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MINISTRY OF HEALTH

EAST AFRICA'S CENTERS OF EXCELLENCE FOR SKILLS AND
TERTIARY EDUCATION IN BIOMEDICAL SCIENCES

PROPOSED CONSTRUCTION OF EAST AFRICA'S KIDNEY INSTITUTE
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NURSE CALL SYSTEM, PUBLIC ADDRESS & VOICE EVACUATION
SYSTEM INSTALLATIONS
(ALL RATES EXCLUSIVE OF TAXES)

EMPLOYER

PRINCIPAL SECRETARY
MINISTRY OF HEALTH
P.O BOX 30016-00100
NAIROBI, KENYA

EMPLOYER'S REPRESENTATIVE

WORKS SECRETARY
STATE DEPARTMENT OF PUBLIC WORKS
P.O BOX 30743-00100
NAIROBI, KENYA

PROJECT MANAGER

PROJECT MANAGER
EAST AFRICA'S CENTRE OF EXCELLENCE
PROJECT
MINISTRY OF HEALTH
P. O. BOX 30016 – 00100
NAIROBI, KENYA

LEAD CONSULTANT

M/S POLITECNICA INGEGNERIA ED
ARCHITETTURA SOCIETA COOPERATIVA
220, VIA GALILEO GALILEI 41126
MODENA; ITALY

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1 PART A: GENERAL SPECIFICATION

1.1 **General:**

The site of the proposed project shall be situated at Kenyatta National Hospital, Off Ngong Road, Nairobi.

1.2 **Reference Sites:**

The offered equipment shall have been sold in Kenya in sufficient quantities to provide good proof of a Tenderer's capability of handling similar projects. Tenderers shall supply a detailed record of similar equipment that have been installed by them.

In addition to ensure continued support of the proposed equipment from the manufacturer, the Tenderer must submit documentary evidence that they are indeed authorised and accredited distributor/reseller of the manufacturer.

1.3 **Cable Management:**

The necessary infrastructure (excluding conduit work and cable raceways) for the Proposed Systems shall be done by the Electrical Sub - contractor, however should additional requirements be necessary the Sub - Contractor shall provide all the working drawings showing all the necessary conduit/trunking cable ways.

1.4 **Systems Requirements:**

The systems shall comprise but not limited to the following:

- Nurse Call System
- Public Address & Voice Evacuation System

1.5 **Commencement of Works:**

The Tenderer in submitting his bid shall be deemed to have allowed for commencing the works on site immediately upon appointment.

1.6 **Scope of the Sub - contract Works:**

The Sub - contract Works shall comprise the supply, delivery, erection, testing, commissioning and setting to work of the complete **systems** as detailed in this Specification and accompanying Sub - contract Drawings.

The Tenderer shall include for all apparatus and appliances not particularly called for in this Specification or on the Sub - contract Drawings but which are necessary for the successful completion and satisfactory functioning of the Sub - contract Works.

It is deemed that if, in the opinion of the Sub - contractor at the time of tendering there exists a discrepancy in the Specification, Drawing or both, that the Sub - contractor clarifies this difference with the Engineer before tendering.

The Tenderer shall provide as an integral part of his bid a statement of compliance in which he shall clearly declare any items of the Specifications to which his offer does not comply and an alternative which is included in the offer.

The Sub - contractor shall be obliged to liaise with other parties involved in the project and to provide any necessary information as and when required.

No claims for extra payment shall be accepted from the Sub - contractor due to his failure to adhere to the above requirements.

The work to be installed under the Sub - contract shall comprise but not restricted to the supply and installation of the following complete as specified elsewhere in this Specification:

1. Wall/ ceiling mounted Outlets.
2. Pull Cords
3. Door Indicators
4. Speakers
5. Etc.

All equipment as far as is practicable shall be designed and manufactured by a single preferred manufacturer. In any case equipment shall be of uniform standards compatible in operation and spare parts trained support and maintenance facilities being available. In this regard the Tenderer shall produce a letter of guarantee and commitment from the equipment manufacturer for production at tender opening. Any tender without such a commitment letter shall be rejected.

1.7 Ordering of Materials:

The Sub - contractor shall order materials from quantities taken from his own approved working drawings and not from the quantities shown on the Sub - contract Drawings or in the Specification.

1.8 Builder's Work Requirements:

All chasing, cutting away and making good of walls and slabs shall be by the Main contractor.

1.9 Tender Return Items:

Drawings and publications illustrating the systems and equipment being offered against the schedules shall be returned with the Tender, together with a comprehensive description of the systems being offered to meet the requirements detailed elsewhere in the Specification.

1.10 Standards and Regulations:

The design, manufacture, selection, installation, testing, commissioning and subsequent maintenance of all equipment and materials described in this Specification shall comply with internationally recognised standards.

1.11 Documentation:

Record Drawings, Operating instructions, log book and certificates of installation and commissioning shall be provided adjacent to the control and indicating equipment at the end of the Sub - contract .

Operating and Maintenance Instructions shall be provided before the system is accepted. The instructions shall describe the system operation, zoning, routine care and maintenance, fault finding procedures and the function and settings of all controls.

The instructions shall include a full set of drawings, other manufacturer's handbooks and proprietary items and a complete list of spare parts provided and which are available. Full details shall be provided of all manufacturers and suppliers.

1.12 Defects Liability and Spares:

The Sub - contract or shall provide a comprehensive routine and emergency call out service for the defects liability period, and shall confirm the response time to be provided. This service shall include routine examination and any adjustments, cleaning, replacement of parts as required to keep the system in full working order.

All equipment shall have a minimum 1 year warranty period from the manufacturer.

The Tenderer shall include details of a proposed Maintenance Sub - contract to provide regular maintenance from the start of the defects liability period, in accordance with this specification. The Client is not bound to accept the offer from the Sub- contractor.

An appropriate set of spares shall be provided, including consumable and modular items, which can be replaced by on-site maintenance staff. A list of the proposed spare parts shall be provided with the Tender.

1.13 Inspection, Testing and Commissioning:

The Sub - contract or shall inspect, test and commission the works in accordance with the equipment manufacturer's recommendations. The results of all tests shall be recorded on the standard test forms unless otherwise specified.

Before completion of the installation the Sub - contract or shall submit to the Engineer for acceptance, a method statement of the procedure to be used for testing and commissioning, which has been agreed with the equipment manufacturers.

Before cables are terminated each cable shall be tested for continuity, insulation resistance, polarity and markings. Following satisfactory testing, cables shall be terminated in the equipment only by the manufacturer's appointed representative.

Power supplies shall be tested prior to making connections to the control equipment. The Sub - contractor shall allow for all necessary attendance during the testing and commissioning of any ancillary systems interconnected with the security system.

PART B

PARTICULAR SPECIFICATIONS

2 PART B: PARTICULAR SPECIFICATIONS - NURSE CALL SYSTEM

2.1 General

Equipment includes the following: all equipment listed and described in this document.

- Coordinate all work with other trades.
- Provide all incidental equipment and devices not mentioned herein that are required to provide a complete system and to realize a complete stable and safe operation thereof. All conduit, raceway, power, and grounding for these systems shall be installed or supplied by the Electrician.
- Provide a Renewable Annual Maintenance Agreement Proposal for all service work beyond the warranty period.
- After the system is completely installed and tested, provide the services of one technician to assist the User in adjusting the system and its terminations, connections and its programmed functionality. Provide a minimum of 16 hours unless otherwise specified.
- Drawings and conditions of the Sub - contract, including but not limited to General Conditions, and the Special Conditions listed below, apply to work of this section.
 1. Supplementary Instructions to Bidders
 2. Supplementary Conditions
 3. Summary of the Work
 4. Project Coordination
 5. Cutting and Patching
 6. Definitions and Standards
 7. Submittals
 8. Schedules and Reports
 9. Temporary Facilities
 10. Security Regulations
 11. Safety and Health
 12. Products
 13. Project Closeout

2.2 Project/Work Identification

Sub - contract documents indicate the scope of work of the Sub - contract, and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Sub - contract documents include, but are not necessarily limited to, the following:

1. site conditions and restrictions
2. Other work prior to work of Sub - contract
3. Alterations and coordination with existing work
4. Other work to be performed concurrently by User
5. Other work to be performed concurrently by separate Sub - contractors
6. Other work subsequent to work of Sub - contract
7. Requirements for occupancy by User prior to completion of work of Sub - contract

2.3 Project Objective

- A. This performance specification provides the minimum requirements for a supervised audio-visual Voice over IP-based Nurse Call System. The System shall include, but not be limited to all equipment, materials, labour, documentation, and services necessary to furnish and install a complete, operational Voice over IP-based Nurse Call System. The System shall have full duplex audio as well as "push to talk" control for high-noise areas. The System shall comply in all respects with all pertinent codes, rules, regulations, and laws of the hospital authority and local jurisdiction. The System shall comply in all respects with the requirements of the specifications, Manufacturer's recommendations and Underwriters Laboratories Inc. (UL) Listings.

- B. Each System shall be capable of supporting in excess of 1,000 Patient Stations (>2,000 beds) and 5,000 Peripheral Stations. The System shall support networking of systems to a single integrated platform for:
 1. Wireless communications system(s)
 2. Reporting Database
 3. ADT Integration
 4. Wireless Locating
 5. Electronic Whiteboard
 6. PC Staff Console (List View and Floorplan view) applications
 7. Patient/Staff Assignments
 8. Automatic/Manual Messaging

- C. It is further intended that upon completion of this work, the User be provided with complete information and drawings describing and depicting the entire System(s) as installed, including all information necessary for maintaining, troubleshooting, and/or expanding the System(s) at a future date, and complete documentation of System(s) testing.

2.4 Manufacturer

1. Acceptable Nurse Call System Manufacturers as Ascom Patient Systems US or any other approved equivalent manufacturer.
 - A. All equipment and components shall be the Manufacturer's current model. The materials, appliances, equipment, and devices shall be tested and listed by a nationally recognized approval agency for use as part of a Nurse Call System. The Manufacturer's representative shall be responsible for the satisfactory installation of the complete System.

 - B. The Sub - contract or shall provide, from the acceptable Manufacturer's current product lines, equipment and components, which comply, with the requirements of these specifications. Equipment or components, which do not provide the performance and features required by these specifications, are not acceptable, regardless of manufacturer.

 - C. The Manufacturer of the System equipment shall be regularly involved in the design, manufacture, and distribution of all products specified in this document. These processes shall be monitored under a quality assurance program that meets ISO requirements. The Manufacturer shall have the financial stability to provide project financing/lease options to the User if desired.

- D. All System components shall be the catalogued products of a single Supplier. All products shall be listed by the Manufacturer for their intended purpose.
- E. All connected field electronics shall be both designed and manufactured by the same company, and shall be tested to ensure that a fully functioning System is designed and installed. The VoIP-based Nurse Call System shall utilize Ethernet topology, switches, gateways, and devices. These devices shall make up a UL 1069 Listed nurse call LAN/WAN. The Nurse Call System shall be FDA Registered, Class II, 501(k) exempt.

2.5 Alternates

- A. Strict conformance to this specification is required to ensure that the installed and programmed System shall be function as designed, and shall be accommodate the future requirements and operations of the building User. All specified operational features shall be met without exception.
- B. The authorized Representative of the Manufacturer of the equipment shall be responsible for the satisfactory installation of the complete System.
- C. All equipment and components shall be the Manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approval agency for use as part of an audio-visual Voice Over IP-based Nurse Call System. The authorized Representative of the Manufacturer shall be responsible for the satisfactory installation of the complete System.
- D. All Annunciators, Staff Consoles, VoIP Staff Stations, IP Switches, Station Gateways, Telephone Gateways, IP Devices, Patient Stations, Dome Lights, and Peripheral Devices shall be provided by the same System Supplier, and shall be designed and tested to ensure that the System operates as specified. All equipment and components shall be installed in strict compliance with the Manufacturer's recommendations.
- E. Alternates to the equipment specified shall be considered only if all sections of the performance specification are met. Any deviations from System performance as outlined in this specification shall be considered only when the following requirements have been met:
 - 1. A complete description of proposed alternate System performance methods with three (3) copies of working drawings thereof shall be submitted to the User for approval not less than ten (10) calendar days prior to the scheduled date for submission of bids. The Supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed System complies fully with the paragraph, as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed System does not comply with the paragraph as written, and the Supplier feels the proposed System shall be accomplish the intent of the paragraph, a full description of the function, as well as a full narrative description of how its proposal shall be meet its intent, shall be provided. Any submission that does not include a point-by-point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed System does not comply.

2. The acceptability of any alternate proposed System shall be the sole decision of the User or their authorized Representative.

2.6 **References**

General (References)

- A. All work and materials shall conform to all applicable Federal, State, and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state, or local codes, and this specification, it is the Bidder's responsibility to immediately bring the conflict to the attention of the Engineer for resolution. National standards shall prevail unless local codes are more stringent. The Bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the Engineer.
- B. System components proposed in this specification shall be listed by Underwriters Laboratories, Inc. (UL) to operate together as a System. The Supplier shall be responsible for filing all documents, paying all fees (including, but not limited to plan checking and permits), and securing all permits, inspections, and approvals. Upon receipt of approved drawings from the authority having jurisdiction, the Supplier shall immediately forward two sets of drawings to the User. These drawings shall either be stamped as approved or a copy of the letter stating approval shall be included.

2.7 **Definitions**

ADT: Admission Discharge Transfer System

AFF: Above Finished Floor

AHJ: Authority Having Jurisdiction

Approved: Unless otherwise stated, materials, equipment, or submittals approved by the Authority or AHJ

Circuit: Wire path from a group of devices or appliances to a control module

DL: Dome Light

ESM: Event Subscription Manager

FDA: Food and Drug Administration

HL7: Health Level 7 protocol

IP: Internet Protocol

IPN: IP Network

PD: Peripheral Device

PN: Peripheral Network

PSpkr: Pillow Speaker

RTLS: Real Time Locate System

SC: Staff Console (Master Station)

UL or ULI: Underwriters Laboratories, Inc.

UL Listed: Materials or equipment Listed and included in the most recent edition of the UL Equipment Directory

2.8 System Description

2.8.1 General

- A. The System shall be network-based and incorporate decentralized, distributed intelligence architecture. This intelligent architecture shall be built on an IP (Internet Protocol) network. The System shall allow both data and voice to be distributed over a common network infrastructure, which is consistent with the communication industry. Communication devices on the network shall be utilize standards-based protocols. The System shall also provide a means of interoperability with 3rd party wired and wireless network devices within the facility, including PCs, PDA's, phones, databases, pagers, etc.
- B. Each System shall be capable of supporting in excess of 1,000 Patient Stations (>2,000 beds) and 5,000 Peripheral Stations. The System shall support networking of up to three Systems of this size.
- C. The System shall consist of (include):
 - 1. Staff Consoles and Annunciator Panels with colour touch screen LCD panels
 - 2. VoIP Staff Station with configurable colour touch screen for workflow & bed management operation
 - 3. Station Gateways
 - 4. Ethernet Switches/powered distribution hubs
 - 5. Single and Dual Patient Stations
 - 6. Configurable Single-Gang Push/Pull Type Peripheral Devices
 - 7. Single-Gang Dual Aux Input Stations with optional electrical isolation
 - 8. 1, 2, and 4-Section LED Corridor Lights
 - 9. Network Bridge and Configuration Software
 - 10. Telephone Gateway (Supporting Analog, T1 and/or SIP connectivity)
- D. The System shall be capable of integrating to:
 - 1. Most brands of in-building wireless telephone systems
 - 2. Most brands of pocket paging systems
 - 3. Hospital data gathering and reporting software
 - 4. Staff locating systems, wireless call cords, IPTV system, Public Address System, CCTV switching controls, and door access controls
 - 5. Patient-to-staff assignments, wandering patient alarm systems, bed exit and/or fall prevention alarm systems, and patient equipment calls
 - 6. Marquee display panels, PC monitors, and large screen monitors such as Flat Panel LCD or Plasma displays
 - 7. Select Electronic Medical Record (EMR) system(s)
- E. The System shall be capable of Hill-Rom and/or Stryker bed side-rail communication compatibility or any other approved equivalent including visual and audible annunciation of patient safety and fall prevention alarms generated by the bed and of disconnected bed.
- F. It shall be possible to configure the System using a modular, flexible GUI application that provides the system administrator the ability to manage, (add, delete, modify) and diagnose information within the nurse call network. Systems not supporting administrative access remotely shall not be accepted.

- G. The System shall not rely on any computer for operation. Systems requiring a PC to be connected for operation shall not be accepted.
- H. The system architecture shall not require external power supplies. Systems requiring power supplies to be installed separately from the control equipment shall not be accepted.

2.9 Stations

2.9.1 Patient Stations

- A. Patient Stations are a primary point of two-way communication between patients and staff. Equipped with three call buttons and a cancel button, they offer users an easy-to-operate means of placing calls on the patient-staff communications system. With a built-in speaker and microphone, these devices also provide patients with the means of opening a full-duplex channel of audio communications with attending staff, and vice versa. On-board LEDs provide operational feedback as well as status indication.
- B. Smart Patient Stations provide separate 18-pin receptacles for the connection of pillow speakers. Each station also comes equipped with two ¼" (0.64 mm) receptacles that can be programmed to accept either an input from auxiliary hardware having an FDA approved or cleared nurse call connection, or a bed call cord. An optional Smart Patient Station with two ¼" (.64 mm) receptacles only (no pillow speaker receptacle) shall be available for locations where only call cords are used, eliminating the receptacle concerns of contaminates for infection control.
- C. Patient Stations shall provide a durable 18-pin pillow speaker receptacle and two user-configurable ¼" jacks for use with call cords or as non-latching (auxiliary) inputs.
- D. Stations shall provide four buttons that are field configurable allowing User to define call priorities without ordering custom stations. Configuration software shall allow the User to select from a list of button templates. The system shall include default templates and allow the User to create and define custom templates.
- E. Patient Stations shall be available with an optional 37-pin bed interface receptacle on the front of the station, for use where bed interfaces are shown on plans, eliminating the need for separate devices.
- F. Systems unable to provide Patient Stations that support pillow speaker(s), bed interface(s), and up to two auxiliary inputs from the Patient Station shall not be accepted.
- G. Removal of the pillow speaker, bed interface or call cord/auxiliary alarm cable shall generate a cord out call.
- H. Stations shall NOT require the use of "dummy" plugs for any receptacles including call cord/auxiliary device, pillow speaker, and bed interface connections. Systems requiring a dummy plug to be inserted to cancel cord out calls shall not be accepted.
- I. Patient Stations must provide the ability to intentionally remove a device (call cord, pillow speaker, bed interface) without placing a call to the System. When this feature is activated, the removal of any of these items shall not send a cord out call.

- J. Stations must provide a cleaning mode to allow housekeeping to clean station surfaces without generating false calls. Activating cleaning mode shall temporarily disable the front panel buttons for a defined period of time.
- K. It shall be possible to cancel a call from any cancel button within a patient room by linking stations when configured to do so and code allows.
- L. Patient Stations shall be configurable for custom call types without custom ordering devices from the Manufacturer or replacing devices.
- M. Patient Stations shall have separate speaker and microphone to support full duplex audio. Systems using half-duplex audio (voice operated switch) shall not be accepted.
- N. Patient Stations shall include two independent auxiliary inputs (1/4" jacks) capable of supporting either latching auxiliary hardware having an FDA approved or cleared nurse call connection and/or non-latching call cords. Staff members shall be able to configure these inputs for latching or non-latching inputs at the station via a button press on the face of the station. The Patient Stations shall provide a visual indication of the auxiliary input status being set.
- O. Patient Stations shall have a status LED to indicate call and communication status.
- P. Each Patient Station button shall have a dedicated LED to indicate that the button has been pressed or is actively indicating a call. Patient Stations using a single LED to indicate the pressing of any button shall be not be accepted.
- Q. Patient Stations shall support a staff follow mode that, when activated, alerts staff to calls from other stations by an audible tone at the station in their current location. The staff follow tone shall match the tone of the incoming call priority.
- R. Patient Stations shall NOT have DIP switches that require manual setting by field personnel. Each Patient Station shall have a preconfigured identification number that specifies the station type automatically. Stations utilizing manual DIP switches shall not be considered.
- S. Patient Stations shall be hot swappable and not require system shutdown or removal of power prior to replacement.
- T. Patient Stations shall support simultaneous input of pillow speaker and bed. If either connection is removed, audio must automatically transfer to the remaining device or to the on-board station speaker.
- U. Volume levels for each Patient Station shall be adjustable on a station-by-station basis. Universal settings, or settings that affect an entire wing or floor, shall not be accepted.
- V. All Patient Stations shall be supervised.
- W. Each Patient Station shall connect to the System wiring via a single RJ-45 connector. All connections to television and light controllers shall be via removable lever connectors providing simple, hot swappable serviceability.
- X. Patient Stations shall provide on-board lighting to provide visibility in dark rooms.

2.9.2 Staff, Duty Stations

- A. Staff/Duty Station features shall be identical in operation to the Patient Station with the exception of the call cord, pillow speaker, and bed interface receptacles.
- B. Annunciation tones at Staff/Duty Stations must be identical to the tones generated by the Staff Console for each priority to clearly identify call types. Systems having duty tones that are not identical to tones generated by the Staff Console shall not be accepted. Room graphical displays shall be provided

2.9.3 VoIP Staff Stations

- A. The VoIP Staff Station is a dynamic communication device providing flexible operation via User defined menus and touch points utilizing factory provided templates. The VoIP Staff Station may provide communication needs including, but not limited to surgical communication, Patient room communication, room status signals, and nurse rounding timers, dispatch requests to supporting departments and speed dial operation to any device on the Telligence LAN or any other approved network. It operates as both a user interface and a communications device that sends and receives data and audio signals over the IP network. As an audio device, it provides audible signalling functions and facilitates two-way full-duplex staff patient and staff to staff communications.
- B. The VoIP Staff Station shall be IP-based, utilizing Voice over IP technology.
- C. The VoIP Staff Station shall have a 5.7" backlit colour touch LCD screen.
- D. The touch screen shall provide all necessary touch point soft keys as opposed to mechanical switches. Systems having mechanical switches shall not be accepted.
- E. The touch screen shall be configurable to support up to sixteen (16) menus. Each menu shall be capable of supporting up to sixteen (16) configurable touch points. Menus can be created via templates that can be applied to individual devices, or all devices in a given area, allowing simplified and efficient installation and ongoing management.
- F. Intercom audio between the VoIP Staff Station to any device on the Telligence or any other approved network shall be full duplex, and provide the ability to switch to half duplex for environments with excessive ambient noise and privacy control. Systems unable to support user selectable full duplex and one-way (half-duplex) audio shall not be accepted.
- G. The VoIP Staff Station shall connect to the nurse call LAN/WAN utilizing CAT. 6 cable and powered Ethernet. No separate power supply or wiring shall be used.
- H. The VoIP Staff Station shall support room devices for a minimum of two beds, including dome light and up to five peripheral stations. Systems requiring separate cable plan to support the nurse call devices and workflow devices shall not be accepted.
- I. The VoIP Staff Station shall provide a screen saver mode reducing ambient light in patient rooms when staff is not present. The time elapse from last use to screen saver shall be user configurable. With integration of RTLS the screen saver shall give way to the home screen when staff is registered in the room in which the VoIP Staff Station

resides.

2.9.4 Peripheral Stations

- A. Peripheral Stations are addressable initiating devices that provide patient room call-for-assistance indication to the patient-staff communications system. When a Peripheral Station is activated, visual indication of the call displays at the dome light associated with the patient room, and an appropriate call indication registers on the staff console, as well as on any installed and covering annunciators.
- B. Each room shall be capable of supporting more than nine Peripheral Stations. These stations shall be configurable to generate any level of call supported by the system configuration. Examples of Peripheral Stations are: Lavatory, Shower, Staff Emergency, Remote Cancel, Housekeeping, Code Blue, Code Pink, Urgent, Family Call, Staff Normal, Manual Presence, Auxiliary Inputs, etc.
- C. Pushbutton/Pull Cord Stations shall be field configurable to allow one, two, or three pushbuttons, with or without a pull cord.
- D. Call type/priority for each pushbutton or pull cord shall be programmable in system programming to annunciate the User-determined call type. The physical device button label shall be replaceable to match the specified call type/priority.
- E. Peripheral Station buttons shall be configurable for ‘Toggle On / Toggle Off’, supporting bed management, patient flow, workflow and other non-clinical type events, as defined by the User. Check latest configuration options to clarify any limitations.
- F. Peripheral Stations shall provide on-board lighting for visibility in dark rooms.
- G. Peripheral Stations shall require only two wires for installation.
- H. Each Peripheral Station button shall have a dedicated LED to indicate that the button has been pressed or is actively indicating a call.
- I. All Peripheral Stations shall have the ability to be individually numbered to represent a separate and distinct location, even stations that are in the same daisy chain.
- J. Peripheral Stations shall not require any screws to be removed for maintenance personnel to remove the station.
- K. Peripheral Stations shall NOT have DIP switches that require manual setting by field personnel. Each station shall have a preconfigured identification number that specifies the station type automatically. Stations utilizing DIP switches shall not be considered.
- L. Peripheral Stations shall be hot swappable and not require system shutdown or removal of power prior to replacement.
- M. Peripheral Station pull cords shall be made of a non-contaminant material to reduce the spread of nosocomial infections. Pull cords made of cotton or other absorbent materials shall be not be accepted.
- N. Peripheral Stations shall provide a cleaning mode to allow housekeeping to clean

station surfaces without generating false calls. Activating cleaning mode shall temporarily disable front panel buttons for a configurable period of time.

- O. All Peripheral Stations must be fully supervised.

2.10 Consoles, Annunciators and Lights

2.10.1 Corridor Lights

- A. Corridor (dome) and zone lights provide bright, easy-to-see visual annunciation that speeds response time and increases caregiver efficiency. These devices are typically installed in corridors and outside patient rooms to provide staff with a visual cue as to the origin of a call placed on the system.
- B. Corridor (dome) lights operate in a similar fashion to annunciator panels or staff consoles: the light colour and flash rate indicates the type and priority of the call. Models are available with one, two, or four sections.
- C. Each Corridor Light shall utilize Light Emitting Diodes (LED) for displaying colours. Corridor Lights utilizing incandescent bulbs shall not be accepted.
- D. Corridor and Zone Lights shall be available in one, two, or four sections.
- E. To maintain aesthetics, reduce obstruction, and limit risk of damage to devices, the maximum size of each Corridor Light shall not be greater than 5 inches in length, nor shall it protrude more than 3.5" from the mounted surface.
- F. Each Corridor Light section shall be capable of indicating in excess of eight User-selected configurable colours. Corridor Lights requiring more than four sections to provide this many colours shall not be acceptable.
- G. To allow for maximum flexibility, the Corridor Light shall be configurable via programming to allow multiple sections of a single light to illuminate and/or flash the same colour for higher priority calls.
- H. Corridor Lights shall be able to match most existing Corridor Light schemes via programming. Systems with corridor light schemes that are not able to match existing systems shall be not be accepted.
- I. Any corridor lights requiring the replacement of filter caps or lenses to obtain facility-requested corridor light colours for any priority shall not be accepted.
- J. Corridor Light shall provide a diagnostic indication of room status to prevent maintenance personnel from disrupting patients.

2.10.2 Staff Consoles

- A. The Staff Console is a primary point of contact among users of the system. It operates as both a user interface and a communications device that sends and receives data and audio signals over the IP network.
- B. As a user interface, the Staff Console alpha-numerically displays incoming calls from stations and connected healthcare equipment, and provides a means for the operator to

prioritize and respond to selected events. As an audio device, it provides audible signalling functions and facilitates two-way full-duplex staff/patient and staff/staff communications.

- C. The Staff Console shall provide visual identification of the calling station(s) by room number, bed identification, priority, station type or call type. Staff Console audible annunciation shall indicate priority level. Incoming calls shall be displayed on the colour display in the colours for their associated priority levels. Staff Console shall also display an elapsed time for each pending call.
- D. The Staff Console shall be IP-based, utilizing Voice over IP technology.
- E. The Staff Console shall have a 5.7" backlit colour touch LCD screen.
- F. The touch screen shall utilize programmable soft keys as opposed to a mechanical dial/touchpad.
- G. Staff Console display shall provide an adjustable tilt mechanism for viewing clarity.
- H. Intercom audio between the Staff Console and any station in the System shall be full duplex. Systems providing only one-way (half-duplex) audio shall not be accepted.
- I. The Staff Console shall connect to the nurse call LAN/WAN utilizing CAT 6 cable and powered Ethernet. No separate power supply or wiring shall be used.
- J. The call pending screen on the Staff Console shall allow five calls to be visible at a time and provide a simple scrolling function to view additional calls when more than six pending calls are present. Pending calls shall be displayed in priority order regardless of the order in which they are received.
- K. The Staff Console shall have the ability to "automatically select" incoming calls in order of priority, or to allow the user to select what call to answer from the pending calls list.
- L. The user shall have the ability to adjust the volume of the Staff Console incoming call tones.
- M. User shall be able to make available or remove selected functions/buttons from the Staff Console screens where selected functions are not to be used and to simplify operation. Functions/buttons that can be removed include Audio Page, Swing/Capture/Share and volume adjustments.
- N. User shall be able to make available or password protect selected functions/buttons from the Staff Console where functions are to be restricted to approved users. Functions/buttons that can be restricted include Audio Page, Swing/Capture/Share, Reminder Clear and volume adjustments.
- O. The Staff Console shall provide users the ability to go into half duplex mode to provide the ability to not transmit discussions at the nurse station into patient rooms.
- P. The Staff Console shall be able to call other Staff Consoles, Annunciators and VoIP Staff Stations on the same network. Staff Console/Annunciator/ VoIP Staff Station to

Staff Console/Annunciator/VoIP Staff Station audio shall be full VoIP, full duplex.

- Q. Staff Consoles and Annunciators shall be programmable to receive and display selected call priorities from desired areas, or to delay selected calls for a programmable interval.
- R. Staff Consoles shall have the ability to adjust independent talk and listen volume levels via easy-to-use touchscreen controls. These settings shall be adjustable on a room-by-room basis. Systems using group or zone-wide audio adjustments shall not be accepted.

2.10.3 Annunciator Panels

- A. The Annunciator provides a primary call display for users of the system. It operates as both a user interface and a communications device that sends and receives data and audio signals over the IP network.
- B. As a user interface, the Annunciator alpha-numerically displays incoming calls from stations and connected healthcare equipment, and provides a means for the operator to prioritize and respond to selected events. As an audio device, it provides audible signalling functions and facilitates two-way full-duplex staff/patient and staff/staff communications.
- C. The Annunciator shall provide visual identification of the calling station(s) by room number, bed identification, priority, station type or call type. The Annunciator shall indicate priority level. Incoming calls shall be displayed on the colour display in the colours for their associated priority levels. Annunciators shall also display an elapsed timer for each pending call.
- D. The Annunciator Panel shall be IP-based, utilizing Voice over IP technology.
- E. Annunciators shall have a 5.7" backlit colour touch LCD screen.
- F. The touch screen shall utilize programmable soft keys as opposed to a mechanical dial/touchpad.
- G. Annunciators shall provide intercom capability via panel speaker and microphone. Intercom audio between the Annunciators and any station in the System shall be full duplex. Systems utilizing one-way (half-duplex) audio shall not be accepted.
- H. The Annunciator shall connect to the nurse call LAN/WAN utilizing CAT 6 cable and powered Ethernet. No separate power supply or wiring shall be used.
- I. The Annunciator shall be able to call other Annunciators, Staff Consoles and VoIP Staff Stations on the same network. Staff Console/Annunciator/ VoIP Staff Station to Staff Console/Annunciator/VoIP Staff Station audio shall be full VoIP, full duplex.
- J. Staff Consoles and Annunciators shall be programmable to receive and display selected call priorities from desired areas, or to delay selected calls for a programmable interval.
- K. The call pending screen on the Annunciator shall allow five calls to be visible at a time and provide a simple scrolling function to view additional calls when more than six pending calls are present.
- L. The Annunciator shall have the ability to "automatically select" incoming calls in order

of priority, or to allow the user to select what call to answer from the pending calls list.

- M. User shall be able to make available or remove selected functions/buttons from the Annunciator screens where selected functions are not to be used and to simplify operation. Functions/buttons that can be removed include Audio Page, Swing/Capture/Share and volume adjustments.
- N. User shall be able to make available or password protect selected functions/buttons from the Annunciator where functions are to be restricted to approved users. Functions/buttons that can be restricted include Audio Page, Swing/Capture/Share, Reminder Clear and volume adjustments.

2.11 Network Equipment

2.11.1 Switches and Gateways

- A. All control equipment shall be IP-based, utilizing IP Switches and gateways for connection to room devices. These devices shall make up a UL 1069 Listed Nurse Call LAN/WAN. The controller equipment shall mount in a standard rack to be shared with the facility's IT equipment or shall mount in an independent rack. The IP switches and gateways shall have power supplies to support all field devices internally. Systems using a proprietary enclosure/card cage for central equipment and/or requiring power supplies apart from the control equipment shall not be accepted.
- B. IP Switches shall be networked, allowing all units/floors of a facility to connect as a single System. Each nurse call system shall connect to the hospital's network via a software bridge that isolates the hospital network from the nurse call network to maintain UL requirements. This connection to provide connectivity to supplemental features such as display screens, an ADT system, wireless telephones, pocket pagers, wireless Voice over IP devices, and a reporting database.

2.12 Call Cords

2.12.1 Single Call Cords

- A. Provide call cords as required. The call cord shall have a heavy duty, moulded, ¼" connector, a flexible PVC jacketed cable, and a moulded, flame retardant, ABS switch housing. The switch shall be the momentary contact type. The cord shall be <8'> in length, have an integrated sheet clip, and be suitable for ethylene oxide sterilization.
- B. Call Cords shall be of a sealed design with a smooth shape and minimal crevices to allow for easy, comprehensive cleaning to assist in keeping infectious contaminants out of the pendant and reduce the potential for cross contamination.
- C. An optional call cord shall be available providing a call assurance LED indicating to the patient a call has been placed.

2.12.2 Breath Call Cords

- A. Provide rate only for Breath call cords where needed for use by patients who do not have adequate use of their hands to initiate a call. The Breath call cord shall have a heavy duty, moulded, ¼" connector, a flexible PVC jacketed cable, and a momentary contact switch that is sensitive to air pressure. The cord shall be 9' in length, feature an

adjustable arm for clamping the call cord onto a headboard or bed frame, and be suitable for use in oxygen atmospheres. Each Breath call cord shall be furnished with twelve (12) replacement straws.

2.12.3 Air Bulb Call Cords

- A. Provide rate only for air bulb call cords where needed for use by patients who must remain distant from electrical fixtures. The air bulb call cord shall have a heavy duty, moulded, combination ¼" connector/air pressure sensitive switch. The "cord" shall consist of <6'> <10'> of flexible tubing terminated with an air bulb, have an integrated sheet clip, be suitable for use in oxygen atmospheres, and be suitable for ethylene oxide sterilization.

2.12.4 Geriatric Call Cords

- A. Provide rate only for geriatric call cords where for use by patients who have minimal use of their hands to initiate a call. The geriatric call cord shall have a heavy duty, moulded, ¼" connector, a flexible <white> <beige> <gray> PVC jacketed cable with a sensitive, momentary contact reed switch that requires only a gentle squeeze or tap to activate. The cord shall be 10' in length, have an integrated sheet clip, and be suitable for ethylene oxide sterilization.

2.12.5 Pillow Speakers

- A. Provide one (1) pillow speaker for each Single Patient Station and two (2) pillow speakers for each Dual Patient Station. The pillow speakers shall have an 18-pin, durable plug that can withstand accidental removal from station plug without damage to pillow speaker or patient station. The housing shall contain the nurse call button, a speaker, and buttons for TV volume control and channel control in a moulded, flame-retardant, ABS housing. The cord shall be 8' in length and have an integrated sheet clip.
- B. Optional 37-pin pillow speakers may be used to plug into 37-pin receptacles, either on the patient stations or on a separate device.

2.13 To Set Priority

While the room and bed number of a patient are selected and appear in the display window of annunciator panel, the system program shall allow the attendant to set any one of three groups of priority types by pressing the priority button (PRIORITY).

Patient Call Group—for assignment of one of three levels (Normal, Priority (Code Red), Emergency (code Blue)) to be displayed at the staff console as a four-character priority name when a patient or staffs places a call from the peripheral devices.

Selecting the desired priority shall cause the new priority to replace the old one, and the system shall acknowledge the successful change. The next time a call is placed by the patient or automatically placed by the device, the new priority (device name) shall be displayed at the master station.

2.14 Integrations

2.14.1 Interface engine

- A. Each nurse call UL 1069 Listed network shall connect to the hospital's network via a software bridge that isolates the hospital network from the nurse call network to maintain UL requirements. This connection to the hospital's network shall be allow the integration of supplemental systems such as:
1. Wireless communication system(s)
 2. Reporting Database
 3. ADT Integration
 4. Wireless Locating
 5. Electronic Whiteboard
 6. PC Staff Console applications
 7. Patient/Staff Assignments
 8. Automatic/Manual Messaging
 9. This integration shall provide a single database for the entire facility, for ease of administrator maintenance.
- B. The integration platform **MUST** be compatible with other Nurse Call Systems offered by the selected vendor to allow migration options to other Systems. A Manufacturer whose interface platform cannot be shared with their other Systems shall not be accepted. The browser-based Management Reporting is required

2.14.2 Management Reporting

- A. A server computer running Microsoft SQL Server and a reporting application shall reside on the hospital's network to monitor all nurse call activity and log events into the SQL database. Reporting applications that do not utilize Microsoft SQL Server shall not be acceptable. The nurse call events shall be retrievable in the form of user-defined reports. The reporting database must provide flexibility to generate reports for facility wide efficiency studies, unit performance statistics, incident report/details, and system performance/device failures.
- B. Staff members shall be able to generate and view reports from any networked PC with Internet Explorer 6.0. Systems requiring staff members to go to a dedicated PC to generate or review reports, or requiring special software applications such as pc Anywhere to be loaded on PCs to provide report access, shall not be accepted.
- C. The reporting database shall allow up to 25 user logins, and be expandable to 125 logins for access to generate or view reports. Systems that only allow a single user to generate or view reports at a time shall be considered unacceptable.
- D. Staff shall gain access to the reporting package via a login name and password. Each staff member's password shall determine which areas within the facility the staff member can include in his or her reports.
- E. The reporting system shall include a wizard that provides step-by-step instructions to the user. Help menus shall also be available so that the user does not need to refer to a hardcopy user manual for assistance.
- F. The reporting system must be capable of automatically generating scheduled

reports. When the report is generated, a hyperlink shall be emailed to predetermined recipients. The recipient may click on the hyperlink and log in to view the report. This is applicable to PC's on the hospital intranet with appropriate access in order to secure the data.

G. The reporting system shall allow report templates to be defined and saved. A user shall be able to select a template for fast and simple report generation. The system shall allow a minimum of 125 report templates to be set up and saved. The Reporting system shall have the option to provide up to 625 templates shall be available.

H. Reports shall be organized by the user to include and sort data by any or all the following categories:

1. Time and Date-Range in days, hours, and minutes
2. Shift-Range in hours and minutes
3. Room/Bed Number-A range of bed numbers between four to six digits
4. Area Name-19 characters assigned to a group of rooms
5. Call Priority-Seven levels
6. Event-Any combination or all nine events
7. Staff Level-Any one or all three levels
8. Patient Name-Up to 25 characters

I. Dependent on the user's report selections, a generated report shall include a statistical summary of the maximum and average times for the following event pairs at each priority level:

1. Place/Answer-The interval between the time a call is placed to the Staff Console and the time the Staff Console answers the call.
2. Place/Clear-The interval between the time a call is placed to the Staff Console and the time a staff member makes the first response by answering from the Staff Console, pressing the presence set button at the originating station, or pressing the CANCEL button at the originating station.
3. Place/Cancel-The interval between the time a call is placed to the Staff Console and the time it takes for a staff member to disconnect the call at the Staff Console (unless the reminder feature is activated), press the CANCEL button at the originating station, or press the presence clear button at the originating station.
4. Connect/Disconnect-The interval between the time a Staff Console either originates or answers a call and the time the Staff Console ends the call.
5. Reminder Set/Reminder Clear-The interval between the time the reminder feature is activated for a particular room/bed number and the time the reminder feature is cancelled.
6. Presence Set/Presence Clear, the interval between the time the presence feature is activated at a station and the time the presence feature is cancelled, with associated call/event.

J. The reporting system shall then take the Place/Answer, Place/Clear, Place/Cancel, and Reminder Set/Reminder Clear statistical summaries and display them in the report as a percentage in comparison to target rates determined by the administration. A percentage between 0 and 99 indicates that the staff's response

time did not meet the standards set by the author of the report or the administrator of the system.

- K. The reporting system shall allow each area of the facility to set target response times for each of the call priorities. Various types of exception reports shall be available to provide information about calls that were not handled within the department's target time. Systems with reporting packages that do not allow each area to set target times or to create exception reports shall not be accepted.
- L. The reporting system shall record system failure signals, thereby allowing maintenance personnel to generate reports relating to system reliability and service response times.
- M. Where supported, wireless phone integration (if present), shall provide the Nurse Call system an 'acknowledgement' of events sent to the wireless interface to be recorded in the reporting system providing historical data on the success of events being automatically routed to caregivers wireless devices. The client-based Shift Assignments are required

2.14.3 Patient, Staff Assignments

- A. Staff assignment software to assign staff to wireless devices and staff to beds shall be available via client-based software. The staff assignment screens shall be password protected. The login password shall determine the staff, beds and wireless devices available to the operator.
- B. The assignment screens shall allow the user to choose whether the patient name shall be displayed for each bed (requires an ADT interface), or whether each bed shall be simply indicate its current patient stations (occupied or empty).
- C. The staff assignment software shall allow for shifts to be created ahead of time and saved so that they can be reused.
- D. The staff assignment software shall provide active help to guide the user through the process (without opening a separate help screen). Help screens shall also be available for more detail instructions.
- E. The staff assignment software shall provide the ability to manage float staff. The user shall be able to reassign Staff that work in various locations throughout the hospital from one unit to another without entering the staff names into multiple databases.
- F. The staff assignment software must be client-based, allowing shift assignments to be completed from any networked computer in the facility. Systems requiring a dedicated PC for completion of staff assignments shall not be accepted.

2.14.4 Messaging

- A. The System shall allow text messages to be sent to wireless devices from a messaging browser. Login to the browser shall be password protected.
- B. The messaging software shall allow the user to send a message to a caregiver's wireless device by selecting either the caregiver's name, the caregiver's wireless device number, the number of the bed that requires assistance, or the name of the

patient that requires assistance (requires ADT interface). Systems that require the user to know who is assigned to a bed/patient in order to send a message shall not be accepted.

- C. The messaging software shall provide feedback to indicate that the wireless system has received the message. Systems that do not provide acknowledgment of sent messages shall not be accepted.
- D. The messaging software shall be browser-based, allowing users to send messages from any networked PC with Internet Explorer 6.0. Systems that require a dedicated PC or special software loaded onto individual PCs to provide messaging access shall not be accepted. The Wireless Telephone Integration is required

2.14.5 Wireless Telephone Integration

- A. The Nurse Call System shall allow connection to any brand of in-house wireless telephone system including wireless VoIP systems. This integration shall allow calls from patients to automatically ring the wireless device of the assigned caregiver(s). The wireless device must show the caregiver the bed number of the call, the call type/priority, and optionally either the unit name or the patient name (with presence of ADT interface).
- B. The wireless telephone integration shall allow no less than three levels of staff, plus a charge nurse and a "group," to be assigned to each patient/bed or call priority. These assignments shall be performed via the client-based assignments software. The rollover time from the primary staff member to the secondary, tertiary, and charge nurse shall be definable by the facility.
- C. A call escalation manager shall manage automatic messaging to wireless devices. The call escalation manager shall also provide group page functions that allow any defined group of devices to receive any selected call type(s). When a call is sent to a group, the call escalation manager shall also provide the ability to transmit a "call cancel" in the event of a call being attended to; remaining staff not yet on-site can be notified that the situation has been attended to.
- D. System shall be capable of integrating to wireless devices without the need for additional third party software.
- E. The wireless integration shall allow device failures in the Nurse Call System to generate an automatic call directly to a Biomed device.
- F. The Wireless integration shall not require User to disable functions of the wireless phones including voice mail.

2.14.6 Pocket Pager Interface

- A. The Nurse Call System shall allow connection to most brands of in-house pocket pager systems via TAP 1.8 protocol. This integration shall allow calls from patients to automatically send text messages to their assigned caregiver(s). The pager display must show the caregiver the bed number of the call, the call type/priority, and optionally the unit name or patient name (with presence of ADT interface).
- B. The pocket pager integration shall allow no less than three levels of staff, plus a charge

nurse and a "group," to be assigned to each patient/bed or call priority. These assignments shall be performed via the client-based assignments software. The rollover times between assigned caregivers shall be definable by the facility. Each Nursing Unit shall be have the ability to define rollover times independent of other department requirements.

- C. A call escalation manager shall manage automatic messaging to the pocket pagers. The call escalation manager shall also provide group page functions that allow any defined group of devices to receive any selected call type(s).
- D. The call escalation manager shall also provide the ability to transmit a Call Cancel in the event of a call being attended to; remaining staff not yet on-site can be notified that the situation has been attended to.

The pocket pager integration shall allow device failures in the Nurse Call System to generate an automatic page to a Biomed pager(s).

- E. The pocket pager integration shall allow housekeeping events to generate an automatic page to a Housekeeping device.

2.14.7 ADT Interface

- A. The System shall allow automatic monitoring of the facility's HL7 (Version 2.2/2.3) Admit, Discharge & Transfer (ADT) transactions, and shall parse selected patient demographic fields into the Nurse Call System's database. This data shall be made available to assignments, messaging, electronic white board, and reporting applications.

2.14.8 Net Board Electronic Whiteboard

- A. An electronic 'white board' shall provide automated, real-time patient and staff information. This software client shall display real-time data in a format configurable by the user. There shall be more than 40 fields of data available to display, selectable on a per unit or login basis. Twelve of these fields must allow for on-the-fly manual entry of notes pertaining to the bed/room that remain with the room, and an additional twelve fields for notes pertaining to the patient. Notes associated with the patient must transfer with the patient when moved to another bed/unit.
- B. Patient information shall automatically populate (with interface to ADT system).
- C. Staff information shall automatically update from the client-based assignments software.
- D. The electronic white board must allow up to 125 simultaneous logins, each having the ability to customize their screen as needed.

2.14.9 Telephone Gateway

- A. The nurse call network shall be equipped with an SIP compatible device that has SIP IP for connection to PBX extension ports.
- B. The telephone gateway shall provide access to wired telephones that are connected to the hospital's telephone system. It shall allow wired or wireless telephones to

communicate with Patient and Staff Stations. The call information shall include the room and bed identification, call type, and patient name (if available from ADT). The telephone gateway shall communicate using standard telephone protocols.

- C. The telephone gateway shall be programmable via any PC that is connected to the network, either onsite or remotely. The gateway shall support up to 512 stations on the Nurse Call System. The gateway shall accept multiple inputs and outputs to connect to multiple Systems on site.

2.14.10 List View Client Software

- A. List View Client Software shall be available to provide a list view of unit activity to supplement the Staff Console. This client shall provide information on:
 - 1. Pending calls
 - 2. Active reminders
 - 3. Reminder reason
 - 4. Staff Location (automated with presence of IR Locate)
 - 5. Patient record data (manually or automatically with presence of ADT Interface)
 - 6. Activity history per patient/bed including:
 - a) Calls
 - b) Audio connection to room
 - c) Reminders
 - d) Text messages (automatic and manual)
 - e) Staff Arrivals
 - 7. Nine levels of staff
- B. The List View Client shall automatically expand to show room summary for the first call on the pending calls list.
- C. Each List View login shall be capable of having a unique reminder reason and messaging list. Systems requiring all users to share the same remind and messaging list shall not be accepted.
- D. The List View Clients shall be password protected. The login password shall determine the units visible and view preferences for each client.
- E. List View Client's text colors shall be configurable to match Corridor Light settings.
- F. The List View Client shall be capable of messaging a caregiver (one of three levels assigned plus charge or team) from the List View screen
- G. Staff icons shall be configurable to match their staff type via one of nine available levels/colors. Systems limited to less than nine staff types shall not be acceptable.
- H. The List View Client shall be capable of running on an existing PC at the nurse station or on a PC dedicated to Nurse Call System functions. Systems requiring a dedicated PC for the functions listed shall not be accepted.
- I. List View Clients shall be capable of 'filtering' call activity based on call priority and/or what nursing unit the event was generated. Font size and color shall also be configurable. These features shall allow List View Clients to have the flexibility serve as system wide Supplemental Code Blue Display(s) and departmental status screens to allow LCD's or Plasmas to be used as an option to marquee displays.

2.14.11 Map View Client Software

- A. Map View Client Software shall be available to provide a map view of each nursing unit via login to supplement the Staff Console. This client shall display the following information:
1. Staff list shall sort by level, name, device type (phone/pager), and device ID
 2. 3D unit map
 3. Staff location via multi-coloured icons
 4. Call activity via room colour change
 5. Reminder icons
 6. Activity history per patient/bed including:
 7. Calls
 8. Audio connection to room
 9. Reminders (with optional Reminder reason)
 10. Text messages (automatic and manual)
 11. Staff Arrivals
 12. Location list shall be sortable by level, name, location or battery status
 13. Patient census list shall be sortable by patient name, bed number
 14. Unique icon for each device type (pager, phone, team)
 15. Display bed-by-bed, three levels of assigned staff plus charge and active teams
- B. Staff presence icons shall be configurable to match staff level/type. Up to nine colours/levels shall be available.
- C. The Map View shall be configurable on site using a pick and place set up wizard. Systems requiring CAD files to be imported or graphical software for creation of unit maps shall not be accepted.
- D. The Map View Client shall automatically show room summary for any selected room.
- E. The Map View Clients shall be password protected. The login password shall determine the units visible and view preferences for each client.
- F. The Map View Client shall be capable of running on an existing PC at the nurse station or on a PC dedicated to Nurse Call System functions. Systems requiring a dedicated PC for the functions listed shall not be accepted.

2.14.12 Real Time Locate System Integration

- A. The Nurse Call System shall allow connection to a third party Real Time Locate System (RTLS). The Locate “network” shall be an optional infrastructure integrated to Nurse Call via a software connection.
- B. The RTLS, when integrated to Nurse Call, shall be configurable to provide the following functionality when staff wearing a RTLS device enters a room:
1. A pending patient normal call shall be cancelled and all associated LED’s and signals shall be extinguished, if a Staff Console or Wireless Phone had not previously answered the call.

2. A pending reminder shall be cancelled and all associated LED's and signals shall be extinguished if the appropriate level of staff has entered the room for the given reminder level.
3. The matching coloured section of the corridor light, as assigned to the RTLS device of the staff member entering the room, shall steadily illuminate to indicate staff presence.
4. The Status LED on the Patient Stations shall steadily illuminate while staff is in the room.
5. While staff is registered in a patient room a double press of the call button on the bed rail, pillow speaker or call cord shall generate a Staff Emergency call, providing staff and patients an additional level of safety.
6. MapView, and ListView and NetBoard Clients shall indicate staff locations

C. The Management Reporting software (if present) shall record all events of staff entering and exiting patient rooms. This data shall be available to draw reports showing identification of staff entering patient rooms; time stamped and indicates duration with the patient when associated to a call.

The Nurse Call System's software (i.e. – List View Clients) shall be capable of displaying low battery signals (provided the RTLS sends this data to the Nurse Call System).

D. The RTLS shall be capable of supporting Equipment Tracking. Equipment tags shall be configurable providing the nurse call system the option to display device locations on the corridor lights.

2.15 Submittals

2.15.1 Project Submittal

- A. The Sub - contract or shall purchase no equipment for the System specified herein until the User has approved the project submittals in their entirety and has returned them to the Sub - contractor. It is the responsibility of the Sub - contract or to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the Sub - contract or to proceed with the installation and shall not be construed to mean that the Sub - contract or has satisfied the requirements of these specifications. The Sub - contract or shall submit three (3) complete sets of documentation within 30 calendar days after a purchase order is awarded.
- B. Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements in the Sub - contract documents. In addition, the Sub - contract or shall provide specific notation on each shop drawing, sample, catalogue sheet, installation manual, etc. submitted for review and approval, of each variation.

2.15.2 Closeout Submittal

- A. Two (2) copies of the following documents shall be delivered to the building User's Representative at the time of System acceptance. The closeout submittals shall include:
 1. Project-specific operating manuals covering the installed System.

2. As-built drawings consisting of: a scaled plan of each building showing the placement of each individual item of equipment, as well as raceway size and routing, junction boxes, and the conductor size, quantity, and colour in each raceway. All drawings must reflect point-to-point wiring, device addresses, and programmed characteristics.
3. The application program listing for the System as installed at the time of acceptance by the building User (disk, hard copy printout, and all required passwords).
4. The name, address, and telephone number of the authorized factory Representative.

2.16 Quality Assurance

2.16.1 Qualifications of Sub - contractor

- A. The Sub - contract or shall have successfully installed similar Systems of comparable size and complexity. The User reserves the right to reject any control components for which evidence of a successful prior installation performed by the Sub - contract or cannot be provided.
- B. The Sub - contract or shall have in-house engineering and project management capability consistent with the requirements of this project. Qualified and approved Representatives of the System Manufacturer shall perform the detailed engineering design of all control equipment. Qualified and approved Representatives of the System Manufacturer shall produce all drawings, submittals, and operating manuals. The Sub - contract or is responsible for retaining qualified and approved Representative(s) of those System Manufacturers specified for detailed System design and documentation, coordination of System installation requirements, and final System testing and commissioning in accordance with these specifications.

2.17 Pre-Installation Requirements

- A. The provider shall submit a detailed project plan that shall be describe in detail how the provider shall be approach the project from inception to finalization. The plan must include at a minimum the following information:
 1. Project Staging
 2. Project Management
 3. Equipment Schedules
 4. Installation Time Lines
 5. Other Trade Requirements
 6. Final Acceptance Testing
 7. Personnel Resumes
 8. Progress Report Sample
- B. All equipment and components shall be installed in strict compliance with each Manufacturer's recommendations. Consult the Manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc. before beginning System installation. Refer to the Manufacturer's riser/connection diagrams and details for all specific System installation/termination/wiring data.

2.18 Delivery, Storage and Handling

2.18.1 Receiving and Handling

- A. The Sub - contract or shall be responsible for all receiving, handling, and storage of his materials at the job site.
- B. Use of loading docks, service driveways, and freight elevators shall be coordinated with the User.

2.18.2 Storage

- A. The User shall be provide the Sub - contract or with a lockable storage space for the Sub - contractor's use during this project. The Sub - contract or shall be responsible for the security of this space.
- B. Overnight storage of materials is limited to the assigned storage area. Materials brought to the work area shall be installed the same day or returned to the assigned storage area unless previously approved by the User.

2.18.3 Rubbish

- A. The Sub - contract or shall remove rubbish and debris resulting from his work on a daily basis. Rubbish not removed by the Sub - contract or shall be removed by the User and back-charged to the Sub - contractor.
- B. Removal of debris and rubbish from the premises shall be coordinated with the User.

2.19 Project Conditions

2.19.1 Conditions

- A. It shall be the Sub - contractor's responsibility to inspect the job site and become familiar with the conditions under which the work shall be performed. Inspection of the building may be made by appointment with the User. Sub - contractors are requested to inspect the building prior to the pre-bid meeting.
- B. A pre-bid meeting shall be held to familiarize the Sub - contractors with the project. Failure to attend the pre-bid meeting may be considered cause for rejection of the Sub - contract or's bid. The minutes of this meeting shall be distributed to all attendees and shall constitute an addendum to these specifications.
- C. All work, except for may be conducted during normal working hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, by properly coordinating the work with the User. Noise restrictions do apply. The core drilling, testing of signals, and other work disruptive to occupants shall be prohibited between 6:00 a.m. and 6:00 p.m., Monday through Friday, and shall be explained at the pre-bid meeting. The Sub - contract or is to include, in his base bid, all overtime necessary to complete his work.
- D. The Sub - contract or shall be responsible for prior coordination of all work and demolition with the User.

2.20 Warranties and Maintenance

2.20.1 Warranty

- A. The Sub - contract or shall warranty all materials, installation, and workmanship for one (1) year from date of acceptance, unless otherwise specified. A copy of the Manufacturer's warranty shall be provided with closeout documentation and included with the operation and installation manuals.
- B. The System Supplier shall maintain a service organization with adequate spare parts stock within 75 miles of the installation. Any defects that render the System inoperative shall be repaired within 24 hours of the User notifying the Sub - contractor.

2.21 Training

2.21.1 Training

- A. The System Supplier shall schedule and present a minimum of 8 hours of documented formalized instruction for the building User, detailing the proper operation of the installed System.
- B. The instruction shall be presented in an organized and professional manner by a person who has been factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
- C. Optionally, in service training for clinical staff shall be conducted by clinical professionals. Vendors who cannot provide trainers with clinical background for in-service training shall not be accepted.

2.22 Installation

2.22.1 General

- A. All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place. Fasteners and supports shall be sized to support the required load.

2.22.2 Conductors

- A. The requirements of this section apply to all System conductors, DC power, and grounding/shield drain circuits, and to any other wiring installed by the Sub - contract or pursuant to the requirements of these specifications.
- B. All circuits shall be rated and power limited in accordance with the National Electrical Code (NEC), and installed in conduit or enclosed raceway. All System conductors shall be of the type(s) specified herein.

- Category 6
- 16 AWG Power (if applicable)

2.22.3 Conductors and Raceways

- A. The entire System shall be installed in a skilful manner in accordance with approved

Manufacturer's installation manuals, shop drawings, and wiring diagrams. The Sub - contract or shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets, and similar devices necessary for the complete installation. All wiring shall be of the type required by the NEC and approved for the purpose by local authorities having jurisdiction.

- B. Any shorts, opens, or grounds found on new or existing wiring shall be corrected prior to the connection of these wires to any panel component or field device.
- C. All penetration of floor slabs and firewalls shall be fire-stopped in accordance with all local fire codes.

2.23 Field Quality Control

2.23.1 Test & Inspection

- A. All wiring shall be tested for continuity, shorts, and grounds before the System is activated.
- B. All test equipment, instruments, tools, and labour required to conduct the tests shall be made available by the installing Sub - contractor.
- C. The System, including all its sequence of operations, shall be demonstrated to the User or his Representative. In the event the System does not operate properly, the test shall be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the User, his Representatives, and the Fire Inspector.
- D. At the final test and inspection, a factory-trained Representative of the System Manufacturer shall demonstrate that the System functions properly in accordance with these specifications. The Representative shall provide technical supervision, and shall participate during all of the testing for the System.

3 IP BASED PUBLIC ADDRESS AND VOICE EVACUATION SYSTEM

3.1 General Requirements & Scope

The PA/VA system shall be integrated with the fire detection and alarm system to provide the specified cause and effect / alarm sequencing in the event of a fire being detected within the building. The necessary interface units required to achieve the specified cause and effect shall be built within the PA/VA control equipment / racks and pre-wired to clearly marked terminals.

No modification of the CIE is allowable on site and all interface requirements must be carried out as part of the rack build prior to shipping to site.

The PA/VA controllers / routers shall be fully IP configurable and the system must have the capability of allowing up to 250 controllers being connected on a single system. Each controller shall be capable of controlling 4 channels of audio with simultaneous announcements from different sources being operated across all 4 channels.

Connection locally within a rack shall be via a CAT. 6 screened cable, where multiple racks are deployed around the site connection between the racks shall be achieved using a fibre optic cable certified to BS8434-2 for 'enhanced' operation in the event of a fire. Each rack on a network using the fibre optic cable shall be fitted with a fibre switch to control and manage the network connectivity, the fibre switch shall be EN54-16 certified.

The PA/VA equipment rack shall be supplied with a 4 way, duplex, fibre Patch panel and necessary supporting materials to allow the direct termination of the network fibre optic cable within the rack, external terminations of the network cable shall not be considered. The PA/VA network shall have a 100mbit bandwidth / capacity and be capable of transmitting ~200 concurrent messages.

The CIE shall be battery backed in the event of a failure of the mains supply for a period of 24 hours with the additional capacity of operating at full alarm load for a period of 30 minutes following this period. Standby batteries shall be provided in the form of sealed lead acid cells. The CIE shall be supported using an EN54-4 power supply unit. The racks supplied shall be IP31 rated with a glazed, lockable door. Please note that the PA/VA system indications must be visible with the door closed on the rack from a distance of 600mm.

Prior to the PA/VA racks being shipped to site a Factory Acceptance Test (FAT) shall be carried out at the manufacturer's premises; the FAT shall be confirm the system functionality (cause and effect) and fault free products prior to shipment of the CIE racks. The FAT tests being carried out shall be formally documented, copies of such being handed over as part of the overall O&M manuals on completion of the project.

The design of the loudspeakers required to provide the automatic and manual speech announcements in the building shall be in accordance with the requirements detailed in section 14 of BS5839-3: 2013.

The intelligibility level this project is to be designed to meet is 0.5STI. Where necessary the services of a specialist acoustic engineer shall be engaged and you shall provide a statement in your tender return confirming how you shall be achieve the audibility and intelligibility requirements of BS5839-8: 2013. Where necessary you shall be provide evidence in the form of an academic acoustic model.

The system supplied shall meet the following requirements with respect to audibility and intelligibility:

- 10dB greater than ambient background noise levels for speech messages
- The minimum audibility requirements of BS5839-1: 2013 for the attention grabbing tone preceding the emergency message

The spacing of loudspeakers shall be guided as per section 14 of BS5839-8:2013, particular attention shall be made in the design of loudspeaker layouts to the following:

Loudspeakers should be chosen primarily for their ability to produce an intelligible result rather than for aesthetic considerations such as size or appearance.

In a normal acoustic environment loudspeaker placement shall satisfy the following:

The distance between the centres of loudspeakers shall not greater than:

- 6m for unidirectional loudspeakers; and
- 12m for bi-directional loudspeakers

The unobstructed distance between the loudspeaker and any listener is not greater than:

- 6m for unidirectional loudspeakers; and
- 12m for bi-directional loudspeakers

The fire alarm evacuation zones associated with the PA/VA system specified are detailed within

The Public Address (PA) zones required are detailed in appendix 2.

The loudspeaker circuits to be installed shall be fully monitored and the system shall have the flexibility to be able to provide both impedance and/or end of line monitoring.

Impedance monitoring shall be employed in any circuit where there are 20 loudspeakers or less, where there are greater than 20 loud speakers on a given circuit end of line monitoring shall be employed. All loudspeaker zones shall be wired with a minimum of an A and B circuit with all loudspeakers being evenly distributed and interleaved across both circuits. In the event of a failure of a single circuit 50% of all loudspeakers shall remain in operation and evenly distributed.

The system supplied shall have the capability of having loudspeakers installed in the form of a loop within a single fire or PA zone. The loop shall be fitted with short circuit isolators between every 10 loudspeakers providing a high level of system integrity. A loudspeaker loop shall not exceed 1000M in length with a maximum load of 500 watts.

Paging and Fireman' Microphones shall be installed in accordance with appendix 3. The microphones shall be connected via the system data bus using a screened CAT. 6 cable (fire rated in the case of the Fireman's MIC's to BS8434-2) and wired in the form of a radial circuit back to the PA/VA rack/s.

The MIC's must be controlled and powered by the PA/VA CIE and supplementary PSU's local to the MIC's shall be not be permissible.

The maximum cable distance using a CAT. 6 cable between the MIC's and the PA/VA CIE shall not exceed 300M, where distances exceed 300M the system shall have the capability of being able to supply the wiring of the MIC's utilizing fibre optic cabling. The units shall be certified to EN54-16.

All amplifiers to be supplied shall be class D and fully monitored and available in sizes of 4 x 125 watts, 4 x 250 watts, 2 x 250 watts, 2 x 400 watts and 2 x 500 watts. The units shall be certified to EN54-16.

Where possible the use of Direct Drive Amplifier (DDA) shall be employed where the 100v loudspeaker line is driven directly from the amplifier and a secondary transformer is not employed. This option shall be allow racks to be both smaller and lighter. Any DDA amplifier used as part of the rack build shall have an internal EN54-4 battery charger. Standby amplification is not required in line with BS5839-8: 2013 section 16.

The voice alarm system specified shall have the capability of being controlled and managed via a Graphical User Interface (GUI). The GUI shall be supplied in the form of a touch screen PC and monitor with graphics pages drawn and imported to provide a visual overview of the site. The GUI provided must be able to control PA/VA zones or groups of zones in order to route messages, control entertainment equipment and make schedule announcements.

The GUI shall be supported on a PC with the following minimum specification:

- 1 GB RAM or higher
- Free hard disk space min 200MB
- CD-ROM / USB
- Network card 100 Mbit or higher
- Microsoft Windows®2000 / XP
- Professional / Vista / 7 compatible
- Monitor with 1280 x 1024 pixel (ratio 4:3, 16:9 not supported)

With the addition of a System Communication Unit (SCU) detailed further within this specification the following functionality shall be achieved via the GUI:

- Recording, prior listening and discarding of announcements
- Simultaneous play back of pre-recorded audio messages
- Scheduler function for automatically controlled audio messages
- System status and indication logging
- Call 'stacking' functionality where two calls may be transmitted to a common area simultaneously but shall be played individually according to their system priority level

Before commencement of construction of the rack/s for this project a User Requirements Document (URD) shall be completed, signed and issued to the specialist

supplier conforming that the product being built is in accordance with the design requirements of the project. The URD shall be confirm:

- VA Zones
- PA Zones
- Microphone's to be supplied (Paging and Fireman's)
- Standby battery requirements
- Special message requirements
- Entertainment system requirements

The following cable types shall be employed;

Voice Alarm Product;

Description	Cable type	Fire rated
Loud speaker	Cat 6	Yes
Fireman's microphone	Cat 6	Yes
Fire Interface	2 core	Yes
Network cable	Cat 6	Yes
Music interface	2 pair twisted	No

3.2 Technical Specification

Products to be supplied as part of this project shall meet the following technical specifications for each system component as detailed below. PA/VA Controller / Router for up to 24 loudspeaker zones (583362.22) System master control module with audio signal processing for connecting and controlling power amplifiers and associated control equipment with the following functionality:

- Four independent audio outputs for connecting power amplifiers (up to 500W per channel) and for simultaneous processing of up to four different audio channels per controller
- Connection of audio signal to one or up to six user-defined loudspeaker zones for each audio output to obtain up to twenty-four loudspeaker circuits per module (12No A&B Zones)
- Upgrade to a complex alarm/ public address system through integrated LAN interfaces
- Continuous monitoring of power amplifiers by means of a 22 kHz test tone. The defined loudness level is also taken into account for the backup amplifier (where employed)
- Continuous inaudible monitoring of loudspeaker circuits (earth faults, short / open circuits, and impedance deviations with specified tolerances for each loudspeaker circuit)
- Continuous monitoring of line and microphone of up to four connectable Microphones or universal input modules per control module
- Audio filters such as parametric equalizers, high and low-pass filters and delays per audio channel can be set
- Four sensor inputs for optional, continuous and automatic volume control in real time, independent of the ambient noise level
- Eight programmable, potential free contact outputs for controlling external components (e.g. priority relays) or for signalling various indicator states (collective fault messages)

- Four Ethernet 100 Mbit/s interface connections with switch function.
- Integrated TWI bus for optional connection of an additional module (e.g. time synchronization using TCM-GPS)
- Display for indicating operation status, errors, circuit connection, and active power-saving mode via multi-coloured LEDs
- Emergency control operation (Power Save) during a power failure to preserve battery capacity – this means not activating background music or low-priority announcements when there is a failure in the primary power supply. The connected amplifiers are switched to standby mode
- Non-volatile audio memory for up to 1 hour, freely scalable, for user specific canned audio

3.3 System communication unit (SCU)

The system communication unit (SCU) shall act as a digital audio memory for the PAVA system. The unit shall be provide a minimum of 50 channels of audio data to be recorded and played back at the same time – regardless of the available bandwidth from the PA/VA network.

The connection to a PA/VA system network shall be established via Ethernet and is monitored continuously, the SCU shall be housed within one of the equipment racks to be supplied as part of this project. As per EN54-16, the audio data for critical alarms and evacuation messages shall be stored on non-volatile flash memory. The memory capacity within the SCU shall be a minimum of 2 hours.

Additional messages, such as announcements, signals, music files or advertising texts, shall be stored on a hard drive within the SCU. The memory capacity shall be a minimum of 1,000 hours.

3.4 VCM display/control module

The View control module for clear and easy display of collective messages and for operation of the voice alarm system in accordance with the EN 54-16 standard with the following:

Each rack or system must have control and display indications to ensure compliance with EN54-16. In a networked system confirmation prior to the building of the control racks shall be sought to confirm which rack shall house the VCM module.

- 5 keys for operating the voice alarm system
- Integrated buzzer for acoustic signals

3.5 Power Amplifier

Power amplifier 4 x 125W; class D, 24 V DC (580242) highly efficient class D power amplifier having the following characteristics: Certified to EN54-16

- 4 x 125 watt channel Direct-Drive amplifier for voice alarm application that utilize industry standard 100V speakers (no step up secondary transformers on loudspeaker output) High efficiency (80% typical) Class D Amplifiers Delivers maximum possible power under any overload or overdrive condition to maintain intelligibility of voice messages

- Integrated temperature compensated battery charger certified to EN54 Part 4, capable of charging up to 65Ah battery pack
- Compliant with IEC BS EN 60268-3, 55013 55020 norms
- Microcontroller based extensive self-monitoring and control
- Protection against overload and wiring short
- Protection against overheating
- Temperature management with variable speed fan assisted cooling
- LED status display per audio channel for POWER, SIGNAL, CLIP, and FAULT
- LED status display for MAINS POWER; BATT POWER, CPU STATUS, SYSTEM FAULT
- Symmetrical audio inputs and control via CAT 5 cable with RJ45 connector
- 100 V outputs via pre-assembled system cable, lockable

3.6 Fully digital paging microphone (MIC)

Fully digital paging microphone (MIC) with electret microphone (cardioid characteristic) on a flexible 300 mm long gooseneck with the following functionality:

- Integrated broadband loudspeaker for monitoring and previewing purposes as well as intercom functions
- Continuous acoustic monitoring of microphone capsule. Acoustic monitoring is not only used to check the functioning of the voice coil but also of the capsule
- 12 freely programmable buttons, which can be individually labeled
- 13 integrated and 12 freely programmable LED display elements including a combined operation and error display
- Digital transmission of control signals and all four audio signals to and from the digital paging MIC and the supply voltage via DAL link
- The paging MIC shall be connected to the PAVA system controller via CAT 6 cable (screened) and RJ45 socket (up to 300 meters distance)
- Optional fiber optic connection for distances up to 2,000 meters
- RJ12 socket for connection with up to 6 expansion modules via daisy chain
- An audio input with 2 cinch sockets at the back of the digital call station for connecting an auxiliary device allows audio playback outside of the central control unit

3.7 Fireman's Microphone

Fully digital Fireman's microphone with handheld microphone and built in loudspeaker for monitoring and previewing purposes and intercom functions in surface-mounted or flush-mounted housing with the following functionality:

- Continuous acoustic monitoring of microphone capsule. Acoustic monitoring is not only used to check the functioning of the voice coil but also of the capsule

- Five freely programmable buttons for the alarm
- One button for the all-clear signal
- One button for reset/acoustic
- Three integrated LED display elements (in operation, fault, busy)
- Digital transmission of control signals and all audio signals to and from the digital call station and the supply voltage via DAL link
- The Fireman's MIC shall be connected to the PAVA system in star-shaped topology via CAT 5 cable and RJ45 socket (up to 300 meters distance)
- Optional fiber optic connection for distances up to 2,000 meters
- Display window and locking mechanism in accordance with EN 54-11
- Enclosure to be coloured Red

3.8 GPS time synchronization module

Module to all the PA/VA system to be time synchronization by means of GPS signals. This will allow accurately timed, automated announcements time-controlled volume adjustments or simply precise time-logging of announcements or trouble alarms.

The module shall be connected to the VA/PA system directly using a standard CAT. 6 cable (max. 10m) and shall be contained within one of the PA/VA racks to be supplied as part of this project.

A fault in the module or satellite reception is entered in the message list.

The GPS signal is transmitted to the receiver via the antenna and coaxial cable.

3.9 Graphical User Interface (GUI)

The Graphical User Interface is used to easily address zones, transmit and preview and voice announcements, and input and display text messages.

It shall be operated by means of a graphical user interface which displays the individual object with the loudspeaker or display zones. The application can also be used by means of a touch screen, so it has a simple and clear design and saves on space. The GUI shall have the following functionality:

The graphics shall be created simply and conveniently using a bitmap of the building. A paging microphone shall be required local to the GUI for voice announcements.

- Full-screen application, suitable for use via touch screen
- Graphical view (e.g. building layout) for zone selection and status display
- Zone display in table form with selection and status display
- LIVE announcements via PTT (press to talk) button on screen or paging microphone
- Record, preview and transmit announcements.
- Input text messages for display view
- Text display in conjunction with voice announcements
- Time-controlled text display, in intervals or loops
- Status display for each zone – assigned or error
- Several PC call stations on one TCP/IP LAN

- Project-specific Help function

3.10 Loudspeakers

Loudspeakers shall be supplied for this project meeting the specifications detailed below as a minimum. All loudspeakers supplied shall be EN54-24 certified.

3.11 5” Ceiling Loudspeaker

EN54-24 certified voice alarm ceiling loudspeaker designed for flush fixing into suspended ceiling c/w fire dome.

Note maximum spacing between ceilings loudspeakers shall not exceed 6M.

Technical Specification:

Max power Rated	9w
Power Rated	6w
SPL AT 1W/1M (100 HZ - 10 KHZ)	91dB
FREQUENCY RANGE (-10DB)	180 Hz - 20 KHz
RATED IMPEDANCE	1.7k Ω / 3.3k Ω / 6.7k Ω / 13k Ω
POE enabled	Yes

3.12 Network Equipment

3.12.1 Switches and Gateways

A. All control equipment shall be IP-based, utilizing IP Switches and gateways for connection to room devices. These devices shall make up a UL 1069 Listed PA/VA system LAN/WAN. The controller equipment shall mount in a standard rack to be shared with the facility's IT equipment or shall mount in an independent rack. The IP switches and gateways shall have power supplies to support all field devices internally. Systems using a proprietary enclosure/card cage for central equipment and/or requiring power supplies apart from the control equipment shall not be accepted.

B. IP Switches shall be networked, allowing all units/floors of a facility to connect as a single System. Each PA/VA system shall connect to the hospital's network via a software bridge that isolates the hospital network from the nurse call network to maintain UL requirements. This connection to provide connectivity to supplemental features such as display screens, an ADT system, wireless telephones, pocket pagers, Nurse Call, wireless Voice over IP devices, and a reporting database.

3.13 Examination

A. Examine conditions, with the Installer present, for compliance with requirements and other conditions affecting the performance of the wireless clock system.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.14 Installation

3.14.1 General:

Install system in accordance with applicable codes. Install equipment in accordance with manufacturer's written instructions.

A. Wiring Methods:

1. Conceal wiring except in unfinished spaces.
2. All new wiring on this project must be properly rated for the application.
3. Cable to the new devices at new locations shall be installed in a neat and professional manner, following the standard procedures used in the electrical Sub - contract ing trade.
4. Exposed wiring shall not be permitted under any circumstances on this project.
5. Any wiring, which is considered sloppy by the Engineer, shall be strictly unacceptable.
6. Upon installation completion, a room-by-room test shall be conducted for every device in the system. A technician shall perform the test after school hours, and repairs shall be performed as needed at no cost to the Engineer to any devices, which do not function correctly, including cable. A written room-by-room report following testing and repairs shall be prepared and submitted to the Engineer.

3.14.2 Field Quality Control

A. Sub - contract or Field Service:

1. Provide services of a service representative for this project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.

B. Inspection

1. Make observations to verify that units and controls are properly labelled.

C. Testing:

1. Rectify deficiencies indicated by tests and completely re-test work affected by such deficiencies at the Sub - contractor's expense. Verify by the system test that the total system meets the specifications and complies with applicable standards.

3.14.3 Commissioning

Train Engineer's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventative maintenance of the system. Operator Manuals and User Guides shall be provided at the time of this

training.

Schedule training with Engineer through the Architect, with at least seven (7) days advance notice.

3.14.4 Cleaning And Protection

Prior to final acceptance, clean system components and protect from damage and deterioration.

PART C

PRICE SCHEDULES

4 PART C: PRICE SCHEDULES

4.1 GENERAL NOTES TO TENDERERS

1. The Bills of Quantities form part of the Sub - contract documents and are to be read in conjunction with the Sub - 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 (**excluding 16% VAT**).
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 thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the Sub - contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality shall be accepted.
5. Should the Sub - contractor install any material not specified here in before receiving **written approval** from the Project Manager, the Sub - contractor shall remove the material in question and, **at his own cost**, install the proper material.
6. The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.
7. The Bills of Quantities are divided generally into three sections:-

a. Sub - contractual Requirements – Bill 1

Sub - contractors Sub - contractual requirements as called for the bill of quantities shall be priced and included in the tender. 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

The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the Sub - contract Drawings, conditions of Sub – contract and specifications. The unit of measurements and observations are as per Volume 1 or as indicated in the Bills of Quantities.

c. Summary

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, summary volume included. The Sub - Contractor shall insert his totals and enter his grand total tender sum in the summary of prices of Volume 1.

4.2 BILLS OF QUANTITIES

SECTION D.W. 1.0 TITLE: PRELIMINARIES & CONTRACTUAL REQUIREMENTS

Item	Description	Unit	Qty	Rate	KShs.
1	<u>CONTRACTUAL REQUIREMENTS</u>				
A.	Preparation of working drawings, printing and distribution.	Sum			
B.	Preparation of ‘As Installed Drawings’, printing and distribution as specified. Drawings to include: (a) Blue Prints - 4 sets of each. (b) AutoCAD on CD – 2 No. (c) Operational Instructions, manuals and test certificates	Sum			
		Sum			
		Sum			
C.	Allow Kshs. 4,200,000.00 Provisional sum for overseas factory inspection to cater for 6 No. persons (Client Rep- 1 No., SDPW Electrical Engineer – 2 No., User Departments Reps – 2 No., Consulting Electrical Engineer – 1 No.) for Nurse call & PA	Sum			4,200,000.00
D.	Any other item necessary to complete the installations in this section (please state)	Sum			

Total Carried to Main Summary of Prices

SECTION D.W. 2.0 TITLE : NURSE CALL

Item	Description	Unit	Qty	Rate	KShs.
2.1	<p><u>Nurse Call System</u></p> <p>- For the supply, Installation, testing & commissioning of the following complete with associated accessories as specified and shown on the drawings.</p>				
A.	Two Way Communication/Intelligent/IP Based Nurses Call Master Station (Staff Console) complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved.	No.	1		
B.	<p>Two Way Communication/Intelligent/IP Based Nurses Call Repeater Station (Staff Console) complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;</p> <ul style="list-style-type: none"> ▪ Ground Floor ▪ First Floor ▪ Second Floor 	No. No. No.	5 5 4		
C.	<p>IP Based Nurses Call Display Unit Station complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;</p> <ul style="list-style-type: none"> ▪ Ground Floor ▪ First Floor ▪ Second Floor 	No. No. No.	3 2 6		
D.	<p>Two Way Communication/IP Based Patient Emergency Station (Code Blue) (Patient Console) complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;</p> <ul style="list-style-type: none"> ▪ Ground Floor (Recovery Area) ▪ First Floor (ICU Area) 	No. No.	11 19		
Total carried forward to next page					

Item	Description	Unit	Qty	Rate	KShs.
E.	Two Way Communication/IP Based Patient Emergency Station (Code Red) (Patient Console) complete with Extension cord, RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;				
	▪ Ground Floor	No.	31		
	▪ First Floor	No.	7		
	▪ Second Floor	No.	80		
F.	Two Way Communication/IP Based Staff or Doctor Emergency Station (Staff Console) complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;				
	▪ Ground Floor	No.	8		
	▪ First Floor	No.	18		
	▪ Second Floor	No.	4		
G.	Two Way Communication/IP Based Staff or Duty Station (Staff Duty Console) complete with RJ45 Connector and any other associated accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;				
	▪ Ground Floor	No.	20		
	▪ First Floor	No.	14		
	▪ Second Floor	No.	5		
H.	Nurses Call washroom Pull cord station complete with associated wiring and accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;				
	▪ Ground Floor	No.	20		
	▪ First Floor	No.	7		
	▪ Second Floor	No.	31		
I.	3no. display colour system Nurses Call Zone/Dome light (ceiling or wall mounted) complete with associated wiring and accessories as Telligence C600, IP Fusion Ultima or equal and approved as follows;				
	▪ Ground Floor	No.	63		
	▪ First Floor	No.	44		
	▪ Second Floor	No.	127		
Total carried forward to next page					

Item	Description	Unit	Qty	Rate	KShs.
J.	48 Port Data POE switch as Cisco 3850 Series configured per Telligence C600, IP Fusion Ultima system or equal and approved to support Nurses Call System complete with links, 48 Port patch panels, cables organizers, Dual redundant modular power supplies and associated accessories as follows;				
	▪ Ground Floor	No.	2		
	▪ First Floor	No.	2		
	▪ Second Floor	No.	2		
K.	Supply and installation of rack mounted server unit configured per Telligence or IP Fusion system or equal and approved complete with Dual redundant modular power supplies and associated accessories, management software, licenses and a programming work station to complete the installation.	No.			
			1		
L.	Allow use and configuration of the above system with Structured Cabling done by others (Cables by others)	Sum		.	
M.	Allow for interconnection and programming of the the Nurses Call System	Sum		.	
N.	Allow for interfacing with the Public Address System, Master Clock System and Fire Detection & Alarm System as call for and approved by Engineer.	Sum		.	
O.	Installation, testing & commissioning	Sum			
P.	Labeling, Documentation, 2 year Warranties, associated Training and certification.	Sum			
	N.B; Provide comprehensive list of spare part and associated part numbers for above system				
Q.	Any other item necessary to complete installation in this section (Please state)	Sum		.	
Total carried forward to Main Summary of Prices					

SECTION D.W. 3.0 TITLE : IP BASED PUBLIC ADDRESS AND PIPED MUSIC SYSTEM

Item	Description	Unit	Qty	Rate	KShs.
3.1	<u>IP Based Public Address and Piped Music System</u> For the supply, Installation, testing & commissioning of the following complete with associated accessories as specified and shown on the drawings.				
A.	IP Based 91dB, 9W RMS, 5” ceiling/ surface mounted speakers as Honeywell or approved equivalent complete with associated accessories as follows; <ul style="list-style-type: none"> ▪ Basement Level ▪ Ground Floor ▪ First Floor ▪ Second Floor 	No.	43		
		No.	67		
		No.	56		
		No.	35		
B.	IP Based microphone as Honeywell or approved to be installed at the announcement station/ remote paging complete with associated accessories	No.			
			6		
C.	Supply and installation of rack mounted IP Based Public Address controller Server complete with Back Ground Music Player and associated accessories, management software, licenses to complete the installation.	No.			
			1		
D.	48 Port Data POE switch as Cisco 3850 Series configured to support Honeywell Series software or equal and approved to support PA/VA System complete with links, 48 Port patch panels, cables organizers, Dual redundant modular power supplies and associated accessories as follows; <ul style="list-style-type: none"> ▪ Basement Level ▪ Ground Floor ▪ First Floor ▪ Second Floor 	No.	2		
		No.	3		
		No.	3		
		No.	2		
E.	Allow use and configuration of the above system with Structured Cabling done by others (Cables by others)	Sum			
		.			
F.	Allow for interconnection and programming of the the above System	Sum			
		.			
G.	Allow for interfacing with the Master Clock System, Nurses Call System and Fire Detection & Alarm System as call for and approved by Engineer.	Sum			
		.			

Total carried forward to next page

Item	Description	Unit	Qty	Rate	KShs.
H.	Installation, testing & commissioning	Sum			
I.	Labeling, Documentation, 2 year Warranties, associated Training and certification.	Sum			
	N.B; Provide comprehensive list of spare part and associated part numbers for above system				
J.	Any other item necessary to complete installation in this section (Please state)	Sum			
Total carried forward to Main Summary of Prices					

NURSES CALL, AND PUBLIC ADDRESS SYSTEMS INSTALLATION
MAIN SUMMARY OF PRICES

Item	Description	Unit	QT Y	Rate	KShs.
DW 1.0	Section 1 Preliminaries and Contractual Requirements				
DW 2.0	Section 2 Nurse Call System				
DW 3.0	Section 3 IP Based Public Address and Piped Music System Sub Total				
Total Carried Forward to Main Summary of Volume I					

5 PART D: TECHNICAL SCHEDULE

5.1 Documentation Requirements

Document	With Bid	Before Manufacture	During FAT	Upon Delivery
Preliminary general arrangement drawing (with dimensions)	YES			
QA / QC Plan in accordance with ISO 9001:2008		YES		
General arrangement drawing (with dimensions)		YES		
Schematics/Line diagrams for construction	N/A	YES	N/A	N/A
Recommended Spares List	N/A	N/A	N/A	YES
Routine Test Reports / Certificates			YES	
Type Test Reports / Certificates	N/A	N/A	YES	N/A
Commissioning Procedure	N/A	N/A	N/A	YES
As-built General arrangement drawing			YES	
As-built Schematics			YES	
Site Test Reports / Certificates				YES
Special Test Reports / Certificates	N/A	N/A	YES	NO

5.2 Technical Schedule

The tenderer **MUST SUBMIT** comprehensive manufacturer's technical brochures and performance details for all items listed in this schedule (fill forms attached).

ITEM No.	Description	Remarks
A	Nurse Call system	
B	Master clock system	
C	Public Address system	

PART E:

DRAWING SCHEDULE

6 PART E: DRAWING SCHEDULE

6.1 DRAWING SCHEDULE:

As shall be provided during project implementation.