**Scope of Work**

Name of Project: Supply and Installation of IT Network Infrastructure for the High National Elections Commission (HNEC), Tripoli, Libya

Location: Tripoli, Libya

Objective:

The scope of this assignment includes the design, supply and installation of the following components:

- Wired and wireless computer network infrastructure
- Access control equipment
- Server room infrastructure
- Surveillance system

The Supplier shall install the cabling infrastructure of the building N2 and N3, set up the network endpoints, and set up the HNEC server rooms in a proper manner to meet the operational, security and environmental requirements. HNEC installed the network infrastructure for Building N1 under another contract. However, the selected supplier, under the terms of this contract shall also implement the network interconnectivity between Building N1 and buildings N2 and N3.

The Supplier will receive drawings and floor maps of the buildings after signing the contract.

The Scope of works shall be read in conjunction with the Bill of Quantities and the drawings. The details specified in the scope of work is based on the estimation provided by the Client (HNEC), and the vendor may seek any clarification required during the site visit. Items and quantities mentioned in the Bill of Quantities should be used for providing quotes, and BoQ shall prevail in case of any discrepancy between the scope of work description and BoQ. The vendor shall provide quotes inclusive of all costs needed to have the item finished: including but not limited to labour, materials, equipment, cabling, pulling, ducting, piping and all required accessories/works, transportation, overhead, and taxes.

All materials and equipment shall comply with the specifications and shall be approved by UNDP and Client (HNEC) before and after the installation. When detailed specification, name or model is mentioned, the contractor shall comply with this unless the vendor can find a technically compliant equivalent and get prior approval from UNDP & Client.

A tender briefing and site visit will be conducted on 19 February 2019 at 11:00 am (Libya time) to clarify any issues related to this tender and vendors are encouraged to attend the site visit. Any questions and clarifications required should be emailed to the UNDP Libya email address procurement.ly@undp.org and the deadline for submitting questions and clarifications shall be 5 days before the bid submission deadline. Any questions or queries submitted after this deadline will not be considered or answered.

## Requirements

The technical requirements and specifications toward the scope of the work are mentioned below. The supplier shall install and configure all network switches provided by HNEC & UNDP. There is no need to supply network switches for IT data network; however, the supplier shall provide switches as specified in the BoQ for the surveillance network.

### GENERAL REQUIREMENTS

1. Each jack shall be Single (only data points for tally Center) RJ45 endpoint, which allows plugging either Ethernet cable. Some points are dual Jack and the estimated number of single and dual jacks are mentioned in the price Schedule Form (Form F).
2. The approach of the network must be a hierarchical model with modular topology.
3. The hierarchical model components shall be the access layer, the distribution layer, and the core (backbone) layer.
4. Core layer requirements
   a. Network design shall support redundant point-to-point L3 interconnections in the core (triangles, not squares)
   b. Network design shall avoid L2 loops
   c. Network design shall include at least two L3 core layer switches to support the redundancy
   d. The switches must interconnect with each other by high-speed channel (more than 1Gb/s bandwidth) or with link aggregation (up to 4 x 1Gb/s)
   e. The links to the distribution layer switches must be implemented with fibre-optic channels at 1Gb/s bandwidth
   f. The installation, testing of inter-building and intra-building fibre-optic, and UTP cables must be implemented according to NECA/FOA 301-2016 or ANSI/TIA-568-D/C standard.
   g. The core layer devices shall locate at the basement of Building N1, in the datacenter.
5. Distribution layer requirements
   a. Each building must have at least two distribution layer switches for redundancy
   b. High availability in the distribution layer shall be provided through dual equal-cost paths from the distribution layer switches to each core layer switch and from the access layer switches (of the same building) to each distribution layer switch.
   c. The design shall have the mechanisms to avoid L2 loops
   d. The design shall implement default gateway redundancy
   e. The links from the distribution layer switch to the core layer and the access layer switches must be implemented with 1Gb/s fibre-optic channels
   f. The distribution layer switches of the same building must interconnect with each other by 1 Gbs/s fibre-optic channels (or with higher channel than 10Gb/s bandwidth if possible)
   g. The installation and testing of inter-building and intra-building fibre-optic cables must be implemented according to NECA/FOA 301-2016 or ANSI/TIA-568-D/C standard.
6. Access layer requirements
   a. Each floor of the building must have its access layer switches
   b. The switches in the access layer shall be connected to two separate distribution layer switches of the same building for redundancy
   c. Default gateway redundancy using dual connections to redundant systems (distribution layer switches)
   d. The links from the access layer switch to the distribution layer switches must be implemented with 1Gb/s fibre-optic channels
   e. The end nodes must be connected to the access layer switches at least with UTP cat Six (6) cables at 1Gb/s bandwidth

f. The installation, testing of inter-building and intra-building fibre-optic, and UTP cables must be implemented according to NECA/FOA 301-2016 or ANSI/TIA-568-D/C standard.

**REQUIREMENT 1: WIRED NETWORK**

This chapter describes the number of nodes per buildings and floors.  The number of data points also include cabling for the voice network. The voice network cabling shall be identical to the wired data network cabling, and the required number of voice sockets are included in the total number of network ports specified in this section (798).

**A. Building N2**

Building N2 consists of, ground floor, first and second floors. This building will host the Tally centre. Below table describes the network nodes distribution for the building N2.

Table 1.1 Describes the Infrastructure Requirements for the Building (B2), Ground Floor.

| | Office 1 | Office 2 | | Office 3 | Office 4 | Office 5 | Aisle | TOTAL |
|---|---|---|---|---|---|---|---|---|
| | | A | B | | | | | |
| NUM-PERSON-MAP | 14 | 5 | 0 | 12 | 6 | | 0 | 37 |
| PC Socket | 14 | 12 | 5 | 20 | 10 | 5 | 2 | 68 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER Socket | 3 | 3 | 3 | 4 | 2 | 0 | 3 | 18 |
| CAMERA | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| ACCESS POINT | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 5 |
| Data IP Projector | | | 1 | | | | | 1 |
| Data port for IPTV | | | 3 | | | | | 3 |
| TOTAL | 18 | 16 | 13 | 25 | 13 | 6 | 11 | 102 |
| | | | | | | | 82 | Single Jack |
| | | | | | | | 15 | Double Jack |
| ACCESS CONTROL | 0 | 0 | 0 | 0 | | | 0 | 0 |
| NUM-PATCH-PANEL-24 | 5 | | | | | | | |
| NUM-SWITCH-48 | 3 | | | | | | | |
| Fiber-patch-cord-12 | 5 | | | | | | | |
| CABLE-FIBER | 5 | | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | | |

Table 1.2 Describes the Infrastructure Requirements for the Building (B2), First Floor.

| | Intake | Data Entry 1 | Data Entry2 | Clearance | Correction | Aisle | TOTAL |
|---|---|---|---|---|---|---|---|
| NUM-OFFICE | office 1 | office 2 | office 3 | office 4 | office 5 | office 6 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NUM-PERSON-MAP | 35 | 50 | 50 | 10 | 15 | 0 | 160 |
| PC | 35 | 50 | 50 | 10 | 15 | 0 | 160 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER | 25 | 25 | 25 | 4 | 5 | 2 | 86 |
| CAMERA | 4 | 4 | 4 | 2 | 2 | 2 | 18 |
| ACCESS POINT | 1 | 1 | 1 | 0 | 1 | 1 | 5 |
| Dataport  IP Projector | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Data port for IP Monitor | 0 | 0 | 0 | 0 | 0 | 6 | 6 |
| TOTAL | 65 | 80 | 80 | 16 | 23 | 12 | 276 |
| | | | | | | 96 | single jack |
| | | | | | | 90 | double jack |
| ACCESS CONTROL | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NUM-PATCH-PANEL-24 | 12 | | | | | | |
| NUM-SWITCH-48 | 6 | | | | | | |
| Fiber-patch-cord-12 | 12 | | | | | | |
| CABLE-FIBER | 12 | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | |

Table 1.3 Describes the Infrastructure Requirements for the Building (B2), Second Floor.

| Column1 | ARCHIVE & QUALITY | AUDIT | MGMT | MGMT2 | Aisle | NONE | TOTAL |
|---|---|---|---|---|---|---|---|
| NUM-OFFICE | office 1 | office 2 | office 3 | office 4 | office 5 | office 6 | |
| NUM-PERSON-MAP | 40 | 15 | 15 | 15 | 0 | 0 | 85 |
| PC | 40 | 15 | 15 | 15 | 0 | 0 | 85 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER | 10 | 5 | 5 | 5 | 6 | 0 | 31 |
| CAMERA | 4 | 4 | 2 | 2 | 2 | 0 | 14 |
| ACCESS POINT | 1 | 1 | 1 | 1 | 0 | 1 | 5 |
| IP TV | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTAL | 55 | 25 | 23 | 23 | 8 | 1 | 135 |
| | | | | | 85 | single jack | |
| | | | | | 25 | double Jack | |
| ACCESS CONTROL | 0 | 0 | 1 | 1 | 0 | 0 | 2 |
| NUM-PATCH-PANEL-24 | 8 | | | | | | |
| NUM-SWITCH-48 | 3 | | | | | | |
| Fiber-patch-cord-12 | 1 | | | | | | |
| CABLE-FIBER | 8 | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | |

## B. Building N3

Building N3 consists of, ground floor, first and second floors. This building hosts the Call centre.

Table 1.4 Describes the Infrastructure Requirements for the Building (B3), Ground Floor.

| Ground Floor | تسجيل المرشحين | حجرة الكابينات | قسم التدريب | التوعية | المراقبين | Aisle | المقهى | TOTAL |
|---|---|---|---|---|---|---|---|---|
| | office 1 | office 2 | office 3 | office 4 | office 5 | office 6 | office 7 | |
| NUM-OFFICE | 1 | 2 | 3 | 4 | 5 | | 6 | |
| NUM-PERSON-MAP | | | | | | | | 0 |
| PC Socket | 14 | 2 | 14 | 14 | 8 | 2 | 2 | 56 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER Socket | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 10 |
| CAMERA | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 4 |
| ACCESS POINT | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 4 |
| IP TV | | | | | | | | |
| TOTAL | 17 | 2 | 17 | 17 | 11 | 8 | 2 | 74 |
| | | | | | | | 58 | Single Jack |
| | | | | | | | 8 | Double Jack |
| ACCESS CONTROL | 1 | 0 | 0 | | | | 0 | 0 | 1 |
| NUM-PATCH-PANEL-24 | 4 | | | | | | | |
| NUM-SWITCH-48 | 2 | | | | | | | |
| Fiber-patch-cord-12 | 4 | | | | | | | |
| CABLE-FIBER | 4 | | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | | |

Table 1.5 Describes the Infrastructure Requirements for the Building (B3), First Floor.

| OFFICE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Aisle | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUM-OFFICE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
| NUM-PERSON-MAP | | | | | | | | | | 0 | 0 |
| PC Socket | 8 | 7 | 8 | 7 | 8 | 7 | 8 | 7 | 5 | 2 | 67 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER Socket | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 2 | 13 |
| CAMERA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| ACCESS POINT | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 |
| IP TV | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| TOTAL | 10 | 8 | 10 | 8 | 10 | 8 | 11 | 9 | 6 | 6 | 86 |
| | | | | | | | | 60 | single jack | | |
| | | | | | | | | 13 | double | | |

| | | | | | | | | | jack | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ACCESS CONTROL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NUM-PATCH-PANEL-24 | 4 | | | | | | | | | | |
| NUM-SWITCH-48 | 2 | | | | | | | | | | |
| Fiber-patch-cord-12 | 4 | | | | | | | | | | |
| CABLE-FIBER | 4 | | | | | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | | | | | |

Table 1.6 Describes the Infrastructure Requirements for the Building (B3), Second Floor.

| OFFICE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Aisle | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NUM-OFFICE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 7 | 8 | | |
| NUM-PERSON-MAP | | | | | | | | | | 0 | 0 |
| PC Socket | 8 | 7 | 12 | 10 | 12 | 10 | 8 | 7 | 5 | 2 | 81 |
| IP PHONE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PRINTER Socket | 2 | 2 | 3 | 0 | 3 | 0 | 2 | 2 | 1 | 2 | 17 |
| CAMERA | 0 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 10 |
| ACCESS POINT | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 4 |
| IP TV 50" | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTAL | 11 | 9 | 19 | 12 | 18 | 12 | 11 | 9 | 6 | 6 | 113 |
| | | | | | | | | | 83 | single jack | |
| | | | | | | | | | 15 | double jack | |
| ACCESS CONTROL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NUM-PATCH-PANEL-24 | 5 | | | | | | | | | | |
| NUM-SWITCH-48 | 3 | | | | | | | | | | |
| Fiber-patch-cord-12 | 1 | | | | | | | | | | |
| CABLE-FIBER | 1 | | | | | | | | | | |
| Size-Rack-UNIT | 36 | | | | | | | | | | |

## C. Gates (Security blocks)

Gates include two small rooms in the perimeter of the compound.

Table 1.7

| Location | Network Nodes (Data and Phone) |
|---|---|
| Left Gate | 3 |
| Right Gate | 3 |
| TV data ports Access control room | 8 |
| IP phone voice port | 2 |

## REQUIREMENT 2: WIRELESS NETWORK

UNDP and HNEC will provide access points, and AP controller and the supplier shall provide additional items such as small steel poles, cables etc. (if required based on the site survey) for the installation, and configure the devices as required by the HNEC.

Table 2.1

| Wireless Network | Quantity |
|---|---|

| 2.1 | Installation and configuration of ACCESS POINT Cisco Aironet 183x series x 20 with Cisco AP controller x 1 | 1 |
|---|---|---|

**REQUIREMENT 3:  SERVER ROOM - POWER DISTRIBUTION SYSTEMS AND RAISED FLOOR**

Main electrical distribution panels must have sufficient clearance to enable easy access and repair. The distance between the electrical distribution panel and active ICT equipment should be at least 1 meter unless agreed by UNDP & client due to space constraints. The supplier shall identify an appropriate area for cable penetration after discussing with HNEC. Also, external and internal conduit paths shall be electrically isolated from each other. The supplier shall identify and supply appropriate electrical cables (from the generator to the server room, estimated distance is 150m) and circuit breakers x 2 as recommended by the UPS manufacturer (estimate for 15kv APC UPS is 3pole circuit breakers, and 25 mm * 4, i.e. 4 cables in one copper wire cable, not copper filaments and the cable shall have a rubber buffer between the cables).

The vendor shall supply UPS 15Kva X 2pcs with external battery packs. The UPS should support 1+1 configuration, i.e. can be connected in parallel to provide either fail-safe redundancy or increased capacity, cold-start operation, expandable runtime, network management card for remote monitoring/control and external battery pack (Tower with Included Accessories Hot-swappable, replaceable batteries)

Server room installation services and items including but not limited to:
Table 3.1

|  | Server Room - Power distribution systems and raised floor (building Two (2) floor One (1)) |
|---|---|
|  | Power cable 4 x 16 mm |
|  | Power cable 3 x 6 mm |
|  | circuit breaker 80 A |
|  | Power cable 25mm*4 from the generator to the server room, 150m est distance (recommended specs, subject to UPS specification) and three (3) pole circuit breakers as required for the UPS 15Kva |
|  | Power system Installation including UPS and connectivity with all related accessories such as additional power cables from the generator, circuit breakers etc. for 2 x 15Kva UPS |
|  | Anti-static raised floor for the server room<br>Size 42 sqft est  (7.8 X 5.3)<br>raised floor panels<br>raised floor lifting<br>raised floor accessories<br>raised floor installation<br>Rack Power Distribution Unit |

The supplier shall equip server room with an **anti-static raised floor** with a load bearing capacity of 4 x 42U racks of 600 Kg each and 2 x 32U racks of 375 Kg each. The Supplier must procure the raised floor and provide information about the cost of the procurement per sq/m. The Supplier shall also provide cost information about the installation of the raised floor in the bid response documents. The cost shall include raised Floor (Sqm) materials & installation with all Accessories.   (Installation of the all necessary components for the raised floor, raised floor ramp and cable management systems are the sole responsibility of the vendor. During the installation the contractor should place the panels and cable management trays according to the requirements of HNEC ICT department)

Raised floor location: Server Room (Building N2)

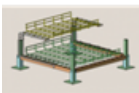The anti-static raised floor must have the following features:
- Finished floor system height up to 12 inches.
- Floor panels with anti-static coverage, such as Static Dissipative Vinyl, High-Pressure Laminates, Aluminum-based fire resistant / noncombustible material or similar
- Floor Type: Reinforced Bolted Stringer type with under the floor cable & power trays
- Increased weight bearing abilities up to Heavy Grade or Extra Heavy Grade Systems (by MOB PF2 PS SPU specification)
- Metal components must have nickel or powder coatings in preference to zinc passivation to mitigate the risk of "zinc whiskers".
- The raised access floor shall be installed in the way to accommodate all the network cables, power cables and fire suppression system paths required.
- The floor itself must also be hardwearing, anti-static and be able to withstand high temperatures and heavyweights.

Detailed list of raised floor panels, additional panel requirements and accessories are listed for easy reference.

Table 3.2

| S No | Type (Picture) | Product Name | Qty |
|------|----------------|--------------|-----|
| 1 |  | Raised floor Main kit: Antistatic load bearing 12 inches (Square feet) | 42 (Est) |
| 2 |  | Perforated Air Flow Panel | 4 |
| 3 |  | Underfloor fans with air ducts for airflow panel | 6 |
| 4 |  | Infinity® Air Grate for Steel w/Levelers or similar | 2 |
| 5 |  | The PLUGG 5" Circle Grommet or similar | 6 |
| 6 |  | KoldLok ® Integral 1010 – Unit or similar | 4 |
| 7 |  | 3-inch Grommet | 3 |

| 8 |  | 4" x 4" Cable Guard | 4 |
|---|---|---|---|
| 9 |  | Panel Lifter and Holder Kit | 2 |
| 10 |  | Ramp Kit Complete (if required based on the design) | |
| 11 |  | 12-inch Multi-level cable trays with vertical support for Raised floor 42 Sqm as required | |

## REQUIREMENT 4: SERVER ROOM - COOLING SYSTEM

The Supplier shall install cooling equipment for the server room. Cooling units can be installed against walls. There must be sufficient clearance to enable easy access and repair. The distance between cooling equipment and active ICT equipment should be at least 1 meter unless agreed by UNDP & client due to space constraints.

Table 4.1

| 4 | **Cooling System** | |
|---|---|---|
| 4.1 | Cooling system DC room size 7.8 X 5.3 X 3.3 (24000 btu/hr or higher) | 3 |
| 4.2 | Installation & Commissioning including Indoor units, pipes and accessories Installation | 1 |

## REQUIREMENT 5: SERVER ROOM - FIRE SUPPRESSION SYSTEM

For the fire alarm and prevention (against fires class A, B and C) fire suppression system shall be installed by the vendor.

The system shall conform to the following technical requirements:
- The system must work with synthetic/chemical fire suppression gas and extinguishes a fire by removing the free radicals or heat elements from the fire triangle (Oxygen, Heat and Fuel).
- The manufacturer of the suppression system hardware and detection components shall be ISO 9000 certified
- Designed for server rooms/datacenters (without negative influence on the servers, network devices, cables, jacks and so on)
- Waterless, Non-corrosive, No residue and oily deposits, No influence on business continuity, Electrically non-conductive
- Extinguishes fire through absorption and chemical reaction
- Discharge no later than 10 seconds

The Supplier shall procure all the required equipment to implement the fire suppression system in the server room of Building N2 (1 unit).

Table 5.1

| 5 | **Fire suppression system** | |
|---|---|---|

| 5.1 | Fire suppression system DC room size 7.8 X 5.3 X 3.3 | 1 |
|---|---|---|
| 5.2 | Fire suppression system installation, configuration and training | 1 |

## REQUIREMENT 6: SURVEILLANCE SYSTEM

The Supplier shall install the surveillance system including the network video recorder, CCTV camera and central management system. Installation of the entire surveillance system network including cabling, pulling, piping, cover ducting and all required accessories and works.

Table 6.1

| 6 | Surveillance system | |
|---|---|---|
| 6.1 | NVR  128 Channel support 30 days data shall be stored locally in a compressed video format (12 months standard equipment warranty) | 1 |
| 6.2 | Indoor IP Cam (CCTV)<br>Please see FORM F: Price Schedule Form for specifications | 40 |
| 6.3 | Outdoor IP Cam (CCTV)<br>Please see FORM F: Price Schedule Form for specifications | 50 |
| 6.4 | Outdoor PTZ IP Cam (CCTV) 30X 4MP | 4 |
| 6.5 | Fibre Cable outdoor OM4 (estimated m) | 1000 |
| 6.6 | Optical Distribution frame (ODF) 12 port SC | 10 |
| 6.7 | Fiber Patch Cords Cables SC to LC | 10 |
| 6.8 | Distribution Box outdoor 15U IP 66 or above | 10 |
| 6.9 | Network Switch 16 Port + 2SFP ports, POE | 10 |
| 6.10 | Inverter 850VA + battery 65A with power stabiliser | 10 |
| 6.11 | Fibre cable Splicing, pulling, ducting and installation | 1 |
| 6.12 | Surveillance System & network Installation, configuration and Training | 1 |
| | Total | |

## REQUIREMENT 7:  ACCESS CONTROL SYSTEM

All server rooms, the entrance of the buildings, conference halls, server rooms and IT operation rooms must be equipped with an access control solution with centralised administration and control of sites and all users. The supplier shall supply and install the access control system as specified below:

| 7 | Access control system | |
|---|---|---|
| 7.1 | The supplier shall procure all the required items for the implementation of the access control requirements (Paxton NET2 or equivalent (Please see description provided below and FORM F: Price Schedule Form for specifications) | 12 |

| 7.2 | Installation and configuration and Training | 1 |
|---|---|---|
| | Total | |

The supplier shall procure all the required items for the implementation of the access control requirements (recommended Brand Paxton NET2 or equivalent). Key features of the system must conform to the following requirements:

- Central control of privileges
- Manage the users and all doors of server rooms
- Event reporting
- Integrate other systems - intruder alarm, fire alarm, lighting, CCTV, Email Notification
- Proximity, magistrate, keypads and biometric type of readers must be compatible
- The components must plug directly into the LAN

## ADDITIONAL INFORMATION

UNDP and HNEC will provide some network equipment as mentioned below and subject to the contract; the selected supplier shall procure items listed in the final price schedule form and any additional items required for the completion of the project.

1. Switches and modules (Not required to supply switch for IT network installation. Switches as specified in the price schedule for surveillance system shall be supplied by the vendor)

The vendor shall procure all the required equipment and accessories including but not limited:

1. Fire suppression system
2. UPS
3. Cooling equipment
4. Access control equipment
5. Anti-static raised floor
6. Surveillance system equipment including CCTV camera.
7. Cables, dual RJ45 jack, patch panels, ducts and other accessories and equipment required for wired and wireless network installation

<div align="center"><b>Project timeline</b></div>

The overall project duration is nine (9) weeks starting from the date of signing the contract. The project shall include the following stages:

Table 15

| N | Project Phases | Timeline |
|---|---|---|
| 1 | Preparation and planning stage | One (1) week |
| 2 | Installation stage<br> - (2.1 Building N2 Three (3) weeks)<br> - (2.2 Building N3, Gates, Security rooms Three (3) weeks) | Six (6) weeks |
| 3 | Testing, acceptance and training stage | Two (2) weeks |
| Total Duration | | Nine (9) weeks |
| 4 | Warranty period | Six (6) months |

The supplier, **One (1) week** after the signing of the contract shall perform the preliminary assessment of the buildings and present a detailed project implementation plan. Project plan itself shall include the network plan, testing, acceptance plan, and the detailed timeline of installation. Detailed network plan including:

- Data network endpoints locations in the offices

- Voice network endpoints locations in the offices

- Intermediate network equipment locations

- Wi-Fi access points locations

- Cabling pathways represented on the floor plans

Technical specialists from HNEC shall approve the installation plan before starting the installation stage. Overall installation work shall be completed within **Six (6) weeks**. The supplier shall start the installation from Building N2 and N3, security rooms and gates. During the installation, the Supplier shall provide reports to HNEC after finishing each stage and perform weekly meetings per request of HNEC staff to discuss the installation progress. At the end of the project, the supplier shall perform the testing and acceptance of the network (**Two (2) weeks**). The testing shall be performed with the presence and close cooperation of the HNEC IT specialists assigned for the management of this project and should be completed within the specified time. The testing shall include all the required tests described in the project implementation plan. With the testing, the supplier shall organise hands-on training for the HNEC staff on the management and maintenance of network infrastructure.

After the installation of the network, the Supplier shall provide Six (6) month warranty

- fixing network faults

- correction of technical defects and malfunctions identified during the warranty period

- technical support for IT staff of HNEC

**Project deliverables**

During the project, the supplier shall provide the following deliverables

Table 16

| N | Deliverable | Description |
|---|---|---|
| 1 | Project implementation plan (document) | The project implementation plan includes:<br>1. Project implementation timeline<br>2. List of required hardware<br>3. Testing and acceptance plan<br>   o Testing strategy<br>   o Timing of testing<br>   o Test plan<br>4. Deliverables acceptance objectives and approach<br>5. Training plan<br>6. Acceptance Criteria & Activities<br>The project plan shall be delivered at the end of the first stage. The Customer shall approve the project plan. |
| 2 | Detailed network design (document) | Detailed network plan includes:<br>● Network endpoints locations in the offices<br>● Phone endpoint locations in the offices<br>● Intermediate network equipment locations<br>● The detailed location plan of the wireless device and cables. (Wireless coverage areas of access points)<br>● Cabling pathways represented on the floor plans<br>Detailed network design shall be delivered at the end of the installation. The Customer shall approve the document. |

| 3 | Implementation of the network according to the design | Installation of the network according to the network design document<br>● Cabling and labelling<br>● Ducting, piping and all required civil works<br>● Installation of network/phone endpoints<br>● Installation of network devices including access points and switches<br>● Installation of the fire prevention system in server rooms<br>● Installation of the cooling systems<br>● Installation of the raised anti-static floor in server rooms<br>● Installation of access control solution<br>● Installation of the surveillance system and CCTV camera |
|---|---|---|
| 5 | Testing acceptance of the network | Testing organised and delivered in accordance with the test strategy and plan. |
| 6 | Training on knowledge transfer | Training courses delivered as required.<br>1. Training 1: Training for network technicians. During the training, all the details related to the network architecture and installation details should be provided by the vendor.<br>2. Training 2: Management of the surveillance system and CCTV camera. |
| 7 | Warranty support | The Supplier shall deliver Six (6) months warranty service:<br>● fixing network faults<br>● correction of technical defects and malfunctions<br>● technical support for IT staff of HNEC |