



SECTION 27 51 23 - INTERCOMMUNICATION SYSTEM

1.1 GENERAL:

- A. Front end portions of the Specifications covering general conditions and conditions of the construction contract are a part of the contract and Contractors shall observe all of the requirements thereof, insofar as they pertain and are applicable to their respective work. Reference to Contractor or Contractors shall imply Intercommunication Contractor.
- B. Applicable National Fire Protection Association (NFPA) Publications: 70-96 National Electrical Code.
- C. The Contractor shall furnish all equipment, accessories, and material required for the installation of new Intercom head end equipment to replace existing Intercom head end equipment in strict compliance with these Specifications. Any material and/or equipment necessary for the proper installation and operation of the system, which is not specifically called for or described herein, shall be deemed part of this Specification.
- D. The system shall be a hybrid intercommunication system primarily utilizing analog components and limited VOIP technology. The Contractor shall provide all necessary PoE power to all VOIP components utilized for the project.

1.2 SCOPE:

- A. Work to be done under this contract shall include the furnishing of all labor, materials, apparatus, and connections to complete, in finished operating condition, the complete intercommunication system head end equipment replacement for Middle School Intercommunication Upgrade, Calallen Independent School District, Corpus Christi, Texas.
- B. The base proposal submitted by the contractor shall include replacement of the existing intercom head in equipment with the new intercom head in equipment specified herein to serve all existing intercom channels. Furnish and install all equipment including, but not limited to all intercom server/notification equipment specified herein; termination of existing intercom cabling to new intercom server/notification equipment including cable extensions if/as required and IP bridges including connections to the existing IT system. Replacement of existing speakers and cabling which are discovered to be dysfunctional after intercom serving equipment replacement is complete shall be provided in accordance with the line item unit pricing included within the contractor proposal documents in addition to the base proposal amount. Provide all necessary equipment and devices to provide complete operating service to all existing intercom channels within the base proposal amount.
- C. Attention is directed that the definition of work, materials, and devices required to modify the existing intercommunication system at the Middle School campus is dependent upon

jobsite observations by the contractor. The contractor shall be responsible for visiting the site and becoming completely informed of the scope of work required for system modifications prior to submittal of proposal. The contractor shall provide all materials, devices, labor, and accessory apparatus required for system modifications in the amount of the proposal.

- D. All Middle School system modifications, and system programming required for a complete/functional system are hereby included in the contract requirements.
- E. A new Valcom IP 6000 series IP-based communication system shall be installed at the existing Middle School Campus. The new communication system shall replace the existing Bogen MCP 35A head end unit and six (6) – 25 channel switch banks. The following generally describes the work required at the Middle School:
1. Main Office:
 - a. Label all existing analog channels as required for termination at talk-back gateways.
 - b. Remove the existing Bogen MCP 35A system, inclusive of the switch banks.
 - c. Install a new Valcom IP 6000 series IP-based communication system processor within the existing floor mounted rack. The new Valcom processor shall be rack-mounted.
 - d. Provide all required rack-mounted talk-back gateways, rack-mounted amplifiers, POE switches, and other required rack-mounted components necessary for the conversion from the Bogen MCP 35A intercommunication system to the new Valcom IP 6000 series system.
 - e. Terminate existing analog channels at the new talk-back gateways.
 - f. Provide CAT 6 cable (quantity required) from the new Valcom processor, and talk-back gateways to the nearest MDF / IDF room. Coordinate the number of required IP addresses or dedicated VLAN with Calallen Technology Department.
 - g. Provide an all-call microphone station at the existing floor mounted rack. Coordinate microphone elevation at the existing rack with Calallen Middle School staff.
 - h. The programming of the new Valcom system shall match the existing Bogen MCP 35A system as / is feasible. Coordinate any additional programming modifications necessary with the Middle School staff.
 - i. Provide and install a quantity of six (6) – new Valcom VE8092 Interactive Console stations in the Office area. The Interactive Stations shall be installed at the main reception desk, secretary office, principal's office, assistant principal's office (quantity of two), and registrar's office. The contractor shall install all required POE cable from the Interactive Stations to the Valcom IP 6000 series unit.
 - j. Provide and install one (1) – 12-port 25V talk-back gateway at the Outdoors Adventure Classroom by the Tennis Courts. Provide CAT 6 cable (quantity required) from the talk- gateway to the nearest IDF rack. Coordinate the number of required IP addresses or dedicated VLAN with Calallen Technology Department.
 - k. The contractor shall furnish and install all required outlet boxes, wall plates, RJ45 jacks, cabling etc., necessary for the components indicated above.
 - l. Contractor shall provide a rack-mounted UPS to serve all equipment installed within the existing floor mounted rack and IDF rack at the Outdoors

Adventure Classroom. The rack mounted UPS shall be sized to maintain the equipment at both racks for a minimum of 90 minutes.

1.3 MANUFACTURER:

- A. The manufacturer of all components intended for installation shall be Valcom. No substitute or alternate systems will not be considered.
- B. The manufacturer shall provide field service representation during construction and support after construction is completed.
- C. The manufacturer shall provide quality assurance certification for the installed system and all of its components. The manufacturer shall provide a report for the installed system at the request of the Owner. The report shall include but not be limited to serial numbers, and pertinent data for all of the system functions.

1.4 CONTRACTOR REQUIREMENTS:

- A. The contractor shall be an authorized dealer of the supplied equipment with full warranty privileges.
- B. The contractor must be factory trained and have attended the manufacturers training program to be an authorized IP 6000 distributor. The contractor and their employees must provide factory certifications for each employee whom will install and program the system.
- C. The contractor shall inventory the necessary parts in order to maintain and service the equipment intended for installation.

1.5 SUBMITTALS:

- A. Electronic submittals shall be organized in the following manner.
 - 1. Cover page indicating the Contractor's name, Project name, and contents of submittal.
 - 2. Table of contents keyed indicating the respective product data included within submitted brochure.
 - 3. All data submitted shall be identified (highlighted, circled, or pointed at with an arrow) on its respective sheet if more than one device/component is indicated on such sheet.
 - 4. Keyed Tab Format Example is as follows:
 - a. Tab 1: Bill of Material.
 - b. Tab 2: Equipment (main processor, talk-back gateways, and amplifiers).
 - c. Tab 3: Call-In Switches (if necessary).
 - d. Tab 4: Speakers (if necessary).
 - e. Tab 5: Rack-Mounted UPS (for main processor, talk-back gateways, and amplifiers).
 - f. Tab 6: Interactive Console.
 - g. Tab 7: Miscellaneous Material.
- B. Operation and Maintenance Manuals:
 - 1. Operation and Maintenance Manuals (O&M) shall include all items listed within the electronic and physical submittals listed above. The format of the O&M Manuals shall comply with the electronic and physical submittals listed above, however, the shop

drawings under tab 9 shall be replaced with a stamped copy of the submittal drawings reviewed by the AHJ.

2. Keyed Tab Format Example is as follows:
 - a. Tab 1: Bill of Material and Recommended Spare Parts.
 - b. Tab 2: Equipment (main processor, talk-back gateways, and amplifiers).
 - c. Tab 3: Call-In Switches (if necessary).
 - d. Tab 4: Speakers (if necessary).
 - e. Tab 5: Rack-Mounted UPS (for main processor, talk-back gateways, and amplifiers).
 - f. Tab 6: Interactive Console.
 - g. Tab 7: Miscellaneous Material.
 - h. Tab 8: Operation and Maintenance Instruction Manuals
3. The Contractor shall submit an electronic copy of the O&M Manuals for review by the Engineer. After all comments from the Engineer have been remediated, the Contractor shall submit one physical copy of the O&M Manuals for final review by the Engineer to confirm all items above are included within the physical copy. After all comments, pertaining to the physical copy, from the Engineer has been remediated, the Contractor shall provide the following:
 - a. Two (2) – physical copies of the entire O&M Manual.
 - b. A flash drive with electronic copies all of the items listed above (1.5.B.2.a through 1.5.B.2.h).

1.6 EQUIPMENT WARRANTY:

- A. The Contractor shall warrant the equipment to be new and free from defects in material and workmanship, and will, within one (1) year from the date of final acceptance, repair or replace any equipment found to be defective at his (the contractor's) sole expense.

1.7 SERVICE FACILITIES:

- A. The Contractor shall make available and maintain a satisfactory service department capable of furnishing equipment inspection and service. The Contractor shall be prepared to offer a service contract for the maintenance of the system beyond the warranty period.

1.8 FINAL INSPECTION:

- A. At the final inspection, a factory trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect. The system shall be run through simulated sequences and functions in the presence of a representative of the Architect. The system must be demonstrated to the satisfaction of the Architect prior to final acceptance. Time and date of demonstration shall be that which is approved by the Architect.

1.9 INSTRUCTION:

- A. A minimum of eight (8) hours of instructional sessions (two four-hour sessions) shall be provided to personnel of the Owner to educate the Owner in proper operation, maintenance, and programming of the system. Hands-on demonstrations of the operation of all system components and the entire system including program changes

and functions shall be provided. Time and date of instructional session shall be selected by the Owner.

- B. Contractor and/or the system's manufacturer's representatives shall provide a typewritten "Sequence of Operation".

1.10 EQUIPMENT AND MATERIAL, GENERAL:

- A. All equipment and components shall be new, and the manufacturer's current model.
- B. All equipment and components shall be installed in strict compliance with manufacturer's recommendations and installation instructions. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation. Any equipment and components not installed per the manufacturers recommendations or installation instructions shall be removed by the Contractor and reinstalled per the manufacturer's recommendations or installation instructions at the Contractor's expense.

1.11 IP 6000 INTERCOMMUNICATION SYSTEM:

- A. The VEIP6K-1 shall provide daily communication, emergency notification, calendar event scheduling, graphical interface, clock control, and on demand distribution of WAV files, pre-recorded audio, and text to simultaneous groups of speakers, speakers with text, strobes, and threat level indicators. The VEIP6K-1 shall feature a simple browser-based interface including graphics, icons, and calendar. Schedule control shall be via automatic initiation (based upon day of the week, calendar date up to one year in advance) or software controlled daily as needed. The VEIP6K-1 shall provide multiple simultaneous schedules, multiple events per schedule and up to 12 simultaneously occurring events. The schedules shall feature one-second resolution. Events shall be capable of controlling paging, relays, text, and streaming audio. The VEIP6K-1 shall allow cascading events from a single time trigger. Schedules shall be presented to the user in a calendar view showing day, date, year and months. The VEIP6K-1 shall provide for default screen view, permissions-based log-in, and roles.
- B. The following paragraphs of 1.11 specify the required capabilities and functions of the new intercom server/notification equipment. All specified capability and functional requirements apply. Those requirements which may not be possible to access due to connection of the new intercom server/notification equipment to the existing intercom channels will be required to function as specified by the scope of the next phase of work whereby existing intercom channels and field devices will be replaced. The contractor shall submit statement of commitment insuring that all specified capabilities and functions specified herein will be available.
- C. The VEIP6K-1 Communication / Notification Server shall provide Common Alert Protocol (send and receive), RSS feeds, ATOM feeds, and Email post.
- D. The VEIP6K-1 shall manually initiate origination of unscheduled events and shall import and convert audio files from wav files with an option to enhance the wav file audio during import and an option to pre-record messages to be utilized for daily communication and emergency alerts. Events shall feature programmable pre/post page delays and volume control per event. A master volume control (system-wide) shall also be available.

- E. The VEIP6K-1 shall be capable of sending and receiving CAP (Common Alert Protocol) messages and executing multiple emergency voice messages and text from key words of one or more CAP message files. The VEIP6K-1 shall communicate with the VIP-102B setup tool for setup and dial code information. The ability to control receipt of messages based upon priority shall be inherent. Audio storage capacity shall be 25,000 seconds.
- F. The VEIP6K-1 shall include a smart UPS (Uninterrupted Power Supply) to provide continued communication during power loss and brown-outs. The smart UPS shall automatically and gracefully shut down the VEIP6K-1 after an extended power loss so when power is restored, the Communication Notification Software shall be fully operational.
- G. The VEIP6K-1 shall allow operation of eight (8) contact closures which are software programmable as either form A or form B. Eight (8) contact closure switch inputs shall be software programmable to activate events, trigger multiple events, broadcast specific information, activate contact closures, etc. including input connections to various building, access, security, and camera systems.
- H. The VEIP6K-1 shall provide four (4) channels of aux audio and be programmable as output audio or input audio on each channel independently. The VEIP6K shall provide four (4) contact closure switch inputs for each aux audio channel and four (4) contact closure outputs for each aux audio channel. Each audio channel shall be able to be manually activated, scheduled, or triggered by software events. The VEIP6K-1 shall provide input audio channels to be software programmable for either VOX or contact closure activation. When the audio channel is programmed as audio out, it shall provide a contact closure that activates automatically for connections to ancillary audio systems. The VEIP6K-1 shall provide four (4) audio channels to broadcast audio signaling to self-amplified speakers, 25/70V amplifiers, autonomous PA systems, and voice signaling equipment.
- I. The VEIP6K-1 shall provide phone access to Valcom IP endpoints from SIP telephone systems. The VEIP6K-1 shall communicate and register with the SIP telephone system as a SIP station or SIP trunk. The VEIP6K shall support up to four (4) simultaneous calls for intercom, and one way page announcements. Two (2) FXS ports shall be provided for connection to stand-alone 2500 type phones, loop start trunk, or FXO port access for intercom calls and one way page announcements.
- J. The VEIP6K-1 shall provide caller identification for intercom calls when SIP access is utilized and provide caller identification to a minimum of two (2) FXS ports when stand-alone phones, loop start trunk, or FXO access is utilized. The 2RU VEIP6K-1 shall include an additional 1 RU Smart UPS to facilitate power and protect operational software from brownouts and power surges. The Smart UPS shall perform an elegant shutdown of software in the event of an extended power loss.
- K. The IP6000 system shall be capable of supervising all endpoints in a Valcom VoIP based paging system and provide notifications when problems are detected. Monitoring is not limited to Valcom VoIP endpoints, however, and any device with a valid IP address on the network can be monitored for network issues. Monitoring system endpoints cannot rely on passive resources, such as syslog, to provide its information. Instead, the system must periodically contact each configured device to verify that it receives a proper response.

- L. The IP Interactive Console, Model VE8092, shall incorporate an adjustable 10.1" color touch screen display capable of tilting to multiple positions in order to reduce glare. The Interactive Console shall provide the ability to send live and/or pre-recorded announcements, push text notifications to LED signs and make and receive calls from SIP (Session Initiation Protocol) endpoints via its one touch interactive display. The console shall also be able to be part of any page group within the IP6000 platform in order to receive pages directed to its particular group using its internal speaker. It shall contain a beam forming microphone array for intercom and live paging functions that eliminates surrounding background noise making for clean intelligible communications and a handset for private communications. The console shall have 4 non skid pads for easy table mounting. The console requires a Power over Ethernet Plus (PoE+) compliant with IEEE 802.3at supplied through the RJ45 network connection. If PoE+ is not available a 24 VDC external power supply can be used, Valcom Model VP-1124D.
- M. The VE6030 shall seamlessly integrate to any VoIP/SIP or legacy phone system via SIP, FXO, FXS, Trunk, or ATA.
- N. The IP6000 platform shall provide up to one thousand analog access paths. System shall be able to add analog access talk paths in increments of 1 (one), 2 (two), or 4 (four) ports. The VE8014BR shall provide a 10/100 Ethernet port, 4 FXS station ports and 4 form C relay contact outputs. The Quad Enhanced Network Station Port Model VE8014BR will provide all circuitry and software to convert network data to audio output and analog telephone control signals. The Quad Enhanced Network Station Port Model VE8014BR will provide all circuitry and software to convert input audio and analog telephone events to zone page audio and control information suitable for transmission to other Valcom ES IP Solutions products. The Quad Enhanced Network Station Port Model VE8014BR shall form one part of a serverless Network based communications system. The Quad Enhanced Network Station Port Model VE8014BR shall provide caller ID signaling. The Quad Enhanced Network Station Port Model VE8014BR shall be powered via either an external 24 Vdc power supply or via an 802.3af PoE Ethernet switch port. The Quad Enhanced Network Station Port Model VE8014BR shall be constructed of steel and be wall, table or rack mountable. The maximum dimensions shall be: 1.72" H x 16.5" W x 11.88" D (4.36cm x 41.91 cm x 30.18.0cm). Shipping Weight shall be approximately: 5.0 lbs (2.25 kg).
- FXO or trunk port access shall be via Model # VE8011BR (one port)
FXO or trunk port access shall be via Model # VE8012BR (two ports)
FXO or trunk port access shall be via Model # VE8014BR (four ports)
- O. The IP6000 Quad Enhanced Network Trunk Port Model VE8024AR will provide a single 10/100 Ethernet port, 4 FXO Trunk ports and 4 Failover ports. The Quad Enhanced Network Trunk Port Model VE8024AR will provide all circuitry and software to convert network data to audio output and analog trunk control signals. The Quad Enhanced Network Trunk Port Model VE8024AR will provide all circuitry and software to convert input audio and analog trunk events to zone page audio and control information suitable for transmission to other Valcom ES IP Solutions products. The Quad Enhanced Network Trunk Port Model VE8024AR shall form one part of a serverless Network based communications system. The Quad Enhanced Network Trunk Port Model VE8024AR shall decode caller ID signaling and transmit it over the network to other Valcom ES IP Solutions products. The Quad Enhanced Network Trunk Port Model VE8024AR shall provide 4 failover ports which will connect the analog trunk circuits to external devices in the case

of power failure. The Quad Enhanced Network Trunk Port Model VE8024AR shall be powered via either an external 24 Vdc power supply or via a 802.3af PoE Ethernet switch port. All setup and configuration of the Quad Enhanced Network Trunk Port Model VE8024AR will be via the Valcom VIP-102B IP Solutions Setup Tool. The maximum dimensions shall be: 16.50" x 1.75" x 9.50" (41.91 cm x 4.45 cm x 24.13 cm). Shipping Weight shall be approximately: 7.80 lbs. (3.54 kg).

FXS port access shall be via Model # VE8021AR (one port)

FXS port access shall be via Model # VE8022AR (two ports)

FXS port access shall be via Model # VE8024AR (four ports)

These network FXO ports allow most station port terminal devices to be connected to the IP6000.

- P. The SIP Intercom Controller (Model VE8090R) shall provide access to Valcom VoIP audio endpoints from SIP telephone servers. The SIP Intercom Controller shall communicate with the SIP telephone server as either registered SIP stations or as a SIP trunk. The SIP Intercom Controller shall support up to four concurrent calls for any combination of talkback intercom or group paging per call. In Station mode, the VE8090R shall allow registration of up to four SIP Stations, each of which will return dial tone and allow the caller to enter a Valcom dial code or group number. In Trunk mode, the VE8090R shall provide support for up to four concurrent calls. The inbound phone number shall automatically be interpreted to be a Valcom group or channel dial code. The VE8090R shall also provide 2 FXS ports to facilitate the addition of POTS telephones, Loop Start Trunk or FXO ports.
- Q. The Quad Networked Page Zone Extender Model VE8004BR will provide a single 10/100 Ethernet port, 4 audio input/output circuits, 4 Digital contact closure inputs and 4 N.O. relay contact outputs. The unit shall be SIP compatible. The Quad Networked Page Zone Extender Model VE8004BR will provide all circuitry and software to convert network data to zone page audio output. The Quad Networked Page Zone Extender Model VE8004BR will provide all circuitry and software to convert seamlessly to Valcom self-amplified analog speakers to be used in common areas such as hallways, outside, cafeteria, gymnasium, etc. via a networked zone expander or as an input audio to zone page audio and control information suitable for transmission to other Valcom ES IP Solutions products over a data network. It shall control these analog Valcom self-amplified speakers connected by zone expander via IP software as to set volume levels, paging groups, class change groups, page and emergency page groups, and emergency voice notification audio levels. The Quad Networked Page Zone Extender Model VE8004BR shall form one part of a serverless Network based communications system. The Quad Networked Page Zone Extender Model VE8004BR shall be powered via either an external 24 Vdc power supply or via an 802.3af PoE Ethernet switch port. All setup and configuration of the Quad Networked Page Zone Extender Model VE8004BR will be via the Valcom VIP-102B IP Solutions Setup Tool. The Quad Networked Page Zone Extender Model VE8004BR shall be constructed of steel and be wall, table or rack mountable. The maximum dimensions shall be: Dimensions: 1.72" H x 16.5" W x 11.88" D (4.36cm x 41.91 cm x 30.18.0cm). Shipping Weight shall be approximately: 6.45 lbs. (2.90 kg). Shall provide an unlimited number of analog low-level audio sources (streaming music, microphone access, or audio from auxiliary outputs) to be connected.

Low level audio connection shall be via Model # VE8001AR (one port)

Low level audio connection shall be via Model # VE8002AR (two ports)
Low level audio connection shall be via Model # VE8004AR (four ports)

These networked audio gateways allow most low-level audio sources to be connected to the IP6000 and shall seamlessly integrate and broadcast to two-way radios in order to facilitate emergency voice/tone notification.

- R. The IP Input/Output Module, Model VE8048A or VE8048AR shall feature eight (8) software programmable contact closures and eight (8) contact closure activated inputs for controlling or monitoring ancillary equipment such as door locks, access control systems or monitoring closures from emergency call buttons or other electronic equipment. It shall also feature. The VE8048A/VE8048AR shall allow remote relay activation and/or initiation of VE6030 server events over an IP-based LAN/WAN. The VE8048AR shall be designed for 19" rack mounting (1U). The (VE8048A) maximum dimensions shall be: 1.75 H x 6.75" W x 9.5" D (4.45cm H x 17.15cm W x 24.13cm D). Shipping Weight shall be approximately: 1.75 lbs. (0.80 kg). The (VE8048AR) maximum dimensions shall be: 16.50" x 1.75" x 9.50" (41.91 cm x 4.45 cm x 24.13 cm). Shipping Weight shall be approximately: 7.80 lbs (3.54 kg). Shall seamlessly integrate to door lock solenoids as to unlock or locks doors. Up to one thousand doors may be controlled.

1.12 COMPONENTS:

- A. 12-Port Talk-Back Gateway: The 12-port talk-back gateway shall be Valcom Cat. No. VE1225.
- B. Interactive Console: The interactive console shall be Valcom Cat. No. VE8092.

1.13 CABLE:

- A. Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box, or raceway containing these conductors, per N.E.C. Article 760-29.
- B. Cat 6 cable required from any Valcom component to the MDF / IDF rack shall be furnished and installed by the Contractor.

END OF SECTION 27 51 23