SECTION 27 52 23
NURSE CALL AND CODE BLUE SYSTEMS

PART 1 - GENERAL

1.1 SECTION SUMMARY

A. Work covered by this document includes design, engineering, labor, material and products, equipment warranty and system guarantee, training and services for, and incidental to, the complete installation of new and fully operating National Fire Protection Association (NFPA) – Life Safety Code 101.3-2 (a) Labeled and (b) Listed, Emergency Service Nurse-Call and/or Life Safety listed Code Blue Communication System and associated equipment (here-in-after referred to as the System) provided in approved locations indicated on the contract drawings. These items shall be tested and certified capable of receiving, distributing, interconnecting and supporting Nurse-Call and/or Code Blue communications signals generated local and remotely as detailed herein.

B. Work shall be completed, Occupational Safety and Health Administration (OSHA), National Recognized Testing Labatory (NRTL – i.e. Underwriters Laboratory [UL]) Listed and Labeled; and VA Central Office (VACO), Telecommunications Voice Engineering (TVE 005OP3B) tested, certified and ready for operation.

C. The System shall be delivered free of engineering, manufacturing, installation, and functional defects. It shall be designed, engineered and installed for ease of operation, maintenance, and testing.

D. The term “provide”, as used herein, shall be defined as: designed, engineered, furnished, installed, certified, tested, and guaranteed by the Contractor.

E. Specification Order of Precedence: In the event of a conflict between the text of this document and the Project’s Contract Drawings outlined and/or cited herein; THE TEXT OF THIS DOCUMENT TAKES PRECEDENCE. *HOWEVER, NOTHING IN THIS DOCUMENT WILL SUPERSEDE APPLICABLE EMERGENCY LAWS AND REGULATIONS,* SPECIFICALLY NATIONAL AND/OR LOCAL LIFE AND PUBLIC SAFETY CODES. The Local Fire Marshall and/or VA Public Safety Officer are the only authorities that may modify this document’s EMERGENCY CODE COMPLIANCE REQUIREMENTS, on a case by case basis, in writing and confirmed by VA’s Project Manager (PM), Project Engineer (RE) and TVE-005OP3B. *The VA PM is the only approving authority* for

other amendments to this document that may be granted, on a case by case basis, in writhing with technical concurrencies by VA's PM, RE, TVE-005OP3B and identified Facility Project Personnel.

F. The Original Equipment Manufacturer (OEM) and Contractor shall ensure ***that all*** management, sales, engineering and installation personnel have read and understand the requirements of this specification ***before*** the system is designed, engineered, delivered and provided. The Contractor shall furnish a written statement stating this requirement as a part of the technical submittal that includes each name and certification, including the OEMs. The Contractor is cautioned to obtain ***in writing, all approvals for system changes relating to the published contract specifications and drawings, from the PM and/or the RE before proceeding with the change***.

1.2 RELATED SECTIONS

A. 01 33 23 – Shop Drawings, Product Data and Samples.

B. 07 84 00 – Firestopping.

C. 26 05 21 – Low – Voltage Electrical Power Conductors and Cables (600 Volts and Below).

D. 27 05 11 – Requirements for Communications Installations.

E. 27 05 26 – Grounding and Bonding for Communications Systems.

F. 27 05 33 – Raceways and Boxes for Communications Systems.

G. 27 10 00 – TIP Structured Communications Systems Cabling.

H. 27 11 00 – TIP Communications Interface and Equipment Rooms Fittings.

I. 27 15 00 – TIP Communications Horizontal and Vertical Cabling.

1.3 DEFINITION

A. Provide: Design, engineer, furnish, install, connect complete, test, certify and guarantee.

B. Work: Materials furnished and completely installed.

C. Review of contract drawings: A service by the engineer to reduce the possibility of materials being ordered which do not comply with contract documents. The engineer's review shall not relieve the Contractor of responsibility for dimensions or compliance with the contract documents. The reviewer's failure to detect an error does not constitute permission for the Contractor to proceed in error.

D. Headquarters (aka VACO) Technical Review, for National and VA Communications and Security, Codes, Frequency Licensing Standards, Guidelines and Compliance:

Office of Telecommunications
Special Communications Team (005OP3B)
1335 East West Highway – 3rd Floor
Silver Spring, Maryland 20910,
(O) 301-734-0350, (F) 301-734-0360

G. General Contractor (GC): H. Contractor: Systems Contractor; you; successful bidder.

1.4 REFERENCES

A. The installation shall comply fully with all governing authorities, laws and ordinances, regulations, codes and standards, including, but not limited to:

1. United States Federal Law:

a. Departments of:

1) Commerce, Consolidated Federal Regulations (CFR), Title 15 – Under the Information Technology Management Reform Act (Public Law 104-106), the Secretary of Commerce approves standards and guidelines that are developed by the:

a) Chapter II, National Institute of Standards Technology (NIST – formerly the National Bureau of Standards). Under Section 5131 of the Information Technology Management Reform Act of 1996 and the Federal Information Security Management Act of 2002 (Public Law 107-347), NIST develops – Federal Information Processing Standards Publication (FIPS) 140-2—Security Requirements for Cryptographic Modules.

b) Chapter XXIII, National Telecommunications and Information Administration (NTIA – aka ‘Red Book’) Chapter 7.8 / 9; CFR, Title 47 Federal communications Commission (FCC) Part 15, Radio Frequency Restriction of Use and Compliance in “Safety of Life” Functions & Locations.

2) FCC - Communications Act of 1934, as amended, CFR, Title 47 – Telecommunications, in addition to Part 15 – Restrictions of use for Part 15 listed Radio Equipment in Safety of Life / Emergency Functions / Equipment/ Locations (also see CFR, Title 15 – Department of Commerce, Chapter XXIII – NTIA):

a) Part 15 – Restrictions of use for Part 15 listed Radio Equipment in Safety of Life / Emergency Functions / Equipment/Locations.

b) Part 58 – Television Broadcast Service.
c) Part 90 – Rules and Regulations, Appendix C.

3) Health, (Public Law 96-88), CFR, Title 42, Chapter IV Health & Human Services, CFR, Title 46, Subpart 1395(a)(b) JCAHO "a hospital that meets JCAHO accreditation is deemed to meet the Medicare conditions of Participation by meeting Federal Directives:"
   a) All guidelines for Life, Personal and Public Safety; and, Essential and Emergency Communications.
4) Labor, CFR, Title 29, Part 1910, Chapter XVII - Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Standard:
   a) Subpart 7 - Definition and requirements (for a NRTL – 15 Labatory's, for complete list, contact (**http:www.osha.gov/dts/otpca/nrtl/faq_nrtl.html**):
      1) UL:
         a) 44-02 – Standard for Thermoset-Insulated Wires and Cables.
         b) 65 – Standard for Wired Cabinets.
         c) 83-03 – Standard for Thermoplastic-Insulated Wires and Cables.
         d) 467-01 – Standard for Electrical Grounding and Bonding Equipment
         e) 468 – Standard for Grounding and Bonding Equipment.
         f) 486A-01 – Standard for Wire Connectors and Soldering Lugs for Use with Copper Conductors
         g) 486C-02 – Standard for Splicing Wire Connectors.
         h) 486D-02 – Standard for Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
         i) 486E-00 – Standard for Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
         j) 493-01 – Standard for Thermoplastic-Insulated Underground Feeder and Branch Circuit Cable.
         k) 514B-02 – Standard for Fittings for Cable and Conduit.
         l) 1069 – Hospital Signaling and Nurse Call Equipment.
         m) 1449 – Standard for Transient Voltage Surge

Suppressors.

n) 1479-03 – Standard for Fire Tests of Through-Penetration Fire Stops.

o) 1666 – Standard for Wire/Cable Vertical (Riser) Tray Flame Tests.

p) 1863 – Standard for Safety, Communications Circuits Accessories.

q) 2024 – Standard for Optical Fiber Raceways.

r) 60950-1/2 – Information Technology Equipment – Safety.

2) Canadian Standards Association (CSA): same tests as for UL.

3) Communications Certifications Labatory (CCL): same tests as for UL.

4) Intertek Testing Services NA, Inc. (ITSNA formerly Edison Testing Labatory [ETL]): same tests as for UL.

b) Subpart 35 – Compliance with NFPA 101 – Life Safety Code.

c) Subpart 36 - Design and construction requirements for exit routes.

d) Subpart 268 - Telecommunications.

e) Subpart 305 - Wiring methods, components, and equipment for general use.

5) Department of Transportation, CFR, Title 49 (Public Law 89-670), Part 1, Subpart C – Federal Aviation Administration (FAA):

a) Standards AC 110/460-ID & AC 707 / 460-2E – Advisory Circulars for Construction of Antenna Towers.

b) Forms 7450 and 7460-2 – Antenna Construction Registration.

6) Veterans Affairs (Public Law No. 100-527), CFR, Title 38, Volumes I & II:

a) Office of Telecommunications:

1) Handbook 6100 – Telecommunications.

a) Spectrum Management FCC & NTIA Radio Frequency Compliance and Licensing Program.

b) Special Communications Proof of Performance Testing, VACO Compliance and Life Safety Certification(s).

b) Office of Cyber and Information Security (OCIS):

1) Handbook 6500 - Information Security Program.

2) Wireless and Handheld Device Security Guideline Version 3.2, August 15, 2005.

c) VA's National Center for Patient Safety – Veterans Health Administration Warning System, Failure of Medical Alarm Systems using Paging Technology to Notify Clinical Staff, July 2004.

d) VA's Center for Engineering Occupational Safety and Health, concurrence with warning identified in VA Directive 7700.

e) Office of Construction and Facilities Management (CFM):

1) Master Construction Specifications (PG-18-1).

2) Standard Detail and CAD Standards (PG-18-4).

3) Equipment Guide List (PG-18-5).

4) Electrical Design Manual for VA Facilities (PG 18-10), Articles 7 & 8.

5) Minimum Requirements of A/E Submissions (PG 18-15):

a) Volume B, Major New Facilities, Major Additions; and Major Renovations, Article VI, Paragraph B.

b) Volume C - Minor and NRM Projects, Article III, Paragraph S.

c) Volume E - Request for Proposals Design/Build Projects, Article II, Paragraph F.

6) Mission Critical Facilities Design Manual (Final Draft – 2007).

7) Life Safety Protected Design Manual (Final Draft – 2007).

8) Solicitation for Offerors (SFO) for Lease Based Clinics – (05-2009).

b. Federal Specifications (Fed. Specs.):

1) A-A-59544-00 - Cable and Wire, Electrical (Power, Fixed Installation).

2. National Codes:

a. American Institute of Architects (AIA): Guidelines for Healthcare Facilities.

b. American National Standards Institute/Electronic Industries Association/Telecommunications Industry Association (ANSI/EIA/TIA):

1) 568-B - Commercial Building Telecommunications Wiring Standards:

a) B-1 – General Requirements.
b) B-2 – Balanced twisted-pair cable systems.
c) B-3 - Fiber optic cable systems.

2) 569 - Commercial Building Standard for Telecommunications Pathways and Spaces.
3) 606 – Administration Standard for the Telecommunications Infrastructure of Communications Buildings.
4) 607 – Commercial Building Grounding and Bonding Requirements for Telecommunications.
5) REC 127-49 – Power Supplies.
6) RS 270 – Tools, Crimping, Solderless Wiring Devices, Recommended Procedures for User Certification.

c. American Society of Mechanical Engineers (ASME):
1) Standard 17.4 – Guide for Emergency Personnel.
2) Standard 17.5 – Elevator & Escalator Equipment (prohibition of installing non-elevator equipment in Elevator Equipment Room / Mechanical Penthouse).

d. American Society of Testing Material (ASTM):
1) D2301-04 - Standard Specification for Vinyl Chloride Plastic Pressure Sensitive Electrical Insulating Tape.

e. Building Industries Communications Services Installation (BICSI):
1) All standards for smart building wiring, connections and devices for commercial and medical facilities.
2) Structured Building Cable Topologies.
3) In consort with ANSI/EIA/TIA.

f. Institute of Electrical and Electronics Engineers (IEEE):
1) SO/TR 21730:2007 - Use of mobile wireless communication and computing technology in healthcare facilities - Recommendations for electromagnetic compatibility (management of unintentional electromagnetic interference) with medical devices.
2) 0739-5175/08/©2008 IEEE – Medical Grade – Mission Critical – Wireless Networks.
3) C62.41 – Surge Voltages in Low-Voltage AC Power Circuits.

g. NFPA:
1) 70 - National Electrical Code (current date of issue) – Articles 517, 645 & 800.

2) 75 - Standard for Protection of Electronic Computer Data-Processing Equipment.
3) 77 – Recommended Practice on Static Electricity.
4) 99 - Healthcare Facilities.
5) 101 - Life Safety Code.

3. State Hospital Code(s).
4. Local Town, City and/or County Codes.
5. Accreditation Organization(s):
   a. Joint Commission on Accreditation of Hospitals Organization (JCAHO) – Section VI, Part 3a – Operating Features.

1.5 QUALIFICATIONS

A. The OEM shall have had experience with three (3) or more installations of Nurse Call systems of comparable size and interfacing complexity with regards to type and design as specified herein. Each of these installations shall have performed satisfactorily for at least one (1) year after final acceptance by the user. Include the names, locations and point of contact for these installations as a part of the submittal.

B. The Contractor shall submit certified documentation that they have been an authorized distributor and service organization for the OEM for a minimum of three (3) years. The Contractor shall be authorized by the OEM to pass thru the OEM’s warranty of the installed equipment to VA. In addition, the OEM and Contractor shall accept complete responsibility for the design, installation, certification, operation, and physical support for the System. This documentation, along with the System Contractor and OEM certifications must be provided in writing as part of the Contractor’s Technical submittal.

C. The Contractor’s Communications Technicians assigned to the System shall be fully trained, qualified, and certified by the OEM on the engineering, installation, operation, and testing of the System. The Contractor shall provide formal written evidence of current OEM certification(s) for the installer(s) as a part of the submittal or to the RE before being allowed to commence work on the System.

D. The Contractor shall display all applicable national, state and local licenses.

E. The Contractor shall submit copy (s) of Certificate of successful completion of OEM’s installation/training school for installing

technicians of the System's Nurse Call and/or Code Blue equipment being proposed.

1.6 CODES AND PERMITS

A. Provide all necessary permits and schedule all inspections as identified in the contract's milestone chart, so that the system is proof of performance tested, certified and approved by VA and ready for operation on a date directed by the Owner.

B. The contractor is responsible to adhere to all codes described herein and associated contractual, state and local codes.

1.7 SCHEDULING

A. After the award of contract, the Contractor shall prepare a detailed schedule (aka milestone chart) using "Microsoft Project" software or equivalent. The Contractor Project Schedule (CPS) shall indicate detailed activities for the projected life of the project. The CPS shall consist of detailed activities and their restraining relationships. It will also detail manpower usage throughout the project.

B. It is the responsibility of the Contractor to coordinate all work with the other trades for scheduling, rough-in, and finishing all work specified. The owner will not be liable for any additional costs due to missed dates or poor coordination of the supplying contractor with other trades.

1.8 REVIEW OF CONTRACT DRAWINGS AND EQUIPMENT DATA SUBMITTALS (AKA TECHNICAL SUBMITTAL[S])

(Note: The Contractor is encouraged, but not required, to submit separate technical submittal(s) outlining alternate technical approach(s) to the system requirements stated here-in as long as each alternate technical document(s) is complete, separate, and submitted in precisely the same manner as outlined herein. VA will review and rate each received alternate submittal, which follows this requirement, in exactly the same procedure as outlined herein. Partial, add-on, or addenda type alternates will not be accepted or reviewed.)

A. Submit at one time within 10 days of contract awarding, drawings and product data on all proposed equipment and system. Check for compliance with contract documents and certify compliance with Contractor's "APPROVED" stamp and signature.

B. Support all submittals with descriptive materials, i.e., catalog sheets, product data sheets, diagrams, and charts published by the

manufacturer. These materials shall show conformance to specification and drawing requirements.

C. Where multiple products are listed on a single cut-sheet, circle or highlight the one that you propose to use. Provide a complete and through equipment list of equipment expected to be installed in the system, with spares, as a part of the submittal. Special Communications (TVE-005OP3B) will not review any submittal that does not have this list.

D. Provide four (4) copies to the PM for technical review. The PM will provide a copy to the offices identified in Paragraph 1.3.C & D, at a minimum for compliance review as described herein where each responsible individual(s) shall respond to the PM within 10 days of receipt of their acceptance or rejection of the submittal(s).

E. Provide interconnection methods, conduit (where not already installed), junction boxes (J-Boxes), cable, interface fixtures and equipment lists for the: ENR(s) (aka DMARC), TER, TCR, MCR, MCOR, PCR, ECR, Stacked Telecommunications Rooms (STR), Nurses Stations (NS), Head End Room (HER), Head End Cabinet (HEC), Head End Interface Cabinet (HEIC) and approved TCO locations TIP interface distribution layout drawing, as they are to be installed and interconnected to teach other (REFER TO APPENDIX B – SUGGESTED TELECOMMUNI-CAITONS ONE LINE TOPOLOGY pull-out drawing).

F. Equipment technical literature detailing the electrical and technical characteristics of each item of equipment to be furnished.

G. Engineering drawings of the System, showing calculated of expected signal levels at the headend input and output, each input and output distribution point, and signal level at each telecommunications outlet.

H. Surveys Required as a Part of The Technical Submittal:

1. The Contractor shall provide the following System surveys that depict various system features and capacities required ***in addition to*** the on-site survey requirements described herein **(*see Specification Paragraph 2.4.3*)**. Each survey shall be in writing and contain the following information (the formats are suggestions and may be used for the initial Technical Submittal Survey requirements), as a minimum:

   a. Nurse Call Cable System Design Plan:

      1) An OEM and contractor designed functioning Nurse Call System cable plan **to populate the entire TIP empty conduit/pathway**

distribution systems provided as a part of Specification 27 11 00 shall be provided as a part of the technical proposal. A specific functioning Nurse Call: cable, interfaces, J-boxes and back boxes shall coincide with the total growth items as described herein. It is the Contractor's responsibility to provide the Systems' entire Nurse Call cable and accessory requirements and engineer a functioning Nurse Call distribution system and equipment requirement plan of the following paragraph(s), at a minimum:

1.9 PROJECT RECORD DOCUMENTS (AS BUILTS)

A. Throughout progress of the Work, maintain an accurate record of changes in Contract Documents. Upon completion of Work, transfer recorded changes to a set of Project Record Documents.

B. The floorplans shall be marked in pen to include the following:

1. Each device specific locations with UL labels affixed.
2. Conduit locations.
3. Each interface and equipment specific location.
4. Head-end equipment and specific location.
5. Wiring diagram.
6. Labeling and administration documentation.
7. Warranty certificate.
8. System test results.

1.10 WARRANTIES / GUARANTY

A. The Contractor shall warrant the installation to be free from defect in material and workmanship for a period of two (2) years from the date of acceptance of the project by the owner. The Contractor shall agree to remedy covered defects within four (4) hours of notification of major failures or within twenty-four (24) hours of notification for individual station related problems.

B. The Contractor shall agree to grantee the system according to the guidelines outlined in Article 4 herein.

1.11 USE OF THE SITE

A. Use of the site shall be at the GC's direction.

B. Coordinate with the GC for lay-down areas for product storage and administration areas.

C. Coordinate work with the GC and their sub-contractors.

D. Access to buildings wherein the work is performed shall be directed by the GC.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft.

B. Store products in original containers.

C. Coordinate with the GC for product storage. There may be little or no storage space available on site. Plan to potentially store materials off site.

D. Do not install damaged products. Remove damaged products from the site and replaced with new product at no cost to the Owner.

1.13 PROJECT CLOSE-OUT

A. Prior to final inspection and acceptance of the work, remove all debris, rubbish, waste material, tools, construction equipment, machinery and surplus materials from the project site and thoroughly clean your work area.

B. Before the project closeout date, the Contractor shall submit:

1. OEM Equipment Warranty Certificates.
2. Evidence of compliance with requirements of governing authorities such as the Low Voltage Certificate of Inspection.
3. Project record documents.
4. Instruction manuals and software that is a part of the system.
5. System Guaranty Certificate.

C. Contractor shall submit written notice that:

1. Contract Documents have been reviewed.
2. Project has been inspected for compliance with contract.
3. Work has been completed in accordance with the contract.

PART 2 – PRODUCTS / FUNCTIONAL REQUIREMENTS

2.0 GENERAL REQUIREMENTS FOR EQUIPMENT AND MATERIALS

A. Furnish and install a complete and fully functional and operable Nurse Call System for each location shown on the contract drawings and TCOs **WHOSE EMPTY CONDUIT SYSTEM WAS PROVIDED AS A PART OF SPECIFICATION 27 11 00**.

B. The specific location for each Nurse Call: Central Control Cabinet, Power Supply, Electrical Supervisor Panel, UPS, Two (2) Remote Annunciation Consoles, Master Station, Duty Station, Staff Station, Emergency Station, Dome Light, Code Blue Station, and TCOs are shown in the contract drawings.

C. Coordinate features and select interface components to form an integrated Nurse Call system. Match components and interconnections between the systems for optimum performance of specified functions.

D. Expansion Capability: The Nurse Call equipment interfaces and cables shall be able to increase number of enunciation points in the future by a minimum of 25 percent (%) above those indicated without adding any internal or external components or main trunk cable conductors.

E. Equipment: Active electronic type shall use solid-state components, fully rated for continuous duty unless otherwise indicated. Select equipment for normal operation on input power usually supplied between 110 to 130 VAC, 60 Hz supplied from the Facility's Emergency Electrical Power System.

F. Meet all FCC requirements regarding equipment listing, low radiation and/or interference of RF signal(s). The system shall be designed to prevent direct pickup of signals from within and outside the building structure.

2.1 SYSTEM DESCRIPTION

A. Furnish and install a complete and fully functional and operable Nurse Call and/or Code Blue System **WHOSE EMPTY CONDUIT SYSTEM WAS PROVIDED AS A PART OF SPECIFICATION 27 11 00**.

B. The Contractor shall continually employ interfacing methods that are approved by the OEM and VA. At a minimum, an acceptable interfacing method requires not only a physical and mechanical connection, but also a matching of signal, voltage, and processing levels with regard to signal quality and impedance. The interface point must adhere to all standards.C. The System Contractor shall connect the System ensuring that all NFPA and UL Critical Care and Life Safety Circuit and System separation guidelines are satisfied. The System Contractor is not allowed to make any connections to the Telephone System. D.

System hardware shall consist of a ***standalone (separate)*** nurse call **Code Blue** patient communications network comprised of nurse consoles, control stations, staff and duty stations, room and corridor dome lights, pull cord and/or emergency push button stations, wiring. All necessary equipment required to meet the intent of these specifications, whether or not enumerated within these specifications, shall be supplied and installed to provide a complete and operating nurse call **Code Blue** patient communications network. ***It is not***

acceptable to utilize the telephone cable system for the control and distribution of nurse call (code Blue) signals and equipment.

E. The System is defined as Critical Service and the Code Blue functions is defined as Life Safety/Support by NFPA (re Part 1.1.A) and so evaluated by JCAHCO.

F. Each Code Blue System shall be designed to provide continuous electrical supervision of the complete and entire system (i.e. dome light bulbs [each light will be considered supervised if they use any one or a combination of (UL) approved electrical supervision alternates, as identified in UL-1069, 1992 revision], wires, contact switch connections, circuit boards, data, audio, and communication busses, main and UPS power, etc.). All alarm initiating and signaling circuits shall be supervised for open circuits, short circuits, and system grounds When an open, short or ground occurs in any system circuit, an audible and visual fault alarm signal shall be initiated at the nurse control station. G. All passive distribution equipment shall meet or exceed -80 dB radiation shielding (aka RFI) shielding specifications and be provided with connectors specified by the OEM.

H. All equipment face plates utilized in the system shall be stainless steel, anodized aluminum or UL approved cycolac plastic for the areas where provided.

I. Noise filters and surge protectors shall be provided for each equipment interface cabinet, headend cabinet, control console and local and remote amplifier locations to insure protection from input primary AC power surges and to insure noise glitches are not induced into low voltage data circuits.

J. Plug-in connectors shall be provided to connect all equipment, except coaxial cables. Coaxial cable distribution points shall use coaxial cable connections recommended by the cable OEM and approved by the system OEM. Base band cable systems shall utilize barrier terminal screw type connectors, at a minimum. As an alternate, crimp type connectors installed with a ratchet type installation tool are acceptable provided the cable dress, pairs, shielding, grounding, connections and labeling are the same as the barrier terminal strip connectors. Tape of any type, wire nuts or solder type connections are unacceptable and will not be approved.

K. Contractor is responsible for pricing all accessories and miscellaneous equipment required to form a complete and operating system. Unless

otherwise noted in this Part, equipment quantities shall be as indicated on the drawings.

L. System Performance:

1. At a minimum, each distribution, interconnection, interface, terminating point and TCO shall be capable of supporting the Facility's Nurse Call and/or Code Blue System voice and data service as follows:
   a. Shall be compliant with and not degrade the operating parameters of the Public Switched Telephone Network (PSTN) and the Federal Telecommunications System (FTS) at each PSTN and FTS interface (if attachment is permitted by TVE 005OP3B), interconnection and TCO terminating locations detailed on the contract drawings.
   b. The System shall provide the following minimum operational functions:
      1) Code Blue calls shall be cancelable at the calling station only. The nurse call master station (s) that a managing Code Blue functions shall not have the ability to cancel Code Blue calls.
      2) Each Code Blue system shall be able to receive audio calls from all bedside stations simultaneously.
      3) Calls placed from any Code Blue station shall generate Code Blue emergency type audible and visual signals at each associated nurse control and duty station, respective dome lights and all local and remote annunciator panels. Calls placed from a bedside station shall generate emergency type visual signals at the bedside station and associated dome light(s) in addition to the previous stated stations and panels.
      4) Activating the silencing device at any location, while a Code Blue call or system fault is occurring shall mute the audible signals at the alarm location.
         a) The audible alarm shall regenerate at the end of the selected time-out period until the call or fault is corrected.
         b) The visual signals shall continue until the call is canceled and/or a fault is corrected. When the fault is corrected, all signals generated by the fault shall

automatically cease, returning the System to a standby status.

c) Audible signals shall be regenerated in any local or remote annunciator panel that is in the silence mode, in the event an additional Code Blue call is placed in any Code Blue system.

d) The additional Code Blue call shall also generate visual signals at all annunciators to identify the location of the call.

2. Each System Nurse Call location shall generate a minimum of distinct calls:
   a. Routine: single flashing dome lights & master station color and audio tone,
   b. Staff Assist: rapid flashing dome lights & master station color and audio tone,
   c. Emergency: Red flashing done lights & master station color and audio tone,
   d. Code Blue (if equipped): Blue flashing dome lights and master station color and audio tone,
   e. Each generated call shall be cancelable at ONLY the originating location,
   f. Staff Locator: Green Flashing dome lights & master station color and audio tone, and

2.3 MANUFACTURERS

A. The products specified shall be new, FCC and UL Listed, labeled and produced by OEM manufacturer of record. An OEM of record shall be defined as a company whose main occupation is the manufacture for sale of the items of equipment supplied and which:
   1. Maintains a stock of replacement parts for the item submitted,
   2. Maintains engineering drawings, specifications, and operating manuals for the items submitted, and
   3. Has published and distributed descriptive literature and equipment specifications on the items of equipment submitted at least 30 days prior to the Invitation for Bid.

B. Specifications contained herein as set forth in this document detail the salient operating and performance characteristics of equipment in order for VA to distinguish acceptable items of equipment from unacceptable items of equipment. When an item of equipment is offered

or furnished for which there is a specification contained herein, the item of equipment offered or furnished shall meet or exceed the specification for that item of equipment.

C. Equipment Standards and Testing:

1. The System has been defined herein as connected to systems identified as Critical Service performing various Emergency and Life Support Functions. Therefore, at a minimum, the system shall conform to all aforementioned National and/or Local Life Safety Codes (which ever are the more stringent), NFPA, NEC, this specification, JCAHCO Life Safety Accreditation requirements, and the OEM recommendations, instructions, and guidelines.
2. All supplies and materials shall be listed, labeled or certified by UL or a NRTL where such standards have been established for the supplies, materials or equipment.
3. The provided equipment required by the System design and approved technical submittal must conform with each UL standard in effect for the equipment, as of the date of the technical submittal (or the date when the RE approved system equipment necessary to be replaced) was technically reviewed and approved by VA. Where a UL standard is in existence for equipment to be used in completion of this contract, the equipment must bear the approved UL seal.
4. Each item of electronic equipment to be provided under this contract must bear the approved UL seal or the seal of the testing laboratory that warrants the equipment has been tested in accordance with, and conforms to the specified standards. The placement of the UL Seal shall be a permanent part of the electronic equipment that is not capable of being transportable from one equipment item to another.

2.4 PORDUCTS

A. General.

1. Contractor is responsible for pricing all accessories and miscellaneous equipment required to form a complete and operating system. The equipment quantities provided herein shall be as indicated on the drawings with the exception of the indicated spare equipment.
2. Contractor Furnished Equipment List (CFEs):
   a. The Contractor is required to provide a list of the CFE equipment to be furnished. The quantity, make and model number of each item is required. Select the required equipment items quantities

that will satisfy the needs of the system as described herein and with the OEM's concurrence applied to the list(s), in writing.

Item	Quantity	Unit
1.	As required	Master Station(s)
2.	As required	Distribution System(s)
2.a	As required	Staff Station
2.a.1	As required	Equipment Back Box(s)
2.b	As required	Duty Station
2.b.1	As required	Equipment Back Box(s)
2.c	As required	Code Blue Station
2.c.1	As required	Equipment Back Box(s)
2.c.2	2 (MIN)	Remote Station(s)
2.d.	As required	Room Dome Light
2.d.1	As required	Equipment Back Box(s)
2.e	As required	Other Dome Light(s)
2.e.1	As required	Equipment Back Box(s)
2.e.2	As required	Corridor Dome Light
2.e.3	As required	Intersectional Dome Light
2.f	As required	System Cable(s)

B. NS Room(s):

Refer to CFM Physical Security Manual (07-2007) for VA Facilities, Chapters 9.3 & 1) and PG 18-10, EDM, Chapters 7- Table 7-1, 8 & Appendix B, Telecommunications One Line Topology for specific Room and TIP Connection Requirements.

G. Interface Equipment:

1. TCR:

a. Code Blue Annunciation Station:

1) The Code Blue Remote Annunciation Station shall be located as shown on the drawings.

2) The Annunciation Station shall be connected to the System via hard wire connection(s) that shall contain all the electrical supervisory tone signals, visual bulbs, read out panel to indicate the location of the Code and system troubles.

3) The System shall not be connected to the Telephone system unless specifically APPROVED BY VA HEADQUARTERS (005OP3B) and (005OP2B) PRIOR TO CONTRACT BID.

4) The Annunciation Station shall be installed in a location directly viewable and the readout is completely readable from the Public Address Microphone Control Console.

5) Provide one (1) spare panel.

H. Call Initiation, Annunciation and Response:

1. Light and Tones:

a Calls may be initiated through:

1) Staff station.

2) Code Blue station.

3) Toilet Emergency Station pull cord / push button.

b Once a call is initiated, it must be annunciated at the following locations:

1) The Corridor, Intersectional and Room dome light associated with the initiating device.

2) A local master control station indicating the call location and priority.

3) All calls must be displayed until they are cleared by the nursing staff **ONLY** from the initiating device location.

I. System Functional Station:

1. Master Control:

a. Simple Tone and Light:

1) A visual / aural (tone only) system shall be provided, protected and located in the Day Hospital, , OPC where surgery or procedures are not performed. The System shall include a push-button emergency station (pull cord in Day Hospital with an associated corridor dome light in each dressing room (OPC) and toilet OPC, Day Hospital.2) The visual / aural (tone only) system shall also include a power supply and a visual / aural (tone only) display panel in the respective OPC receptionist / secretary's office area and as shown on the drawings. The visual / tone display panel shall generate audible and visual emergency signals to indicate the location of a placed call.

3) The Visual Display Panel shall be a digital readout touch screen to visually announce the location of incoming calls placed in the System including room and bed number and priority of the call. Identify each calling station with an individual display, including separate displays for each patient sharing a dual bedside station. If a digital readout touch screen standard is not required or approved by the Facility during the project design phase, an alpha - numeric scheme shall be provided that identifies the: ward, room and

bed (i.e. Ward 2a, Room 201, Bed A (or 1) shall read 2A201A - or- 2A201-1. Equivalent readouts are acceptable as long as TVE 005OP3B and the Facility approve the readout).

a) Calls placed at emergency stations located in toilets and baths inside bedrooms shall be displayed for the bed closest to the nurse control station. Beds in multi-bed bedrooms shall be identified in a clock-wise pattern upon entering the bedroom.

b) It shall display a minimum of four incoming calls. Additional placed calls shall be stored in order of placement and priority.

4) The visual / aural (tone only) system shall be installed according to the same Procedures, guidelines and standards outlined for a regular Nurse Call System for emergency ***NOT CODE BLUE OPERATION***.

5) Speakerphone and handset communication.

6) Provide one (1) spare station for each ten (1) stations installed.

J. Distribution System: Refer to Specification Sections 27 11 00, Structured TIP Communications Cables; 27 11 00, TIP Communications Interface and Equipment Rooms Fittings and 27 15 00, HORIZONTAL and Vertical TIP Communications Cabling for additional specific TIP wire and cable standards and installation requirements used to install the Facility's TIP network.

1. In addition to the TIP provided under the aforementioned Specification Sections, the contractor shall provide the following additional TIP installation and testing requirements, provide the following minimum additional System TIP requirements, cables & interconnections:

   a. Each wire and cable used in the System shall be specifically OEM certified by tags on each reel and recommended and approved for installation in the Facility.

   b. The Contractor shall provide the RE a 610 mm (2 foot) sample of each wire and/or cable actually employed in the System ***and each*** certification tag for approval before continuing with the installation as described herein.

   c. Copper Cables: Refer to Specification Section 27 15 00, Horizontal and Vertical TIP Communications Cabling; Paragraph

2.4.C12.c. Copper Cables – for minimum technical standards and requirements for additional System voice and data cables.

d. All cabling shall be plenumrated.

h. Provide one (1) spare 1,000 foot roll of approved System (not microphone) cable only.

2. Raceways, Back Boxes and conduit:

a. In addition to the Raceways, Equipment Room Fittings provided under Specification Sections 27 15 00 TIP Communication Room Fittings and 27 15 00 – TIP Communications Horizontal and Vertical Cabling, provide the following additional TIP raceway and fittings:

b. Each raceway that is open top, shall be: UL certified for telecommunications systems, partitioned with metal partitions in order to comply with NEC Parts 517 & 800 to “mechanically separate telecommunications systems of different service, protect the installed cables from falling out when vertically mounted and allow junction boxes to be attached to the side to interface “drop” type conduit cable feeds.

c. Intercommunication System cable infrastructure: EMT or in J-hooks above accessible ceilings, 24 inches on center.

d. Junction boxes shall be not less than 2-1/2 inches deep and 6 inches wide by 6 inches long.

e. Flexible metal conduit is prohibited unless specifically approved by 005OP3B.

f. System Conduit:

1) The PA system is NFPA listed as Emergency / Public Safety Communication System which requires the entire system to be installed in a separate conduit system.

2) The use of centralized mechanically partitioned wireways may be used to augment main distribution conduit on a case by case basis when specifically approved by VA Headquarters (005OP3B).

3) Conduit Sleeves:

a) The AE has made a good effort to identify where conduit sleeves through full-height and fire rated walls on the drawings, and has instructed the electrician to provide the sleeves as shown on the drawings.

b) While the sleeves shown on the drawings will be provided by others, the contractor is responsible for installing

conduit sleeves and fire-proofing where necessary. It is often the case, that due to field conditions, the nurse-call cable may have to be installed through an alternate route. Any conduit sleeves required due to field conditions or those omitted by the engineer shall be provided by the cabling contractor.

g. Device Back Boxes:
   1) Furnish to the electrical contractor all back boxes required for the PA system devices.
   2) The electrical contractor shall install the back boxes as well as the system conduit. Coordinate the delivery of the back boxes with the construction schedule.

3. UPS:
   a. Provide a backup battery or a UPS for the System to allow normal operation and function (as if there was no AC power failure) in the event of an AC power failure or during input power fluctuations for a minimum of 30 minutes.
   b. The Nurse Call Contractor shall not make any attachments or connection to the telephone system until specifically directed to do so, in writing, by the RE.

P. Installation Kit:
1. General: The kit shall be provided that, at a minimum, includes all connectors and terminals, labeling systems, barrier strips, punch blocks or wire wrap terminals, cable ties, solder, hangers, clamps, bolts, conduit, etc., required to accomplish a neat and secure installation. All wires shall terminate in a barrier strip, wire wrap terminal or punch block. Unfinished or unlabeled wire connections shall not be allowed. Turn over to the RE all unused and partially opened installation kit boxes, and twisted pair cable reels, conduit, wire rolls, physical installation hardware. 2. System Grounding:
   a. The grounding kit shall include all cable and installation hardware required. b. This includes, but is not limited to:
      1) Data Cable Shields.
      2) Equipment Cabinets.
      3) Conduits.
      4) Power Panels.
      5) Connector Panels.

6) Grounding Blocks.

3. Wire and Cable: The wire and cable kit shall include all connectors and terminals, audio spade lugs, barrier straps, punch blocks, wire wrap strips, heat shrink tubing, tie wraps, solder, hangers, clamps, labels etc., required to accomplish a neat and orderly installation.
6. Conduit,: The kit shall include all conduit, junction boxes, back boxes, cover plates, feed through nipples, hangers, clamps, other hardware required to accomplish a neat and secure conduit, cable duct, and/or cable tray installation in accordance with the NEC and this document.
7. Equipment Interface: The equipment kit shall include any item or quantity of equipment, cable, mounting hardware and materials needed to interface the systems with the identified sub-system(s) according to the OEM requirements and this document.
8. Labels: The labeling kit shall include any item or quantity of labels, tools, stencils, and materials needed to completely and correctly label each subsystem according to the OEM requirements, as-installed drawings, and this document.
9. Documentation: The documentation kit shall include any item or quantity of items, computer discs, as installed drawings, equipment, maintenance, and operation manuals, and OEM materials needed to completely and correctly provide the system documentation as required by this document and explained herein.

PART 3 - EXECUTION

3.1 PROJECT MANAGEMENT

A. Assign a single project manager to this project who will serve as the point of contact for the Owner, the General Contractor, and the Engineer.

B. The Contractor shall be proactive in scheduling work at the hospital, specifically the Contractor will initiate and maintain discussion with the general contractor regarding the schedule for ceiling cover up and install cables to meet that schedule.

C. Contact the Office of Telecommunications, Special Communications Team (005OP2B) at (301) 734-0350 to have a VA Certified Telecommunications COTR assigned to the project for telecommunications review, equipment and system approval and co-ordination with VA’s Spectrum Management and OCIS Teams.

3.2 COORDINATION WITH OTHER TRADES

A. Before beginning work, verify the location, quantity, size and access for the following:
   1. Isolated ground AC power circuits provided for systems.
   2. Primary, emergency and extra auxiliary AC power generator requirements.
   3. Junction boxes, wall boxes, wire troughs, conduit stubs and other related infrastructure for the systems.
   4. System components installed by others.
   5. Overhead supports and rigging hardware installed by others.

B. Immediately notify the Owner, GC and Consultant(s) in writing of any discrepancies.

3.3 NEEDS ASSESSMENT

Provide a one-on-one meeting with the particular nursing manager of each unit affected by the installation of the new nurse call/code blue system. Review the floor plan drawing, educate the nursing manager with the functions of the equipment that is being provided and gather details specific to the individual units; coverage and priorities of calls; staffing patterns; and other pertinent details that will affect system programming and training.

3.4 INSTALLATION

A. General:
   1. Execute work in accordance with National, State and local codes, regulations and ordinances.
   2. Install work neatly, plumb and square and in a manner consistent with standard industry practice. Carefully protect work from dust, paint and moisture as dictated by site conditions. The Contractor will be fully responsible for protection of his work during the construction phase up until final acceptance by the Owner.
   3. Install equipment according to OEM’s recommendations. Provide any hardware, adaptors, brackets, rack mount kits or other accessories recommended by OEM for correct assembly and installation.
   4. Secure equipment firmly in place, including receptacles, speakers, equipment racks, system cables, etc.
      a. All supports, mounts, fasteners, attachments and attachment points shall support their loads with a safety factor of at least 5:1.

b. Do not impose the weight of equipment or fixtures on supports provided for other trades or systems.
c. Any suspended equipment or associated hardware must be certified by the OEM for overhead suspension.
d. The Contractor is responsible for means and methods in the design, fabrication, installation and certification of any supports, mounts, fasteners and attachments.

5. Finishes for any exposed work such as plates, racks, panels, speakers, etc. shall be approved by the Architect, Owner and TVE 005OP3B.
6. Coordinate cover plates with field conditions. Size and install cover plates as necessary to hide joints between back boxes and surrounding wall. Where cover plates are not fitted with connectors, provide grommeted holes in size and quantity required. Do not allow cable to leave or enter boxes without cover plates installed.
7. Active electronic component equipment shall consist of solid state components, be rated for continuous duty service, comply with the requirements of FCC standards for telephone and data equipment, systems, and service.
8. Color code all distribution wiring to conform to the Nurse Call Industry Standard, EIA/TIA, and this document, whichever is the more stringent. At a minimum, all equipment, cable duct and/or conduit, enclosures, wiring, terminals, and cables shall be clearly and permanently labeled according to and using the provided record drawings, to facilitate installation and maintenance.
9. Connect the System’s primary input AC power to the Facility’ Critical Branch of the Emergency AC power distribution system as shown on the plans or if not shown on the plans consult with RE regarding a suitable circuit location prior to bidding.
10. Product Delivery, Storage and Handling:
    a. Delivery: Deliver materials to the job site in OEM's original unopened containers, clearly labeled with the OEM's name and equipment catalog numbers, model and serial identification numbers. The RE may inventory the cable, patch panels, and related equipment.
    b. Storage and Handling: Store and protect equipment in a manner, which will preclude damage as directed by the RE.

11. Where TCOs are installed adjacent to each other, install one outlet for each instrument.
12. Equipment installed outdoors shall be weatherproof or installed in weatherproof enclosures with hinged doors and locks with two keys.

B. Cable Installation - Cable Installation - In addition to the ***MANDATORY*** infrastructure requirements outlined in VA Construction Specifications 27 10 00 – Structured TIP Communications Cabling, 27 11 00 – TIP Communications Rooms and Fittings and 27 15 00 – TIP Communications Horizontal and Vertical Cabling and the following additional practices shall be adhered too:

1. Support cable on maximum 2’-0” centers. Acceptable means of cable support are cable tray, j-hooks, and bridal rings. Velcro wrap cable bundles loosely to the means of support with plenum rated Velcro straps. Plastic tie wraps are not acceptable as a means to bundle cables.
2. Run cables parallel to walls.
3. Install maximum of 10 cables in a single row of J-hooks. Provide necessary rows of J-hooks as required by the number of cables.
4. Do not lay cables on top of light fixtures, ceiling tiles, mechanical equipment, or ductwork. Maintain at least 2’-0” clearance from all shielded electrical apparatus.
5. All cables shall be tested after the total installation is fully complete. All test results are to be documented. All cables shall pass acceptable test requirements and levels. Contractor shall remedy any cabling problems or defects in order to pass or comply with testing. This includes the re-pull of new cable as required at no additional cost to the Owner.
6. Ends of cables shall be properly terminated on both ends per industry and OEM’s recommendations.
7. Provide proper temporary protection of cable after pulling is complete before final dressing and terminations are complete. Do not leave cable lying on floor. Bundle and tie wrap up off of the floor until you are ready to terminate.
8. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at outlets and terminals.

9. Splices, Taps, and Terminations: Arrange on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Cables may not be spliced.
10. Bundle, lace, and train conductors to terminal points without exceeding OEM's limitations on bending radii. Install lacing bars and distribution spools.
11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used.
12. Cable shall not be run through structural members or be in contact with pipes, ducts, or other potentially damaging items.
13. Separation of Wires: (REFER TO RACEWAY INSTALLATION) Separate speaker-microphone, line-level, speaker-level, and power wiring runs. Install in separate raceways or, where exposed or in same enclosure, separate conductors at least 12 inches apart for speaker microphones and adjacent parallel power and telephone wiring. Separate other intercommunication equipment conductors as recommended by equipment manufacturer.
14. Serve all cables as follows:
    a. Cover the end of the overall jacket with a 1″ (minimum) length of transparent heat-shrink tubing. Cut unused insulated conductors 2″ (minimum) past the heat-shrink, fold back over jacket and secure with cable-tie. Cut unused shield/drain wires 2″ (minimum) past the Heatshrink and serve as indicated below.
    b. Cover shield/drain wires with heat-shrink tubing extending back to the overall jacket. Extend tubing ¼″ past the end of unused wires, fold back over jacket and secure with cable tie.
    c. For each solder-type connection, cover the bare wire and solder connection with heat-shrink tubing.

C. Labeling: Provide labeling in accordance with ANSI/EIA/TIA-606-A. All lettering for Nurse Call and/or Code Blue circuits shall be stenciled using **thermal ink transfer process .**
1. Cable and Wires (Hereinafter referred to as “Cable”): Cables shall be labeled at both ends in accordance with ANSI/EIA/TIA-606-A. Labels shall be permanent in contrasting colors. Cables shall be identified according to the System “Record Wiring Diagrams.”
2. Equipment: System equipment shall be permanently labeled with contrasting plastic laminate or Bakelite material. System equipment

shall be labeled on the face of the unit corresponding to its source.

a. Clearly, consistently, logically and permanently mark switches, connectors, jacks, relays, receptacles and electronic and other equipment.

b. Engrave and paint fill all receptacle panels using 1/8” (minimum) high lettering and contrasting paint.

3. Conduit, Cable Duct, and/or Cable Tray: The Contractor shall label all conduit, duct and tray, including utilized GFE, with permanent marking devices or spray painted stenciling a minimum of 3 meters (10 ft.) identifying it as the System. In addition, each enclosure shall be labeled according to this standard.

4. Termination Hardware: The Contractor shall label TCOs and patch panel connections using color coded labels with identifiers in accordance with ANSI/EIA/TIA-606-A and the “Record Wiring Diagrams.”

5. Where multiple pieces of equipment reside in the same rack group, clearly and logically label each indicating to which room, channel, receptacle location, etc. they correspond.

6. Permanently label cables at each end, including intra-rack connections. Labels shall be covered by the same, transparent heat-shrink tubing covering the end of the overall jacket. Alternatively, computer generated labels of the type which include a clear protective wrap may be used.

7. Contractor’s name shall appear no more than once on each continuous set of racks. The Contractor’s name shall not appear on wall plates or portable equipment.

8. Ensure each OEM supplied item of equipment has appropriate UL Labels marked to a ***non-removal*** board in the unit. EQUIPMENT INSTALLED NOT BEARING THESE UL MARKS WILL NOT BE ALLOWED TO BE A PART OF THE SYSTEM. THE CONTRACTOR SHALL BEAR ALL COSTS REQUIRED TO PROVIDE REPLACEMENT EQUIPMENT WITH APPROVED UL MARKS.

D. Conduit: When the Contractor and/or OEM determines additional system conduits are required in order to meet the system minimum performance standards outlined herein, the contractor shall provide these items as follows:

1. Conduit:

a. The Contractor shall employ the latest installation practices and materials. The Contractor shall provide conduit, junction boxes,

connectors, sleeves, weather heads, pitch pockets, and associated sealing materials not specifically identified in this document as GFE. Conduit penetrations of walls, ceilings, floors, interstitial space, fire barriers, etc., shall be sleeved and sealed.

b. All cables shall be installed in separate conduit and/or signal ducts (exception from the separate conduit requirement to allow Nurse Call and/or Code Blue cables to be installed in partitioned cable tray with voice cables may be granted in writing by the RE if requested). Conduits shall be provided in accordance with Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and NEC Articles 517 for Critical Care and 800 for Communications systems, at a minimum.

c. When metal, plastic covered, etc., flexible cable protective armor or systems are specifically authorized to be provided for use in the System, their installation guidelines and standards shall be as specified herein, Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and the NEC.

d. When ”interduct” flexible cable protective systems is specifically authorized to be provided for use in the System, it’s installation guidelines and standards shall be as the specified herein, Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS, and the NEC.

e. Conduit fill (including GFE approved to be used in the system) shall not exceed 40%. Each conduit end shall be equipped with a protective insulator or sleeve to cover the conduit end, connection nut or clamp, to protect the wire or cable during installation and remaining in the conduit. Electrical power conduit shall be installed in accordance with the NEC. AC power conduit shall be run separate from signal conduit.

3.5 PROTECTION OF NETWORK DEVICES

A. Contractor shall protect network devices during unpacking and installation by wearing manufacturer approved electrostatic discharge (ESD) wrist straps tied to chassis ground. The wrist strap shall meet OSHA requirements for prevention of electrical shock, should technician come in contact with high voltage.

3.6 CUTTING, CLEANING AND PATCHING

A. It shall be the responsibility of the contractor to keep their work area clear of debris and clean area daily at completion of work.

B. It shall be the responsibility of the contractor to patch and paint any wall or surface that has been disturbed by the execution of this work.

C. The Contractor shall be responsible for providing any additional cutting, drilling, fitting or patching required that is not indicated as provided by others to complete the Work or to make its parts fit together properly.

D. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate Contractor the Contractor’s consent to cutting or otherwise altering the Work.

E. Where coring of existing (previously installed) concrete is specified or required, including coring indicated under unit prices, the location of such coring shall be clearly identified in the field and the location shall be approved by the Project Manager prior to commencement of coring work.

3.7 FIREPROOFING

A. Where Nurse Call and/or Code Blue wires, cables and conduit penetrate fire rated walls, floors and ceilings, fireproof the opening.

B. Provide conduit sleeves (if not already provided by electrical contractor) for cables that penetrate fire rated walls and Telecommunications Rooms floors and ceilings. After the cabling installation is complete, install fire proofing material in and around all conduit sleeves and openings. Install fire proofing material thoroughly and neatly. Seal all floor and ceiling penetrations.

C. Use only materials and methods that preserve the integrity of the fire stopping system and its rating.

D. Use approved fireproofing tape of the same type as used for the high voltage cables, and apply the tape in a single layer, one-half lapped or as recommended by the manufacturer. Install the tape with the coated

side towards the cable and extend it not less than 25 mm (one inch) into each duct.

E. Secure the tape in place by a random wrap of glass cloth tape.

3.8 GROUNDING

A. Ground Nurse Call and/or Code Blue cable shields and equipment to eliminate shock hazard and to minimize ground loops, commonmode returns, noise pickup, cross talk, and other impairments as specified in CFM Division 27, Section 27 05 26 – Grounding and Bonding for Communications Systems.

B. Facility Signal Ground Terminal: Locate at main room or area signal ground within the room (i.e. head end and telecommunications rooms) or area(s) and indicate each signal ground location on the drawings.

C. Extend the signal ground to inside each equipment cabinet. Ensure each cabinet installed item of equipment is connected to the extended signal ground. Isolate the signal ground from power and major equipment grounding systems.

D. Do not use "3rd or 4th" wire internal electrical system conductors for communications signal ground.

E. Do not connect the signal ground to the building's external lightning protection system.

F. Do Not "mix grounds" of different systems.

G. Insure grounds of different systems are installed as to not violate OSHA Safety and NEC installation requirements for protection of personnel.

PART 4 – TESTING / GUARANTY / TRAINING

4.0 SYSTEM LISTING

The Nurses Call System is NFPA listed as an "Emergency" Communication system. Where Code Blue signals are transmitted, that listing is elevated to "Life Support/Safety." Therefore, the following testing and guaranty provisions are the minimum to be performed and provided by the contractor and Warranted by the OEM.

4.1 PROOF OF PERFORMANCE TESTING

A. Intermediate Testing:

1. After completion of 40% of the installation of a master stations, local and remote stations, treatment rooms, and prior to any further work, this portion of the system must be pretested, inspected, and certified. Each item of installed equipment and devices shall be checked to ensure appropriate UL Listing and Certification Labels are affixed as required by NFPA -Life Safety Code 101-3.2 (a) & (b),

UL Nurse Call Standard 1069 and JCHCO evaluation guidelines, and proper installation practices are followed. The intermediate test shall include a full operational test.

2. All inspections and tests shall be conducted by an OEM-certified contractor representative and witnessed by TVE-005OP3B if there is no local Government Representative that processes OEM and VA approved Credentials to inspect and certify the system. The results of the inspection will be officially recorded by the Government Representative and maintained on file by the RE, until completion of the entire project. The results will be compared to the Acceptance Test results. An identical inspection may be conducted between the 65 - 75% of the system construction phase, at the direction of the RE.

B. Pretesting:

1. Upon completing installation of the Nurse Call and/or Code Blue System, the Contractor shall align, balance, and completely pretest the equipment and devices under full operating conditions.
2. Pretesting Procedure:
   a. During the System Pretest the Contractor shall verify (utilizing approved test equipment) that the System is fully operational and meets all the System performance requirements of this standard.
   b. The Contractor shall pretest and verify that all PSM System functions and specification requirements are met and operational, no unwanted aural effects, such as signal distortion, noise pulses, glitches, audio hum, poling noise, etc. are present. At a minimum, each of the following locations shall be fully pretested:
      1) Nurse Control Stations.
         a) Master Stations
         b) Code Blue Stations
      2) Dome Lights.
         a) Corridors
      3) Local and Remote Enunciation Panels (code blue).
      4) Primary / Emergency AC Power Requirements
      5) NSs.
3. The Contractor shall provide four (4) copies of the recorded system pretest measurements and the written certification that the System

is ready for the formal acceptance test shall be submitted to the RE.

C. Acceptance Test:

1. After the Nurse Call and/or Code Blue System has been pretested and the Contractor has submitted the pretest results and certification to the RE, then the Contractor shall schedule an acceptance test date and give the RE 15 working days written notice prior to the date the acceptance test is expected to begin. The System shall be tested in the presence of a TVE 005OP3B and OEM certified representatives. The System shall be tested utilizing the approved test equipment to certify proof of performance and Life Safety / Critical Service compliance. The tests shall verify that the total System meets all the requirements of this specification. The notification of the acceptance test shall include the expected length (in time) of the test.
2. The acceptance test shall be performed on a "go-no-go" basis. Only those operator adjustments required to show proof of performance shall be allowed. The test shall demonstrate and verify that the installed System does comply with all requirements of this specification under operating conditions. The System shall be rated as either acceptable or unacceptable at the conclusion of the test. Failure of any part of the System that precludes completion of system testing, and which cannot be repaired in four (4) hours, shall be cause for terminating the acceptance test of the System. Repeated failures that result in a cumulative time of eight (8) hours to affect repairs shall cause the entire System to be declared unacceptable.
3. Retesting of the entire renovated System shall be rescheduled at the convenience of the Government and costs borne by the Contractor at the direction of the SRE.

D. Acceptance Test Procedure:

1. Physical and Mechanical Inspection:
   a. The TVE 005OP3B Representative will tour all major areas where the Nurse Call and/or Code Blue System and all sub-systems are completely and properly installed to insure they are operationally ready for proof of performance testing. A system inventory including available spare parts will be taken at this

time. Each item of installed equipment shall be checked to ensure appropriate UL certification labels are affixed.

b. The System diagrams, record drawings, equipment manuals, TIP Auto CAD Disks, intermediate, and pretest results shall be formally inventoried and reviewed.

c. Failure of the System to meet the installation requirements of this specification shall be grounds for terminating all testing.

2. Operational Test:

a. After the Physical and Mechanical Inspection, nurse call master control equipment shall be checked to verify that it meets all performance requirements outlined herein. A spectrum analyzer and sound level meter may be utilized to accomplish this requirement.

b. Following the nurse call master control equipment’s output tap to ensure there are no signal distortions such as intermodulation, data noise, popping sounds, erratic system functions, on any function.

c. The distribution system shall be checked at each interface, junction, and distribution point, first, middle, and last intersectional, room, dome light in each leg to verify that the nurse call distribution system meets all system performance standards.

d. Individual Item Test: The TVE 005OP3B Representative will select individual items of equipment for detailed proof of performance testing until 100% of the System has been tested and found to meet the contents of this specification. Each item shall meet or exceed the minimum requirements of this document.

3. Test Conclusion:

a. At the conclusion of the Acceptance Test, using the generated punch list (or discrepancy list) the VA and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages with the RE. Any retesting to comply with these specifications will be done at the Contractor's expense.

b. If the System is declared unacceptable without conditions, all rescheduled testing expenses will be borne by the Contractor.

E. Acceptable Test Equipment: The test equipment shall furnished by the Contractor shall have a calibration tag of an acceptable calibration service dated not more than 12 months prior to the test. As part of the

submittal, a test equipment list shall be furnished that includes the make and model number of the following type of equipment as a minimum:

1. Spectrum Analyzer.
2. Signal Level Meter.
3. Volt-Ohm Meter.
4. Sound Pressure Level (SPL) Meter.
5. Oscilloscope.

4.2 SYSTEM GUARANTEE PERIOD OF SERVICE

A. Contractor’s Responsibility:

1. The Contractor shall guarantee that all provided material and equipment will be free from defects, workmanship and will remain so for a period of one year from date of final acceptance of the System by the VA. The Contractor shall provide OEM’s equipment warranty documents, to the RE (or Facility Contracting Officer if the Facility has taken procession of the building), that certifies each item of equipment installed conforms to OEM published specifications.
2. The Contractor's maintenance personnel shall have the ability to contact the Contractor and OEM for emergency maintenance and logistic assistance, remote diagnostic testing, and assistance in resolving technical problems at any time. This contact capability shall be provided by the Contractor and OEM at no additional cost to the VA.
3. All Contractor maintenance and supervisor personnel shall be fully qualified by the OEM and must provide two (2) copies of current and qualified OEM training certificates and OEM certification upon request.
4. Additionally, the Contractor shall accomplish the following minimum requirements during the two year guaranty period:
   a. Response Time during the Two Year Guaranty Period:
      1) The RE (or Facility Contracting Officer if the system has been turned over to the Facility) is the Contractor’s ONLY OFFICIAL reporting and contact official for nurse call system trouble calls, during the guaranty period.
      2) A standard work week is considered 8:00 A.M. to 5:00 P.M. or as designated by the RE (or Facility Contracting Officer), Monday through Friday exclusive of Federal Holidays.

3) The Contractor shall respond and correct on-site trouble calls, during the standard work week to:
   a) A routine trouble call within one (1) working day of its report. A routine trouble is considered a trouble which causes a pillow speaker or cordset, one (1) master nurse control station, patient station, emergency station, or dome light to be inoperable.
   b) Routine trouble calls in critical emergency health care facilities (i.e., cardiac arrest, intensive care units, etc.) shall also be deemed as an emergency trouble call. The RE (or Facility Contracting Officer) shall notify the Contractor of this type of trouble call.
   c) An emergency trouble call within four hours of its report. An emergency trouble is considered a trouble which causes a sub-system (ward), distribution point, terminal cabinet, or code one system to be inoperable at anytime.
4) If a Nurse Call and/or Code Blue/ component failure cannot be corrected within four (4) hours (exclusive of the standard work time limits), the Contractor shall be responsible for providing alternate nurse call equipment. The alternate equipment/system shall be operational within a maximum of 20 hours after the four (4) hour trouble shooting time and restore the effected location operation to meet the System performance standards. If any sub-system or major system trouble cannot be corrected within one working day, the Contractor shall furnish and install compatible substitute equipment returning the System or sub-system to full operational capability, as described herein, until repairs are complete.

b. Required On-Site Visits during the ***Two Year*** Guaranty Period
1) The Contractor shall visit, on-site, for a minimum of eight (8) hours, once every 12 weeks, during the guaranty period, to perform system preventive maintenance, equipment cleaning, and operational adjustments to maintain the System according the descriptions identified in this document.
2) The Contractor shall arrange all Facility visits with the RE (or Facility Contracting Officer) prior to performing the required maintenance visits.

3) Preventive maintenance shall be performed by the Contractor in accordance with the OEM's recommended practice and service intervals during non-busy time agreed to by the RE (or Facility Contracting Officer) and Contractor.
4) The preventive maintenance schedule, functions and reports shall be provided to and approved by the RE (or Facility Contracting Officer).
5) The Contractor shall provide the RE (or Facility Contracting Officer) a type written report itemizing each deficiency found and the corrective action performed during each required visit or official reported trouble call. The Contractor shall provide the RE with sample copies of these reports for review and approval at the beginning of the Acceptance Test. The following reports are the minimum required:
   a) The Contractor shall provide a monthly summary all equipment and sub-systems serviced during this guarantee period to RE (or Facility Contracting Officer) by the fifth (5th) working day after the end of each month. The report shall clearly and concisely describe the services rendered, parts replaced and repairs performed. The report shall prescribe anticipated future needs of the equipment and systems for preventive and predictive maintenance.
   b) The Contractor shall maintain a separate log entry for each item of equipment and each sub-system of the System. The log shall list dates and times of all scheduled, routine, and emergency calls. Each emergency call shall be described with details of the nature and causes of emergency steps taken to rectify the situation and specific recommendations to avoid such conditions in the future.
6) The RE (or Facility Contracting Officer) shall convey to the Facility Engineering Officer, two (2) copies of actual reports for evaluation.
   a) The RE (or Facility Contracting Officer) shall ensure a copy of these reports is entered into the System’s official acquisition documents.
   b) The Facility Chief Engineer shall ensure a copy of these reports is entered into the System’s official technical record documents.

B. Work Not Included: Maintenance and repair service shall not include the performance of any work due to improper use; accidents; other vendor, contractor, or owner tampering or negligence, for which the Contractor is not directly responsible and does not control. The Contractor shall immediately notify the RE or Facility Contracting Officer in writing upon the discovery of these incidents. The RE or Facility Contracting Officer will investigate all reported incidents and render

4.3 TRAINING

A. Provide thorough training of all nursing staff assigned to those nursing units receiving new networked nurse/patient communications equipment. This training shall be developed and implemented to address two different types of staff. Floor nurses/staff shall receive training from their perspective, and likewise, unit secretaries (or any person whose specific responsibilities include answering patient calls and dispatching staff) shall receive operational training from their perspective. A separate training room will be set up that allows this type of individualized training utilizing in-service training unit, prior to cut over of the new system.

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