Supply and Installation of the following;

- IP Cameras
- Network Video Recorders
- LED Monitors
- Access Control System
- Cabling of the CCTV & Access Control Systems and all Associated Works

## PART 2

### **2.00 TECHNICAL SPECIFICATIONS FOR THE IP-CCTV CAMERAS SYSTEM**

#### **2.01 EXTENT OF WORKS FOR SECURITY SURVEILLANCE SYSTEM**

The security surveillance system should consider the following.

***IP CCTV Camera.*** The cameras specified should be able to cover the distance with clear pictures. Consider whether there shall be need to support the fixed digital cameras with the Pan, Tilt and Zoom Cameras or not. Highly sensitive areas should be covered with more cameras able to take pictures of any person coming in both from the front and the rear. The resolution of the cameras should be able to give motion pictures that are clear.

***LED Monitors.*** The color monitors must be of high resolution and preferably of plasma screen. The size of the monitor should be big enough to allow the operators make correct deductions both in real time operation and during playbacks.

***IP Network Video Recording.*** The recording multiplexer resolution has to be equally high for the monitor to display with a high resolution.

The IP CCTV Surveillance system should be able to support the following;

- IP based recording system with motion detection.
- Digital zooming into recorded images/ live view
- Multi-level password protection and logging facilities
- Integrates with access control, burglar control, burglar alarms and Fire alarm system and other building management systems as may be specified by the engineer.
- Image compression for remote web live and playback viewing in case of IP.
- Multi display monitors
- Automatic daily archiving to hard drive or optical drive.
- Fully adjustable digital video motion detection with exclusion /inclusion multi regions per camera.
- Efficient video collection, storage and retrieval.
- Advanced and instant search capability
- Digitally signed recordings, with audit trails of all operator actions and system event.
- Storage capacity of the Network Video Recorder. Space to provide at least three months continuous recording and back up for automatic archiving for one year and redundancy
- Infra-red illuminators in poor lighting conditions
- Able to interface with other systems on the ground
- Support IP and PoE connectivity.

## **2.02 WORKING DRAWINGS**

The Contractor shall submit to the Project Manager working drawings for the proposed system for approval. The drawings will show the locations for all cameras, cable routing and terminations, telecommunication outlets/connectors, location of NVR, monitors, core switch and Edge switches.

## **2.03 MINIMUM ALLOWABLE TECHNICAL SPECIFICATIONS FOR THE CCTV SYSTEM**

### **2.03.1 GENERAL SPECIFICATIONS FOR THE CAMERAS**

**The cameras are classified into two main types**

#### **a) Fixed cameras –**

These cameras have a fixed area of view depending on its angle of view and the focal length of the lens used.

They can be used in indoor and outdoor depending on the requirements. When used out door, the cameras are housed in a weather proof housing of IP66. Those used indoor come with different shapes of housings. The exview housings are used for cameras covering long distances like corridors and the dome housings are used for common areas like lobbies, security desks etc.

#### **b) Pan Tilt and Zoom Cameras**

These cameras are only used to support the static cameras. They are useful as they are able to pan 360 degrees, tilt over 90 degrees and zoom into an object for Min 16 times and above.

The cameras shall be indoor type and outdoor type with PoE/ 240V main supply with the appropriate power adaptors, 50Hz field frequency and operating according to the CCIR standard with minimum resolution of 2megapixels.

The camera shall be fixed on sliding rail track on the ceiling slab or walls as directed by the Electrical Engineer with an appropriate bracket.

It shall be possible to control the lens and the pan only head remotely via a remote control box at the control room. The Camera must be able to be controlled by a CCTV keyboard

They shall be linked to the Television Monitors and the Control Equipment through CAT 6 A cables as appropriate and according to the project Engineers instructions.

The mounting height and position of cameras shall be such that the desired coverage shall be achieved as distinctly as possible.

The digital signal processing (DSP) camera shall be aesthetically styled. The DSP chip will enable advanced video processing and manipulation to be carried out in the camera head.

## **2.04 MINIMUM REQUIREMENTS FOR THE PROPOSED CCTV SYSTEM**

The cameras shall have the following minimum specifications but cameras with higher specifications shall be accepted:

### **a) IP Bullet camera**

- 3 Mega Pixel Full HD Outdoor IP Bullet Camera with Infrared
  - Built in Infrared 25 meters minimum
  - imaging sensor – 1/2.8” minimum
  - Wide Dynamic Range – 120dB
  - Motorized Varifocal Auto Iris lens
  - Day and night vision; Minimum illumination 0.08lux (colour), 0lux (B/W) IR on
  - Focal Length – 3~8mm
  - IP network capable
  - PoE capability
  - H.265 video compression
  - Accessible edge storage with 64GB internal MicroSD card slot
  - True day and night vision capability
  - Tampering detection, Face detection, Audio Detection, Motion detection and event triggered alarm processing.
  - Masking Capability,
  - Vandal proof IK-10 rating housing
  - Weather proof IP66 rating
  - ONVIF Compliant
- (State make and type, and enclose catalogues)**

### **b) IP Dome CCTV Camera**

- 3 Mega Pixel Full HD IP Dome Camera with Infrared
  - Built in Infrared 20 meters minimum
  - imaging sensor – 1/2.8” minimum
  - Wide Dynamic Range – 120dB
  - Motorized Varifocal Auto Iris lens
  - Day and night vision; Minimum illumination 0.1lux (colour), 0lux (B/W) IR on
  - Focal Length – 3~8mm
  - IP network capable
  - PoE capability
  - H.265 video compression
  - Accessible edge storage with 64GB internal MicroSD card slot
  - True day and night vision capability
  - Tampering detection, Face detection, Audio Detection, Motion detection and event triggered alarm processing
  - Masking Capability,
  - Vandal proof IK-10 rating housing
  - Weather proof IP66 rating
  - ONVIF Compliant
- (State make and type, and enclose catalogues)**

**c) Mini Dome/Fisheye CCTV Camera**

- 3 Mega Pixel Full HD IP
- imaging sensor – 1/2” minimum
- Wide Dynamic Range – 120dB
- angular field of view of atleast H:180°; V:180°; D:180°
- Day and night vision; Minimum illumination 0.5lux (colour), 0lux (B/W) IR on
- IP network capable
- PoE capability
- H.265 video compression
- Accessible edge storage with 64GB internal MicroSD card slot
- True day and night vision capability
- Tampering detection, Audio Detection, Motion detection and event triggered alarm processing
- Masking Capability,
- Vandal proof IK-10 rating housing
- Weather proof IP66 rating
- ONVIF Compliant

**(State make and type, and enclose catalogues)**

**d) IP Box CCTV Camera**

- 3 Mega Pixel Full HD IP box Camera
- imaging sensor – 1/2.8” minimum
- Wide Dynamic Range – 120dB
- Auto Iris lens
- Day and night vision; Minimum illumination 0.1lux (colour), 0lux (B/W) IR on
- Focal Length – 3~8mm
- IP network capable
- PoE capability
- H.265 video compression
- Accessible edge storage with 64GB internal MicroSD card slot
- True day and night vision capability
- Tampering detection, Face detection, Audio Detection, Motion detection and event triggered alarm processing
- Masking Capability,
- Vandal proof IK-10 rating housing
- Weather proof IP66 rating
- ONVIF Compliant

**(State make and type, and enclose catalogues)**

**e) IP PTZ CCTV Camera**

- 3 Mega Pixel Full HD IP Dome Camera with Infrared
- Built in Infrared 100 meters minimum
- imaging sensor – 1/2.8” minimum
- Wide Dynamic Range – 120dB
- Varifocal Auto Iris lens
- Minimum Adjustable digital zoom 16x, optical zoom 32x
- Day and night vision; Minimum illumination 0.1lux (colour), 0lux (B/W) IR on
- Focal Length – 4.5~130mm
- IP network capable

- PoE capability
- H.265 video compression
- Accessible edge storage with 64GB internal MicroSD card slot
- True day and night vision capability
- Tampering detection, Face detection, Audio Detection, Motion detection and event triggered alarm processing
- Masking Capability,
- Vandal proof IK-10 rating housing
- Weather proof IP66 rating
- Heater, Blower and Defog
- Auto tracking
- ONVIF Compliant

**(State make and type, and enclose catalogues)**

## **2.05 MOUNTING BRACKETS**

The Brackets shall:

Be suitable for wall or ceiling mounting of a single camera.

Be at least 5.5"length

Have an auto lock facility.

## **2.06 CAMERA HOUSING**

The camera housing shall:

Be IP66 rated with integral cable management.

Be Weatherproof and constructed from aluminium with epoxy coating.

## **2.07 COLOR VIDEO MONITORS**

The monitor should be capable of providing high levels of picture quality 10MHz bars visible at low brightness and reliability stable synchronization, black level clamping, low sensitivity and high stability.

The monitors shall be high performance color video monitors for monitoring scenes from the above cameras and viewing playback scenes from the video cassette recorders. The monitors shall be located at places to be shown on site by the project manager.

The monitor shall give stable and interference free pictures of scenes being viewed. It shall also conform to the following specifications:

Type:	LED; 50,000hours panel life
System:	NTSC/PAL
Screen Size:	52"
Resolution:	1,920 x 1,080
Display Colour:	16.0 million
Brightness:	350cd/m <sup>2</sup>
Contrast Ratio:	5,000:1
Video input signal:	1.0 V pk-pk
Power consumption:	Not more than 80W
Power input:	240V, 50HZ
Interface:	VGA, DVI, HDMI, RGB, Audio, Video

**(State make and type, and enclose catalogues)**

## 2.08 NETWORK VIDEO RECORDER

The network video recorder shall have the following minimum requirements:

- 32/16 Channels
- Throughput of at least 400Mbps
- Gigabit Ethernet connection
- Multi screen Display: Full/4/9/16 way or as appropriate.
- Storage of 32TB minimum capacity
- external storage support capability
- VGA/HDMI local monitor
- Redundant hot swap power supply
- Network management/viewer software
- In built intelligent video analysis
- H.265,MPEG,MJPEG Compression
- ONVIF compatibility
- Web viewer supported
- PoE enabled
- Smart Video Search Feature for streamlined Investigations
- Recording resolution of 5MP
- IP address filtering, user access log, authentication and encryption
- Auto Launch of Video on specified Alarms/Events
- LED status indicator
- CE,UL certification

(State make and type, and enclose catalogues)

## 2.09 CCTV MANAGEMENT SOFTWARE

CCTV management software with the following minimum specifications: -

- Event Recording Scheme
  - Operate Motion-Detector-Recording
  - NTSC-PAL video recording.
  - Be capable of recording real time images at full resolution and frames rate.
  - Features for connection for alarm system Automatic Recycling
  - Users' passwords.
  - Input, Output, Audio Alert Facilities
  - Remote Viewing Facilities, TCP/IP, INTERNET, ISDN, modem
  - Capability of streaming into the client's existing LAN / WAN infrastructure
  - Ability to quickly search through thousands of hours of recorded video information
  - Event-triggered video recording to reduce storage requirements
  - Masks out disturbing areas, or areas of no interest, within the specified region
  - Identifies & immediately alerts user to potential security breaches
  - Features should be able to be used at very low frame rates
  - Easy calibration for specific applications
  - Color-matching matches user-specified colour to the video image
  - Functions in outside environments with changing light conditions:
    - Auto-learning of background feature
    - Object saliency and object Consistency mechanisms to filter out phantom objects
    - "Out of Focus" condition is user-calibrated by level of focus
  - Automatic self-test of camera validity
  - Motion Trajectory Analyzer provides advanced analysis of the motion of objects
  - Seamless integration into Enterprise security knowledge management solution.
  - Analysis of stationary objects
- (State make and type, and enclose catalogues)**

## 2.10 UNINTERRUPTIBLE POWER SUPPLY (UPS)

This shall be an on-line Un-interruptible power supply with output rating able to provide power to the security surveillance system a minimum of 8 hours in case of power failure.

It shall be microprocessor- based so that both output voltage and frequency are closely regulated and continuously monitored and also provide system diagnostic and shut down protection functions. It shall feature a maintenance by-pass to enable normal routine maintenance operations to be performed without interruptions to the system.

It shall be fitted with both visual and audible alarms to indicate any change in equipment status such as:

input power problems

ups faults

ups overload

battery discharging

**Other parameters are:**

Input supply:	240VAC50HZ
Power factor:	0.8 lag at full load
Current limit:	125% of the normal
Output voltage:	240V AC 50 HZ
Output voltage tolerance:	2%
Output frequency tolerance:	0.05%

**(State make and type, and enclose catalogues)**

**2.11 CABLING**

- a. All cables must pass through conduits or trunking.
- b. All cables and connectors shall be labeled.
- c. No distortion due to kinks, sharp bends or excessive hauling tension shall be allowed.
- d. Cables shall be run in a manner eliminating any possibility of strain on the cable itself or on the terminations.
- e. Cables shall have no joints or splices.
- f. Cables shall be kept at a minimum distance of 150mm from items liable to become hot or cold.
- g. Bending radii shall be not less than eight times the overall cable diameter.
- h. The manufacturers hauling tension shall not be exceeded.
- i. All cable ties and fixings shall be tightened to support the cable loom without distortion of the cable sheath.
- j. The UTP 4 pair shall be of Solid copper, 24 AWG, 100  $\Omega$  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. Cat 6A Structured Cabling shall be used throughout the entire installation.

**(State make and type, and enclose catalogues)**

**2.12 PATCH PANELS**

- a) Shall conform to ANSI/TIA/EIA-568A and rack mounted.
- b) Shall be equipped with RJ45 contacts of Cat 6 sockets with capacity of 12, 24 or 48 ports.
- c) Shall be earthed.
- d) Except for patch cords used to connect NICs to the RJ45 sockets, all patch cords shall be labeled at each extremity with PVC support and intelligible marking. For other components the label shall be of stiff plastic PVC type.

**(State make and type, and enclose catalogues)**

**2.13 ACTIVE NETWORK CONTROL EQUIPMENT AT THE NETWORK CORE**

- The active control equipment at the core should have the following features:
- a. Backplane/switch fabric Bandwidth Capacity of 150 GBPS or more.
  - b. IEEE 802.3 compliant for power over Ethernet
  - c. IEEE 802.1 based security compliant

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

**(State make and type, and enclose catalogues)**

#### **2.14 LABELING**

- a) Horizontal and backbone cables shall be labeled at each end. The cable or its label shall be marked with its identifier.
- b) A unique identifier shall be marked on each faceplate to identify it as connecting hardware.
- c) Each port on the face plate shall be labeled with its identifier.
- d) A unique identifier shall be marked on each piece of connecting hardware to identify it as a connecting hardware.
- e) Each port on the connecting hardware shall be labeled with its identifier.
- f) A unique identifier shall be marked on each **port** on the connecting faceplate to identify it as a connecting hardware.

#### **2.15 NETWORK CABINET**

- a) The cabinet shall be metallic with front clear glass and of good finish and conveniently accessible by technical personnel for maintenance. The main cabinet shall be at least 42U and other cabinets housing edge switch should be at least 22U
- b) Power to the cabinet shall be switched off from within the cabinets. Proper power socket cables to be supplied with the cabinet.
- c) The cabinet for active devices shall conform to ANSI/TIA/EIA-568A specifications with forced cooling.
- e) Support small factor pluggable (SFP) and industry leading density up to 240 of IEEE 8033 for 1000 Base-SX ports per system.
- c) Cabinets shall have adequate room for additional components typically 3U free space.

**(State make and type, and enclose catalogues)**

### **3.00 TECHNICAL SPECIFICATIONS FOR THE ACCESS CONTROL SYSTEM**

#### **3.01 EXTENT OF WORKS FOR ACCESS CONTROL SYSTEM**

The main components of an access control system are:

- a) Intelligent System Controller and Server
- b) The proximity card reader
- c) The proximity cards
- d) The magnetic locks
- e) Biometric readers

#### **3.02 THE IP BASED INTELLIGENT SYSTEM CONTROLLER**

The controller is the main item for control access system.

The controller shall have a built in power supply, with a battery back up facility and sufficient power to drive the number of doors with access control.

The control should be able to provide time zoning, extensive door monitoring, logging of all events and hardware alarms – output.

User's parameters shall be done locally in the stand alone via a portable and easy to use compact programme using the English Languages Software.

The controller should be able to use the proximity cards, biometric readers or the magnetically encoded keys as identifiers as specified by the engineer.

It shall have the following features;

- Bi- processor Central Processing Unit
- With lead battery back-up with four (4 hrs.) hours autonomy in case of network failure.
- Autonomous clock/calendar chip with automatic management of regular/daylight saving time with autonomy of one hour.
- Management of peer to peer connection with other servers and as a consequence a high decision making capability and full operative autonomy.
- Up to 2500 transactions stored on a removable cartridge with a flash EPROM memory.
- The controller shall be capable of controlling 1No.(one) or 2 No.(two) doors in a stand – alone mode and shall have IP based access functionality.
- Should Have TCP/IP RS485 communication compatibility
- The controller shall have a built in power supply, with a battery backup facility and sufficient power to drive two locks.
- Minimum 4-relays output, 4 readers interface support and Wiegand reader support
- 8 input port for door open sensor monitoring and exit button and minimum 2 user defined input port for link with alarm system.
- 12C Bus Expansion Slot

- In built surge protection
- Control software with access to alarm monitoring, time zones, supervision, activity reports etc.
- The control should be able to provide time zoning, extensive door monitoring, logging of all events and hardware alarms – output, and also real time monitoring.
- Users parameters shall be done locally in the stand alone via a portable and easy to use compact programme using the English Languages Software.
- The controller should be able to use the magstripe cards or the magnetically encoded keys as identifiers.
- The card readers shall have a Pin-pad.
- The power for the reader and for the electric lock shall be supplied via the controller.
- **MUST** have a staff attendance Management System capability.

The server as specified by the Engineer should be able to store the transactions for a minimum of two months. The speed of the server to be such that the programming and communication between the card readers and other interface units is fast.

### 3.03 **BIOMETRIC (FINGER AND RFID) AND PROXIMITY CARD READER**

- Shall have biometric state of the art finger print reader.
- Be Bi-directional and meets requirements for HID Proximity cards (standard ISO/ABA 125 KHz, up to 4cm of distance).
- Have Alphanumeric Liquid Crystal Display (LCD), back lit, with two lines of 16 characters each, for the visualization of time data, guide messages for the user, and service messages.
- Should have 2 multicolor LED: Green for the access granted, Red for invalid transaction, Yellow for Echelon Service function.
- Variable Tones for valid/invalid transactions.
- Have a USB Port, RS-485 communication interface, contactless read/write smart card technology Lon Works cabling Interface should be done using unshielded twisted pair cable in free topology. (Transceiver FTT10A, 78Kbps).
- Meets IP31 level of protection.
- At least 1000 fingerprint user capacity.
- At least 1000 valid cards capacity.
- It should be able rated to operate within 0°C ÷ +50°C temperature range.
- It should be rated to operate up to a relative humidity 95% without condensation or as otherwise specified by the engineer for special cases.
- Must meet all laid down international Electromagnetic Compatibility standards.

### **3.04 PROXIMITY/MAGESTRIPS CARD**

The cards shall be of a type and that can accommodate a customer logo, photographs and text should they be required and they shall have a high coercively magnetic strip.

### **3.05 MAGNETIC DOOR CONTACTS**

They shall be of the magnetic reed switch and with appropriate magnet able to handle at least a minimum of 200KN and also of the normally open type

### **3.06 DOOR ACCESS CONTROLLER**

The controller shall be capable of controlling 1No.(one) or 2 No.(two) doors in a stand – alone mode.

The controller shall have a built in power supply, with a battery back up facility and sufficient power to drive two locks.

The control should be able to provide time zoning, extensive door monitoring, logging of all events and hardware alarms – output.

Users parameters shall be done locally in the stand alone via a portable and easy to use compact programme using the English Languages Software.

The controller should be able to use the magstripe cards or the magnetically encoded keys as identifiers.

The card readers shall have a Pin-pad.

The power for the reader and for the electric lock shall be supplied via the controller.

### **3.07 MAGESTRIPS CARD**

The cards shall be of a type that can accommodate a customer logo, photographs and text should they be required and they shall have a high coercivity magnetic strip.

### **3.08 DOOR CONTACTS**

They shall be of the magnetic reed switch and the appropriate magnet and also of the normally open type.

### **3.09 UNINTERRUPTIBLE POWER SUPPLY (UPS)**

This shall be an on-line Un-interruptible power supply with output rating able to provide power to the security surveillance system and controlled access system for a minimum of 8 hours in case of power failure.

It shall be microprocessor- based so that both output voltage and frequency are closely regulated and continuously monitored and also provide system diagnostic and shut down protection functions.

It shall feature a maintenance by-pass to enable normal routine maintenance operations to be performed without interruptions to the system.

It shall be fitted with both visual and audible alarms to indicate any change in equipment status such as:

- input power problems
- ups faults
- ups overload
- battery discharging

Other parameters are:

Input supply:	240VAC50HZ
Power factor:	0.7 lag at full load
Current limit:	125% of the normal
Output voltage:	240V AC 50 HZ
Output voltage tolerance:	2%
Output frequency tolerance:	0.05%

### **3.10 ACCESS CONTROL SERVER CONTROLLER**

- a) Bi-processor CPU68EN302, including a Motorola 68000 (32 Bit architecture) and Ethernet communication processor.
- b) 1 MByte FLASH to download the application firmware.
- c) MByte FLASH EPROM on a removable cartridge for the download of the permanent database and for the transit and events buffer. Optional memory with 8 Mbytes Flash Memory Available.
- d) 1MByte RAM for the activity.
- e) Management of up to 12 Temakeys terminals
- f) Management of up to 64 I/O
- g) Up to 10,000 cards and 2,500 transactions stored on a removable cartridge with flash EPROM memory.
- h) Management of peer to peer connection with the other tema server and as a consequence high decision making capability and full operative autonomy.
- i) Autonomous clock/calendar chip with automatic management of regular /daylight saving time with autonomy of 1.000 hrs in case of power failure.
- j) Lead battery backup with full functionality for 4 hours in case of network failure and signaling o the battery status.

### **3.11 UNDER VEHICLE SURVEILLANCE SYSTEM**

The system should have the following minimum features:

- Ingress Protection – IP68
- Vertical resolution of the image – 10000\*5340 pixels
- Speed of vehicle – 1-30km/h
- Camera – intelligent colour progressive line rapid scan CCD imaging
- Weight capacity – less than or equal to 50 tonnes
- Scanning device volume - 1200x350x210mm
- Scanning device weight- 180Kg
- Power Supply: 240V, 50Hz
- Effective field of view – less than 170 Degrees
- Auxiliary light- 150W
- Communication – RJ45/RS485
- Operating temperature: negative 20 to 60 Degrees Celsius
- Scanning mode – linear scan, triggered by loop detector
- CPU - Intel core2 duo 2.4GHz or higher
- Memory- not less than 4GB
- Storage – not less than 500GB
- Monitor – 22”, Resolution 1920x1080
- Boom barrier – not less than 4.5M
- UPS
- Gigabit Switch
- 8 Channel Network Video Recorder
- High immunity to both electrical and mechanical interference
- Easy maintenance
- Should be harmless to: pacemakers, life support systems, pregnant women and magnetic storage media.

### 3.12 WALK THROUGH METAL DETECTOR

The walk through metal detector should have the following minimum features:

- Multi-zone panel version
  - Passage way internal size 760x2030x580mm(WxHxD)
  - Detection Zones: Atleast 33No.Zones
  - Power Supply: 240V, 50Hz
  - Adjustable sensitivity with range settings
  - Programmable operation
  - Programming access protected by mechanical lock and passwords
  - High immunity to both electrical and mechanical interference
  - Easy maintenance
  - Control unit incorporated in the detector
  - High intensity display using green and red signals
  - High intensity audible alarm signal with programmable volume/tone
  - Signal to be proportional to the mass of the object detected
  - Facility for networking via built-in keypad and RDU or RS232/ RS485 serial connection
  - Multi-zone display bar for height of person localization
  - Should be harmless to: pacemakers, life support systems, pregnant women, magnetic storage media.
  - Photo transit counter
  - Emergency batteries for 6.5 hours' independent operation capability
  - Constructed of heavy duty materials for extremely durable and tamper proof operation.
  - Conform to FAA, (3-GUN-Test), NILECJ-0601-00 standards for all security levels, EC regulations, all international standards relating to electrical safety.
- K4 Rated, Entry and Exit built-in hydraulic, automatic retractable bollard 250mm dia x1000mm high (above ground) cylinder, high security steel 20mm thickness + red LED ring,

**SECTION G**

**SCHEDULE OF UNIT RATES**

## SCHEDULE OF UNIT RATES

1. The tenderer shall insert unit rates against the items in the following schedules and may add such other items as he considers appropriate.
2. The unit rates shall include for supply, transport, insurance, delivery to site, storage as necessary, assembling, cleaning, installing, connecting, profit and maintenance in defects liability and any other obligation under this contract.
3. The unit rates will be used to assess the value of additions or omissions arising from authorised variations to the contract works.
4. Where trade names or manufacturer's catalogue numbers are mentioned in the specification, the reference is intended as a guide to the type of article or quality of material required. Alternative brands of **equal** and **approved** quality will be accepted.
5. The prices quoted shall be deemed to include for all obligations under the sub-contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (including **16% V.A.T and all other taxes applicable at the time of tender**).

**SCHEDULE OF UNIT RATES**

(To be completed by the Tenderer)

NO	DESCRIPTION	QTY	UNIT	RATE	
				KSHS	CTS
1.	Multi- channel wireless microphone	1	No.		
2.	Light weight headphones	1	No.		
3.	Trunk cable splitter	1	No.		
4.	Tap off unit	1	No.		
5.	Handheld microphone	1	No.		
6.	Goose neck microphone	1	No.		
7.	Extension cable 100M	100	LM		
8.	Installation cable, 100M	100	LM		
9.	Network Video Server	1	No.		
11.	Column speakers	4	No.		
12.	10KVA Uninterrupted Power Supply	1	No.		
13.	42U metal cabinet	1	No.		
14.	Extension cards	1	No.		
15.	Cat 6e 4pair 24 AWG, UTP, 10 ohm cable	1	No.		
16.	Digital Control Unit 200 delegates	1	Lm		



**SECTION H**

**BILLS OF QUANTITIES**

## BILLS OF QUANTITIES

### A) PRICING OF PRELIMINARIES ITEMS

Prices will be inserted against item of preliminaries in the Contractor's Bills of Quantities and specification. These Bills are designated as Bill No.1 in this Section. Where the Contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections:

#### (a) Preliminaries – Bill No.1

Contractor's preliminaries are as per those described in section C Sub- Contract Preliminaries and General Conditions of Contract. The Contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

#### (b) Installation Items – Other Bills

- (i) The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
- (ii) The unit of measurements and observations are as per those described in clause 1.0 5 of the section C.

#### (c) Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The Contractor shall insert his totals and enter his grand total tender sum in the space provided below the summary. This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document.

## SPECIAL NOTES TO THE BILLS OF QUANTITIES

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

In accordance with Government policy, the 16% V.A.T and 3% withholding Tax **shall be deducted** from all payments made to the tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA)**.

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

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

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender to be deemed valid**.
6. Tenderers must enclose, together with their submitted tenders, detailed coloured manufacturer's Brochures detailing Technical Literature and specifications on all the equipment they intend to offer e.g. Standby Battery and UPS, Data Switches and Routers etc.

The brochures are to be used to ascertain the suitability of the **ACTIVE** electronic components, PABX, Telephone Instruments and Standby Battery being offered by the bidders. Bidders not complying with this requirement shall be considered technically non-responsive and may subsequently be disqualified.

**HANSARD SYSTEM, AUDIO-VISUAL AND STRUCTURED CABLING INSTALLATION WORKS**

**BILL NO. 1 : SUB-CONTRACT PRELIMINARIES**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
1.00	Discrepancies clause 1.02				
2.00	Conditions of Sub-Contract Agreement clause 1.03				
3.00	Payments clause 1.04				
4.00	Site Location clause 1.06				
5.00	Scope of Contract Works clause 1.08				
6.00	Extent of the Contractor's Duties clause 1.09				
7.00	Firm Price Contract clause 1.12				
8.00	Variation clause 1.13				
9.00	Prime Cost and Provisional Sum clause 3.14 (insert Profit and Attendance which is a percentage of expended PC or Provisional Sum.)				
10.00	Bond clause 1.15				
11.00	Government Legislation and Regulations clause 1.16				
12.00	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only. VAT will also be paid by the contractor as allowed in the summary page)				
13.00	Insurance Company Fees clause 1.18				
14.00	Provision of Services by the Main Contractor clause 1.19				
15.00	Samples and Materials Generally clause 1.21				
16.00	Supplies clause 1.20				
17.00	Bills of Quantities clause 1.23				
18.00	Contractor's Office in Kenya clause 1.24				
19.00	Builder's Work clause 1.25				
20.00	Setting to Work and Regulating System clause 1.29				
21.00	Identification of Plant Components clause 1.30				
<b>Sub-Total C/F to Next Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
22.00	Working Drawings clause 1.32				
23.00	Record Drawings(As Installed) and Instructions clause 1.33				
24.00	Maintenance Manual clause 1.34				
25.00	Hand Over clause 1.35				
26.00	Painting clause 1.36				
27.00	Testing and Inspection – Manufactured Plant clause 1.38				
28.00	Testing and Inspection – Installation clause 1.39				
29.00	Storage of Materials clause 1.41				
30.00	Initial Maintenance clause 1.42				
31.00	Local and other Authorities Notices and Fees clause 1.60				
32.00	Temporary Works clause 1.63				
33.00	Patent Rights clause 1.64				
34.00	Mobilization and Demobilization Clause 1.65				
35.00	Supervision by Engineer and Site Meetings Clause 1.67				
36.00	Allow for Taxes, Profit and Attendance for the above Item 35.00				
37.00	Amendment to Scope of Sub-contract Works clause 1.68				
38.00	Contractor Obligation and Employer's Obligation clause 1.69				
<b>Total for Bill No. 1: Sub-Contract Preliminaries C/F to Main Summary Page</b>					

**BILL NO. 2 - CONFERENCING & PUBLIC ADDRESS SYSTEM**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install &amp; program, test and commission the following:</b>				
A	Digital Conference Central Unit with capacity to support upto 120 discussion units c/w power supply unit as described in particular specifications	1	No.		
B	Network extender as as described in particular specifications	2	No.		
C	Audio networking card	1	No.		
D	Interpretation desk as described in particular specifications	1	No.		
E	Interpretator headphone as described in particular specifications	2	No.		
F	Soft earpads & hard earshells (bag of 20 each)	1	Item		
G	YPC/20 Cable(20m)	5	No.		
H	Wired Chairman Unit with voting (Yes/No/ Abstain) options c/w accessories as described in particular specifications	2	No.		
I	Wired Delegate Unit with voting (Yes/No/ Abstain) options c/w all accessories as described in particular specifications	104	No.		
J	Gooseneck (50cm) Microphone as described in particular specifications	104	No.		
K	ICC5/20 Cable(20m)	150	No.		
L	ICC5/5 Cable(5m)	20	No.		
M	ICC5/2-Cable(2m)	104	No.		
N	Wireless access point as described in particular specifications	1	No.		
O	10.5" Display, 256GB Storage, 2GB RAM, WiFi & Cellurar enabled tablet complete with all necessary software and pre-requisite licences for operation of an e-parliament system as described in particular specifications	104	No.		
P	Adjustable tabletop holder for the tablet	104	No.		
Q	Video input box (with HDMI input)	1	No.		
R	Video output box (with HDMI input)	1	No.		
S	loudspeakers or approved equivalent as described in particular specifications	7	No.		
T	Stereo Amplifier as described in particular specifications	1	No.		
U	12 Channel Mixer as described in particular specifications	1	No.		
V	UHF Wireless Microphone as described in particular specifications	2	No.		
<b>Sub-Total C/F to Next Page</b>					

**BILL NO. 2 - CONFERENCING & PUBLIC ADDRESS SYSTEM CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	UHF Wireless tuner/receiver (Frequency range 822-866 Mhz as described in the particular specification section of this document	1	No.		
B	Floor microphone stand with folding base as described in particular specifications	2	No.		
C	Table Top Microphone Stand	2	No.		
D	Conference Software Modules for Discussion, Message Distribution, Microphone Management, Voting, Mic Logging, Attendance and Access, Delegate Database, Documentation, interpretation, data import/export, video routing, including pre-requisite licences as described in particular specifications.	1	Lot		
E	Desktop PC with 21" LED screen, core i-7/Conference Management or approved equivalent as described in particular specifications	1	No.		
F	AV Room Controller	1	No.		
G	HD PTZ Cameras for Image & Video Capture & Tracking as described in the particular specification of this document	4	No.		
H	NVR Recorder (16 Channel)	1	No.		
I	52" TV Monitor (industrial type) complete with brackets as described in particular specifications	5	No.		
J	Cabling, Cords and Jacks	1	Item		
K	Equipment Racks of adequate Size to house the recorders, UPS any other devices as necessary	1	No.		
L	5KVA Smart Rackmount UPS as described in particular specifications	1	No.		
M	100mm x 200mm, a dot matrix alpha-numeric hall display with an in-built power supply unit as described in particular specifications	1	No.		
N	Custom built suitcase for equipment transportation as described in particular specifications	1	No.		
P	Allow for 100% Maintenance and Support of the installed system for the first one year after expiry of defects liability period	1	Item		
Q	Any other item recommended by tenderer to make the installation complete and functional:- i) ii) iii) iv)	1	Item		
<b>Total for Bill No. 2: Conferencing &amp; Public Address System C/F to Main Summary Page</b>					

**BILL NO.3 - HANSARD RECORDING AND TRANSCRIPTION SYSTEM**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install &amp; program, test and commission the following:</b>				
A	Meeting Recorder Transcription ,Foot pedal, Headset and cables	1	No.		
B	Desktop PC with 21" LED screen, i-7/Hansard Reporter box as described in particular specifications	1	No.		
C	Hansard/Meeting Recorder Software	1	No.		
D	Meeting recorder transcription module	1	No.		
E	64TB Server Unit for storage of recordings as described in particular specifications	1	No.		
F	64TB external harddisk for backup	1	No.		
G	3000 continous hours portable audio digital recorder	1	No.		
H	CDR Digital Audio Recorder	1	No.		
I	Equipment Racks of adequate Size to house the recorders, UPS any other devices as necessary	1	No.		
J	3KVA Smart Rackmount UPS	1	No.		
K	Cabling, cords and Jacks	1	Item		
L	Any other item recommended by Tenderer to make the installation complete and functional:- i) ii) iii) iv)	1	Item		
<b>Total for Bill No. 3: Hansard Recording &amp; Transcription System C/F to Main Summary Page</b>					

**BILL NO. 4: AUDIO VISUAL INSTALLATION WORKS**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, test and commission the following:</b>				
A	Long Throw Digital LED Multimedia Projector with 3000 Luminous Efficiency - Max 160" Screen Optical Keystone USB/AV/SD/HDMI/VGA Interface 3000 Lumens Digital Projector complete with , remote adjustable lence, VGA,HDMI, LAN for Boardroom & Committee room as described in the particular specifications complete with the necessary accessories as described in the particular specification of this document	1	No.		
B	Electric ceiling mount retractable projector lift for item A above for Boardroom & Committee rooms	1	No.		
C	Supply and Install Elite Screens Spectrum, 96-inch 16:9, 4K Theater Electric Motorized Drop Down Projection Projector Screen, as described in the particular specification of this document	1	No.		
D	LCD Projector 6000 Lumens	1	No.		
E	Projector Lift	1	No.		
F	Supply and Install Elite Screens Spectrum,120-inch 16:9, 4K Theater Electric Motorized Drop Down Projection Projector Screen, as described in the particular specification of this document	1	No.		
G	Dual Pop-Up Table Mount Multi-Connection Unit (Black Anodized Aluminum Top)	3	No.		
H	AV Presentation Switcher/Scaler or approved equivalent	1	No.		
I	Medium laser presenter pointer	2	No.		
J	Interactive white board (3' x 4' screen) with stand	1	No.		
K	3KVA Smart Rackmount UPS	1	No.		
L	VGA/Computer cables	200	Lm		
M	Equipment Racks of adequate Size to house the recorders and any other devices as necessary	1	No.		
<b>Sub-Total C/F to Next Page</b>					

**BILL NO. 4: AUDIO VISUAL INSTALLATION WORKS CONTINUED**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	Digital Audio Recorder	1	No.		
B	Ceiling loud speakers as described in the particular specifications to be installed in restaurant & boardroom	12	No		
C	Active public address outdoor loudspeaker system as described in the particular specifications section of this document complete with stands.	2	No.		
D	Hand held Transmitters (Dynamic Cardioids ) frequency range 822 – 866Mhz as described in the particular specification section of this document	2	No.		
E	UHF Wireless tuner/receiver (Frequency range 822-866 Mhz as described in the particular specification section of this document	3	No.		
F	12-Channel Stereo Audio Mixer amplifier as described in the particular specification of this document	2	No.		
H	Floor microphone stand with folding base	1	No.		
I	Cabling, Cords and Jacks	1	Item		
J	Any other items necessary to complete the installation satisfactorily. Please list and give quantity of the items	1	Item		
	i)				
	ii)				
	iii)				
	iv)				
<b>Total for Bill No. 4: Audio Visual Installation Works C/F to Main Summary Page</b>					

**BILL NO. 5: STRUCTURED CABLING INSTALLATION WORKS**

**SCHEDULE NO. 1: BASEMENT FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test and Commission the following :-</b> <b><u>HORIZONTAL CABLING</u></b>				
A	Cat 6A, UTP 4-pair cable pulled between cabinet and outlet plates.	310	Lm.		
B	3M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords for use at workstation area for data outlets.	6	No.		
C	3M, RJ45-RJ11 factory terminated patch cords between Data outlet and Telephone handsets.	2	No.		
D	1M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords to be used in cabinet.	8	No.		
E	RJ45 Cat 6A, UTP (Dual) Data and Voice outlets complete with faceplates and labelling system.	4	No.		
F	IDC (Insulation displacement connectors) - 1M, S110-RJ45 Cat 6A, UTP factory terminated patch cords Jacks to be used in cabinet.	2	No.		
G	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
<b>Basement Floor's Total C/F to Collection Page</b>					

**SCHEDULE NO. 2: GROUND FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test and Commission the following :-</b>				
	<b><u>HORIZONTAL CABLING</u></b>				
A	Cat 6A, UTP 4-pair cable pulled between cabinet and outlet plates.	1810	Lm.		
B	3M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords for use at workstation area for data outlets.	66	No.		
C	3M, RJ45-RJ11 factory terminated patch cords between Data outlet and Telephone handsets.	6	No.		
D	1M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords to be used in cabinet.	72	No.		
E	RJ45 Cat 6A, UTP (Dual) Data and Voice outlets complete with faceplates and labelling system.	36	No.		
F	IDC (Insulation displacement connectors) - 1M, S110-RJ45 Cat 6A, UTP factory terminated patch cords Jacks to be used in cabinet.	6	No.		
G	IDC voice termination kit.	1	No.		
	<b><u>BACKBONE CABLING FOR GROUND FLOOR AND GENERAL REQUIREMENTS</u></b>				
H	1000BASE X 8-Core Outdoor Fibre Optic Cable as data backbone to Server Room complete with connectors and all terminations to active components.	125	Lm.		
I	24 Port Fibre Optic Patch Panel	3	No.		
J	1000Base-SX Multicore SFP fibre modules	3	No.		
K	Dual Fibre optic patch leads.	6	No.		
L	Cable Ties and Self Adhesive Labels for Cable Labelling (Packets of 200 Labels each)	1	Item		
M	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
<b>Sub-Total C/F to Next Page</b>					

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>CABINETS</u></b>				
A	12U Free standing equipment and server cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet).	2	No.		
B	48 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination.	1	No.		
C	24 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination.	1	No.		
D	2U Cable Manager/Organizers.	6	No.		
	<b><u>ACTIVE COMPONENTS</u></b>				
E	48 Port Edge Switch as Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	1	No.		
F	24 Port Edge Switch Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	1	No.		
G	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 to cover 25M radius complete with antennae, power adaptor and all accessories as described in the particular specifications.	2	No.		
H	240V, 50Hz, 1500VA, Rack Mountable Smart-UPSU un-interupted Power Supply unit (UPS) with USB and Serial Port as described in the particular specifications.	2	No.		
I	Grounding and bounding kit complete with 50mm diameter copper bounding bar and 6mm thick green and yellow wire. The Earthing of the system is to be to the approval of the Engineer.	1	Lot		
<b>Ground Floor's Total C/F to Collection Page</b>					

**SCHEDULE NO. 3: FIRST FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test and Commission the following :-</b>				
	<b><u>HORIZONTAL CABLING</u></b>				
A	Cat 6A, UTP 4-pair cable pulled between cabinet and outlet plates.	1350	Lm.		
B	3M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords for use at workstation area for data outlets.	33	No.		
C	3M, RJ45-RJ11 factory terminated patch cords between Data outlet and Telephone handsets.	7	No.		
D	1M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords to be used in cabinet.	48	No.		
E	RJ45 Cat 6A, UTP (Dual) Data and Voice outlets complete with faceplates and labelling system.	24	No.		
F	IDC (Insulation displacement connectors) - 1M, S110-RJ45 Cat 6A, UTP factory terminated patch cords Jacks to be used in cabinet.	7	No.		
G	IDC voice termination kit.	2	No.		
	<b><u>BACKBONE CABLING FOR FIRST FLOOR AND GENERAL REQUIREMENTS</u></b>				
H	1000BASE X 8-Core Outdoor Fibre Optic Cable as data backbone to Server Room complete with connectors and all terminations to active components.	40	Lm.		
I	24 Port Fibre Optic Patch Panel.	2	No.		
J	1000Base-SX Multicore SFP fibre modules.	2	No.		
K	Dual Fibre optic patch leads.	4	No.		
L	Cable Ties and Self Adhesive Labels for Cable Labelling (Packets of 200 Labels each)	1	Item		
M	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
	<b>Sub-Total C/F to Next Page</b>				

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>CABINETS</u></b>				
A	42U Free standing equipment and server cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet) as described in the particular specifications.	1	No.		
B	24 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination as described in the particular specifications.	3	No.		
C	2U Cable Manager/Organizers.	9	No.		
	<b><u>ACTIVE COMPONENTS</u></b>				
D	Backbone Core Switch complete with the chassis, power supply unit, virtual supervisor engine with 10Gigabit Ethernet uplinks, Modular switches, chassis cable management system, high speed fan tray, rack, power supply redundancy and all accessories and as described in the particular specifications	1	No.		
E	24 Port Edge Switch Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	1	No.		
F	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 to cover at least 25M radius complete with antennae, power adaptor and all accessories or an approved equivalent as described in the particular specifications.	2	No.		
G	240V, 50Hz, 3000VA, Rack Mountable Smart-UPS) Un-interrupted Power Supply unit (UPS) with USB and Serial Port or an approved equivalent as described in the particular specifications.	1	No.		
H	Grounding and bounding kit complete with 50mm diameter copper bounding bar and 6mm thick green and yellow wire. The Earthing of the system is to be to the approval of the Engineer.	1	Lot		
I	Supply and install all the necessary splicing kits to terminate the fiber cable between the existing building and the new block.	Lot	1		
J	Supply and install splicing kits for terminating the fiber cable to the different switches	No	4		
	<b>First Floor's Total C/F to Collection Page</b>				

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Test and Commission the following :-</b>				
	<b><u>HORIZONTAL CABLING</u></b>				
A	Cat 6A, UTP 4-pair cable pulled between cabinet and outlet plates.	1250	Lm.		
B	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.	41	No.		
C	3M, RJ45-RJ11 factory terminated patch cords between Data outlet and Telephone handsets.	7	No.		
D	1M, RJ45-RJ45 Cat 6A, UTP factory terminated patch cords to be used in cabinet.	48	No.		
E	RJ45 Cat 6A, UTP (Dual) Data and Voice outlets complete with faceplates and labelling system.	24	No.		
F	IDC (Insulation displacement connectors) - 1M, S110-RJ45 Cat 6A, UTP factory terminated patch cords Jacks to be used in cabinet.	7	No.		
G	IDC voice termination kit.	2	No.		
	<b><u>BACKBONE CABLING FOR SECOND FLOOR AND GENERAL REQUIREMENTS</u></b>				
H	1000BASE X 8-Core Outdoor Fibre Optic Cable as data backbone to Server Room complete with connectors and all terminations to active components.	40	Lm.		
I	24 Port Fibre Optic Patch Panel.	2	No.		
J	1000Base-SX Multicore SFP fibre modules.	2	No.		
K	Dual Fibre optic patch leads.	4	No.		
L	Cable Ties and Self Adhesive Labels for Cable Labelling (Packets of 200 Labels each)	1	Item		
M	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
<b>Sub-Total C/F to Next Page</b>					

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>CABINETS</u></b>				
A	12U Free standing equipment and server cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet).	2	No.		
B	24 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination.	3	No.		
C	2U Cable Manager/Organizers.	6	No.		
D	Grounding and bounding kit complete with 50mm diameter copper bounding bar and 6mm thick green and yellow wire. The Earthing of the system is to be to the approval of the Engineer.	1	Lot		
	<b><u>ACTIVE COMPONENTS</u></b>				
E	24 Port Edge Switchs Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	2	No.		
F	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 to cover 25M radius complete with antennae, power adaptor and all accessories as described in the particular specifications.	2	No.		
G	240V, 50Hz, 1500VA, Rack Mountable Smart-UPS Un-interrupted Power Supply unit (UPS) with USB and Serial Port as described in the particular specifications.	2	No.		
<b>Second Floor's Total C/F to Collection Page</b>					

**BILL NO. 5 COLLECTION PAGE - STRUCTURED CABLING INSTALLATION WORKS**

ITEM	DESCRIPTION	AMOUNT (KSHS)
1.00	TOTAL FOR SCHEDULE NO. 1: BASEMENT FLOOR	
2.00	TOTAL FOR SCHEDULE NO. 2: GROUND FLOOR	
3.00	TOTAL FOR SCHEDULE NO. 3: FIRST FLOOR	
4.00	TOTAL FOR SCHEDULE NO. 3: SECOND FLOOR	
5.00	Allow for preparing and presenting warranty and documentation, indelible point labels and preparing and submitting individual test results (for each point and for all point to be submitted as a bound report).	
6.00	Allow for programming of the ports for data at the building and at the site of the incomer of the fiber optic cable and proper termination of the equipments.	
7.00	Allow for preparation and production of 3No. Sets of "As Installed Drawings" for all Works in this Contract (Hard & Soft Copies in AutoCAD 2018)	
8.00	Allow for Internet Connectivity Charges.	
	<b>TOTAL FOR BILL NO. 5 STRUCTURED CABLING INSTALLATION WORKS C/F TO MAIN SUMMARY PAGE</b>	

**BILL NO. 6: IP-PABX & TELEPHONE EQUIPMENT INSTALLATION WORKS**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install Test and Commission the following items:-</b>				
	<b><u>IP-PABX SYSTEM</u></b>				
A	<b>IP-PABX</b> equipped with 48 extensions ports expandable to 64, 6 exchange lines expandable to 12. 4No. GSM lines, 1No. ISDN digital line and a gateway for IP connectivity to 2 Branches. 1No. PC Operator Console, 2 pairs of Operator handsets and headsets respectively. Should come with the necessary <b>unlimited licenses</b> for IP extensions operations. The PBX should also come with the necessary interface ready to connect to the Local Area Network (LAN) and should be complete with <b>call management software</b> and all peripherals as described in the particular specifications.	1	No.		
B	Supply, install, test and commission a standby battery complete with a trickle charger for the IP-PBX. above with enough capacity to serve all auxiliary equipment linked to the IP-PABX. for a period of minimum 8 hours and life expectancy of 12 years as described in the particular specifications.	1	No.		
C	Supply, install, test and commission an AC Voltage stabilizer for the IP-PABX. and all auxiliary equipment connected to the P.A.B.X. as described in the particular specifications.	1	No.		
D	RJ45 Cat 6A, UTP Voice Outlets complete with face plates and labelling system.	23	No.		
E	24 Port RJ45 Cat 6A, Data/Voice Patch Panel for UTP termination.	1	No.		
F	Supply, install, test and commission 15U Free standing equipment cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet) for telephone points terminations and distribution.	1	No.		
G	Cat 6A, UTP 4-pair screened cable pulled between discase and telephone outlet plate.	650	Lm.		
<b>Sub-Total C/F to Next Page</b>					

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>TELEPHONE INSTRUMENTS</u></b>				
	<b><u>IP Telephone Instruments:</u></b>				
A	IP Enhanced Standard Telephone Instrument Sets complete with Network connectivity with Power over Ethernet as described in the particular specifications.	17	No.		
B	IP Executive Telephone Instrument Sets complete with Network connectivity via Power over Ethernet or 802.11g wireless client mode, High-resolution 3.2-inch QVGA 320 x 240 color screen, 5-line IP phone with access for up to 10 call line appearances as described in the particular specifications.	6	No.		
	<b><u>TELEPHONE CALL MANAGEMENT SYSTEM</u></b>				
C	Supply, install and test a telephone management software complete with a desktop computer and printer as described in particular specifications to the approval.	1	Item		
D	Allow for interconnecting the IP-PBX SMDR port and the desktop computer through RS232 serial link, and for interconnecting the desktop computer and the desktop printer	1	Item		
E	Allow for Earthing of the entire system to the Electrical Engineer's approval.	1	Lot		
F	Allow for Telephone Connectivity Charges.	1	Item		
G	Allow for preparing and presenting warranty and documentation, indelible point labels and preparing and submitting individual test results (for each point and for all point to be submitted as a bound report).	1	Item		
H	Allow for programming of the ports for voice at the building and at the site of the incomer of the fiber optic cable and proper termination of the equipments.	1	Item		
I	Allow for preparation and production of 3No. Sets of "As Installed Drawings" for all Works in this Contract (Hard & Soft Copies in AutoCAD 2018)	1	Item		
	<b>TOTAL FOR BILL NO. 6 IP-PABX &amp; TELEPHONE EQUIPMENT INSTALLATION WORKS C/F TO MAIN SUMMARY PAGE</b>				

**BILL NO. 7: IP-CCTV INSTALLATION WORKS**

**SCHEDULE NO. 1: GROUND & BASEMENT FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Program, Test and Commission the following :-</b>				
	<b><u>IP-CCTV SURVEILLANCE SYSTEM CAMERAS</u></b>				
A	3Megapixel (2048 x 1536) resolution Network IR Indoor Dome Day & Night Camera; 3 ~ 8mm (2.8x) motorized varifocal lens, WDR (120dB), 64GB Edge Storage, R LED (12ea), PoE, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as described in the particular specifications.	9	No.		
B	3Megapixel (2048 x 1536) resolution Network Indoor Bullet Camera; 3 ~ 8mm (2.8x) motorized varifocal lens; Simple focus (Motorized VF), P-Iris; Day & Night (ICR), Enhanced DIS, Defog; 3M real-time WDR (Max. 120dB); 128GB Edge Storage, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as Axis or equal and approved equivalent.	6	No.		
C	3Megapixel (2048 x 1536) resolution, Vandal-Resistant, Weatherproof Network IR Outdoor Bullet built-in IR LEDs Camera; 3 ~ 8mm (2.8x) motorized varifocal lens, WDR (120dB), 64GB Edge Storage, PoE, IP66, IK10, Bi-directional audio support and 3year warranty as described in the particular specifications.	2	No.		
D	3Megapixel (2048 x 1536) resolution Full HD 32x Network IR PTZ Outdoor Camera; 4.5 ~ 135mm (32x) IR corrected optical zoom, 16x digital zoom; Day & Night (ICR), WDR (120dB); Auto tracking, Intelligent video analytics; SD/SDHC/SDXC memory slot, Bi-directional audio support; IP66, IK10 and 3year warranty c/w brackets and accessories as described in the particular specifications.	6	No.		
	<b><u>CABLING</u></b>				
E	Cat 6A, UTP 4 Pair cable as Siemon or its equal and approved equivalent.	1,200	Lm.		
F	1M, Cat 6A, UTP factory terminated Patch Cords	18	No.		
G	3M, Cat 6A, UTP factory terminated Patch Cords	3	No.		
H	32mm Flexible Conduits in metres	20	Lm.		
I	Cable ties, Wrap Markers, Tower clips, Insulating Tapes, Masking Tapes e.t.c.	1	Item		
J	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
<b>Ground &amp; Basement Floor's Total C/F to IP-CCTV Installation Work's Collection Page</b>					

**SCHEDULE NO. 2: FIRST FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<p><b>Supply, Install, Program, Test and Commission the following :-</b></p> <p><b><u>IP-CCTV SURVEILLANCE SYSTEM CAMERAS</u></b></p>				
A	3Megapixel (2048 x 1536) resolution Network IR Indoor Dome Day & Night Camera; 3 ~ 8mm (2.8x) motorized varifocal lens, WDR (120dB), 64GB Edge Storage, R LED (12ea), PoE, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as described in the particular specifications.	7	No.		
B	3Megapixel (2048 x 1536) resolution Network Indoor Bullet Camera; 3 ~ 8mm (2.8x) motorized varifocal lens; Simple focus (Motorized VF), P-Iris; Day & Night (ICR), Enhanced DIS, Defog; 3M real-time WDR (Max. 120dB); 128GB Edge Storage, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as described in the particular specifications.	2	No.		
C	3Megapixel (2048 x 1536) resolution Full HD 32x Network IR PTZ Dome Camera; 4.5 ~ 135mm (32x) IR corrected optical zoom, 16x digital zoom; Day & Night (ICR), WDR (120dB); Auto tracking, Intelligent video analytics; SD/SDHC/SDXC memory slot, Bi-directional audio support; IP66, IK10 and 3year warranty c/w brackets and accessories as as described in the particular specifications.	1	No.		
	<b><u>ACTIVE COMPONENTS</u></b>				
D	48 Port Edge Switch Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	1	No.		
E	Power Distribution Units (PDU) 6/8 way Surge Protected /Triplite Voltage Regulator	1	No.		
	<b><u>BACKBONE CABLING AND GENERAL REQUIREMENTS</u></b>				
F	Multi Mode Fiber Optic 8 Core Cable (Armoured) for interlinking other Floors to Server Room complete with connectors to Active Components and all terminations to active equipment i.e., Floor Edge Switch.	250	Lm.		
G	SFP Fibre Modules.	2	No.		
H	SC-SC fibre Patch Cord.	8	No.		
<b>Sub-Total C/F to Next Page</b>					

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>CABINETS</u></b>				
A	42U Wall mounted equipment cabinet with lockable door, low noise (low Db) fans and power outlet sockets (Additional 6-Way power extension cable, surge protected within the cabinet).	1	No.		
B	48 Port UTP Patch Panel c/w all the necessary accessories.	1	No.		
C	Cat 6A, UTP 2U, Cable Manager (Organizer) c/w all the necessary accessories.	2	No.		
D	240V, 50Hz, 3000VA, Rack Mountable Double Conversion smart un-interrupted power supply unit (UPS) TRUE online INCLUDING Batteries with USB and Serial Port as described in the particular specifications.	1	No.		
E	450mm x 50mm deep Deep Perfotrated GI cable tray complete with all accessories.	15	Lm.		
F	Grounding and bounding kit complete with 50mm diameter copper bounding bar and 6mm thick green and yellow wire. The Earthing of the system is to be to the approval of the Engineer.	1	Lot		
	<b><u>CABLING</u></b>				
G	Cat 6A, UTP 4 Pair cable	850	Lm.		
H	1M, Cat 6A, UTP factory terminated Patch Cords	8	No.		
I	3M, Cat 6A, UTP factory terminated Patch Cords	8	No.		
J	32mm Flexible Conduits in metres	20	Lm.		
K	20mm Flexible Conduits in metres	60	Lm.		
L	Cable ties, Wrap Markers, Tower clips, Insulating Tapes, Masking Tapes e.t.c.	1	Item		
	<b>Sub-Total C/F to Next Page</b>				

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

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
	<b><u>STORAGE</u></b>				
A	32 CH Network Video Recorder (NVR); 100Mbps network camera recording; Embedded Linux OS; Up to 8/6 RAID-5 + Hot standby; SATA Internal HDDs; External e-SATA (2 ports), iSCSI storage (Max. 32TB) iSCSI storage supported. (No IP Camera Licenses required) 3year warranty. as described in the particular specifications.	1	No.		
B	16 CH Network Video Recorder (NVR); 100Mbps network camera recording; Embedded Linux OS; Up to 8/6 RAID-5 + Hot standby; SATA Internal HDDs; External e-SATA (2 ports), iSCSI storage (Max. 16TB) iSCSI storage supported. (No IP Camera Licenses required) 3year warranty. as Axis or approved equivalent.	1	No.		
C	4TB Surveillance SATA HDD Suitable for NVR ABOVE.	8	No.		
D	CCTV and Access Control dedicated Desktop Computer, Intel corei7, 64-bit, 8GB Video Graphics Card Processor/3.6GHz Quad-core/16GB System RAM/4TB SSD/DVD RW/ win10/21" Screen of Multi-Monitor Support complete with a printer as specified in particular specifications for central monitoring.	1	No.		
E	Central IP Video Surveillance Management Software for viewing and Recording live video of premises with support for multi-site / multi-client monitoring (for upto 2 No. client stations).	1	No.		
F	52" LED Monitor, 1,920 x 1,080 resolution 600TV lines, Response Time 8ms (G to G), Panel Life 50,000hours, Contrast Ratio 5,000 : 1, HDMI, DVI, VGA, and component (CVBS common) video output, Ethernet / RS-232C remote control, Built-in speaker. (c/w wall mount bracket); 3year warranty.	2	No.		
G	Any other Item necessary for successful completion of this installation. (Please Itemize) a) b) c) d)	1	Item		
<b>First Floor's Total C/F to IP-CCTV Installation Work's Collection Page</b>					

**SCHEDULE NO. 3: SECOND FLOOR**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install, Program, Test and Commission the following :-</b>				
	<b><u>IP-CCTV SURVEILLANCE SYSTEM CAMERAS</u></b>				
A	3Megapixel (2048 x 1536) resolution Network IR Indoor Dome Day & Night Camera; 3 ~ 8mm (2.8x) motorized varifocal lens, WDR (120dB), 64GB Edge Storage, R LED (12ea), PoE, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as described in the particular specifications.	4	No.		
B	3Megapixel (2048 x 1536) resolution Network Indoor Bullet Camera; 3 ~ 8mm (2.8x) motorized varifocal lens; Simple focus (Motorized VF), P-Iris; Day & Night (ICR), Enhanced DIS, Defog; 3M real-time WDR (Max. 120dB); 128GB Edge Storage, IK8, Bi-directional audio support and 3year warranty c/w brackets and accessories as described in the particular specifications.	3	No.		
	<b><u>CABLING</u></b>				
C	Cat 6A, UTP 4 Pair cable as Siemon or its equal and approved equivalent.	850	Lm.		
D	1M, Cat 6A, UTP factory terminated Patch Cords as Siemon or its equal and approved equivalent.	5	No.		
E	3M, Cat 6A, UTP factory terminated Patch Cords as Siemon or its equal and approved equivalent.	5	No.		
F	Cat 6A, UTP Cable Manager (Organizer) c/w all the necessary accessories.	1	No.		
G	32mm Flexible Conduits in metres	40	Lm.		
H	20mm Flexible Conduits in metres	60	Lm.		
I	Cable ties, Wrap Markers, Tower clips, Insulating Tapes, Masking Tapes e.t.c.	1	Item		
J	Any other Item necessary for successful completion of this installation. (Please Itemize)	1	Item		
	a)				
	b)				
	c)				
	d)				
<b>Second Floor's Total C/F to IP-CCTV Installation Work's Collection Page</b>					

COLLECTION PAGE - BILL NO. 7: IP-CCTV INSTALLATION WORKS

ITEM	DESCRIPTION	AMOUNT (KSHS)
1.00	TOTAL FOR SCHEDULE NO. 1: GROUND & BASEMENT FLOORS	
2.00	TOTAL FOR SCHEDULE NO. 2: FIRST FLOOR	
3.00	TOTAL FOR SCHEDULE NO. 3: SECOND FLOOR	
4.00	Allow for preparation and production of 3No. Sets of "As Installed Drawings" for all Works in this Contract (Hard & Soft Copies in AutoCAD 2018)	
	<b>TOTAL FOR BILL NO. 7. IP-CCTV INSTALLATION WORKS C/F TO MAIN SUMMARY PAGE</b>	

**BILL NO. 8: ACCESS CONTROL INSTALLATION WORKS**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Supply, Install &amp; Program, Test and Commission the following items:-</b> <b><u>Access Control System</u></b>				
A	IP Based Single Door Access Controller complete with accessories as specified in particular specifications	24	No.		
B	IP Based Double Door Access Controller complete with accessories as specified in particular specifications	4	No.		
C	An Electromagnetic Lock of 300Kg Force complete with striking plates installed on each door as described in the particular specifications.	28	No.		
D	IP Based Door Reader with Biometric (Finger) and Proximity Card Reader and complete with keypad and USB port as specified in Particular Specifications	28	No.		
E	Exit Slave Door Reader with Biometric, Keypad and Proximity Card Capabilities. as described in the particular specifications.	28	No.		
F	Emergency Break Glass	28	No.		
G	Override Key Switch	28	No.		
H	Access Control Door Intelligent Power Supply Module complete with batteries as specified in Particular Specifications.	28	No.		
I	Proximity Cards with the individual employee's name as specified in Particular Specifications.(Provisional)	200	No.		
J	Software Module as described in the particular specifications.	1	No.		
K	Access Control Server Controller for 24 doors as specified in Particular Specifications.	1	No.		
L	Wire the entire access control system using 12 core 2.5mm <sup>2</sup> fire resistant cable.	650	Lm.		
M	Door Exit Switch as described in the particular specifications.	28	No.		
N	Cat 6A, 4 Pair, STP Cable for Access Control System	1,350	Lm.		
O	48 Port UTP Patch Panel c/w all the necessary accessories.	1	No.		
<b>Sub-Total C/F to Next Page</b>					

**BILL NO. 8: ACCESS CONTROL WORKS CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
A	240V, 50Hz, 3000VA, Rack Mountable Double Conversion smart un-interrupted power supply unit (UPS) TRUE online INCLUDING Batteries with USB and Serial Port as described in the particular specifications.	1	No.		
B	24 Port Edge Switch as Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications.	1	No.		
C	12 Port Edge Switch Complete with 2No. Power Supply, 10G and 40G uplink ports, POE as described in the particular specifications..	1	No.		
F	Allow for full graphic customization and programming of the installed system.	1	Lot		
D	Power Point wired in 3x2.5mm sq. single core PVC insulated copper cables drawn in concealed 25 mm diameter Heavy Gauge PVC conduits complete with all the necessary accessories.	28	Lm.		
E	Unswitched spur power point complete with socket plate.	28	No.		
G	50mm x 50mm, 2 compartment powder coated 'CLIP-ON' metal type trunking manufactured to approved colour and complete with cover, bends, outlet plates, continuity bonding and all accessories.	85	Lm.		
H	Automatic Door Closure	4	No.		
I	Enhanced Pinpoint <b>Walkthrough Metal Detector</b> as described in particular specification section of this document	2	No.		
	<b>Sub-Total C/F to Next Page</b>				

**BILL NO. 8: ACCESS CONTROL WORKS CONTINUED...**

Item	Description	Qty	Unit	Rate (Kshs)	Amount (Kshs)
	<b>Sub-Total B/F from Previous Page</b>				
B	Vibration electromagnetic sensors embedded in the doors and windows as described in the particular specifications.	14	No.		
C	Panic buttons as described in the particular specifications.	6	No.		
D	Passive infrared motion sensors in the hall way within the house as described in the particular specifications.	10	No		
E	Access control keypad at the main door entrance wired to the control panel	4	No		
F	Flasher/ sounder 240v bell	2	No		
G	Security alarm control panel	1	No		
H	Power point comprising wiring in 3x2.5mm <sup>2</sup> PVC-SC CU cables in concealed PVC conduits	1	No.		
I	20 Amps double pole switches with neon indicator as as described in the particular specifications.	1	No.		
J	Allow for preparation and production of 3No. Sets of "As Installed Drawings" for all Works in this Contract (Hard & Soft Copies in AutoCAD 2018)				
<b>TOTAL FOR BILL NO. 8. ACCESS CONTROL INSTALLATION WORKS C/F TO MAIN SUMMARY PAGE</b>					

**BILL NO. 9: GATE SECURITY SYSTEM INSTALLATION**

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT(KSHS)
	<b>Supply, Install, Program, test and commission the following :</b>				
A	K4 Rated, Entry and Exit built-in hydraulic, automatic retractable bollard 250mm dia x1000mm high (above ground) cylinder, high security steel 20mm thickness + red LED ring all as described in the technical specifications	4	No.		
B	RAL 7016 structured varnishing for the bollards	4	No.		
C	Folding lost casing in galvanized steel sheeting for the bollards	4	No.		
D	Logic Controlled Entrance and Exit	2	No.		
E	Magnetic loop with 25M feeder	4	No.		
F	Traffic LED lights	2	No.		
G	Wall mounted Press Button Panel – 3 functions: UP/DOWN/EMERGENCY	2	No.		
H	IP68 rated Fixed Under Vehicle Surveillance System c/w under vehicle screening unit, licence plate recognition camera, loop sensor, RFid reader & central operating unit	1	Item		
I	Accessories and kits including cabling to connect the bollards to the control panel box housing the logic controlled units. (Maximum distance 55m)	4	No.		
K	List and price any other necessary items to make the bollard system function appropriately (include these costs in the totals in this page)	1	Lot		
	a) b) c)				
<b>TOTAL FOR BILL NO. 9 GATE SECURITY SYSTEM C/F TO MAIN SUMMARY PAGE</b>					

**MAIN SUMMARY PAGE**

ITEM	DESCRIPTION	AMOUNT (KSHS)
1.00	Total for Bill No. 1: Preliminaries	
2.00	Total for Bill No. 2: Conferencing & Public Address System	
3.00	Total for Bill No. 3: Hansard Recording and Transcription	
4.00	Total for Bill No. 4: Audio-Visual Installation Works	
5.00	Total for Bill No. 5: Structured Cabling Installation Works	
6.00	Total for Bill No. 6: IP-PABX & Telephone Equipment Installation Works	
7.00	Total for Bill No. 7: IP-CCTV Installation Works	
8.00	Total for Bill No. 8: Access Control Installation Works	
9.00	Total for Bill No. 9: Gate Security System Installation Works	
10.00	Allow for training of staff on the operation and working of the installations	
11.00	Provisional sum for allowance for the Clerk of Works for IT-based installations	1,500,000.00
12.00	Provisional sum for an overseas factory inspection by 6No. Employer's representatives as described in clause 2.9 page no. D/4 of the specifications	8,000,000.00
13.00	Provisional Sum for Contingency	2,100,000.00
<b>TOTAL FOR HANSARD SYSTEM, AUDIO-VISUAL &amp; STRUCTURED CABLING INSTALLATION WORKS C/F TO FORM OF TENDER</b>		

**Total Amount in Words (Kenya Shillings)**

.....  
 .....  
 .....

**Bidder's Name & Official Stamp**

.....  
 .....

**P.O. Box**.....

**Signature**.....**Date**.....

**PIN NO**.....**V.A.T Certificate NO**.....

**Witness**.....**Address**.....

**Signature Witness**.....**Date**.....

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

## **TECHNICAL SCHEDULE**

1. The technical schedule shall be submitted by tenderers to facilitate and enable the Project Manager to evaluate the tenders, especially where the tenderer intends to supply or has based his tender sum on equipment which differs in manufacture, type or performance from the specifications indicated by the Project Manager.
2. The filling of this schedule forms part of Technical Evaluation of the tenders, and bidders shall therefore be required to indicate the type/make and country of origin of all the materials and equipment they intend to offer to the employer in this schedule.
3. Any bid returned with unfilled Technical Schedule shall be considered technically non-responsive, and the bidder shall automatically be disqualified.

## TECHNICAL SCHEDULE

### 1. General Notes to the Tenderer

- 1.1 The tenderer shall submit technical schedules for all materials and equipment upon which he has based his tender sum.
- 1.2 The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturer's literature shall be accepted. Failure to comply with this may have his tender disqualified.
- 1.3 Completion of the technical schedule shall not relieve the Contractor from complying with the requirements of the specifications except as may be approved by the Engineer.

## TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED

(To be completed by the Tenderer as a Mandatory Requirement)

ITEM	DESCRIPTION	TYPE/MAKE/CATALOGUE NO.	COUNTRY OF ORIGIN
1.	Central Control Unit		
2.	Audio Media Interface unit and power supply unit		
3.	Chip ID Cards		
4.	Transmitter		
5.	Receivers		
6.	Lightweight headphones		
7.	Channel selector		
8.	Table top delegate unit		
9.	Microphones		
10.	Dual tape deck		
11.	Mixer amplifier		
12.	Electronic channel selector		
13.	Encoding unit		
14.	Transcription Foot pedal		

(To be completed by the Tenderer as a Mandatory Requirement)

ITEM	DESCRIPTION	TYPE/MAKE/CATALOGUE No.	COUNTRY OF ORIGIN
1.0	LCD Projectors		
2.0	Laser Mouse Pointer		
3.0	Projection Screen		
4.0	Ceiling Loud Speakers		
5.0	IP PTZ Camera		
6.0	TV Monitors		
7.0	Plasma Screens		
8.0	VGA splitter		
9.0	Video switcher		
10.0	UPS		
11.0	VGA cables		
12.0	RCA cables		

(To be completed by the Tenderer as a Mandatory Requirement)

ITEM	DESCRIPTION	TYPE/MAKE/CATALOGUE No.	MODEL	COUNTRY OF ORIGIN
1.0	Camera			
2.0	Network Video Recorder			
3.0	Walkthrough Metal Detector			
4.0	Network Switches			
5.0	UPS			
6.0	Access Control Readers			
7.0	Retractable Bollards			
8.0	Under Vehicle Surveillance System			
9.0	IP-PABX			