

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 27 51 17 - Provision of Equipment.

1.2 REFERENCES

- .1 Industry Canada - Terminal Attachment Program.
 - .1 CS-03-2010, Compliance Specification.
- .2 National Fire Protection Association (NFPA).
 - .1 NFPA72-2010, National Fire Alarm and Signaling Code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for public address and mass notification systems and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
 - .2 Indicate on drawings:
 - .1 Riser diagram, block diagram of complete sound system.
 - .2 Sound system design criteria.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for sound systems for incorporation into manual.
- .3 Include in manual:
 - .1 Operation instructions.
 - .2 Description of system operation.
 - .3 Description of each subsystem operation.
 - .4 List showing each piece of equipment in system or subsystem by its original manufacturer name and model number.
 - .5 Part list showing parts used in equipment by identification numbers that are standard to electronics industry.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoors, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect sound systems from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.6 ACCEPTABLE PRODUCTS AND MATERIALS

- .1 Where a particular brand name is stipulated, see Instructions to Bidders for procedure for requesting approval of substitute materials and products.

Part 2 Products

2.1 CABLING

- .1 Conduits and junction boxes: provided by Division 26.
- .2 Conductors for communication systems: as indicated.

2.2 CABINET AV001 IN ROOM 200-12

- .1 Wall rack:
 - .1 To EIA 19 standards. Dimensions: 81 in H x 22 in L x 25 in P. Usable height 44 spaces, usable depth 23½ in. Welded construction with 2,500 lb load capacity.
 - .2 Support: 16 gauge steel, black (powder coated) and accessories. Rack equipped with two pairs rackrails, numbered rackspaces, 16 gauges, tapped 10-32 mounting holes in EIA spacing. Provide 200 mm base accommodating wiring, load capacity to support rack including equipment.
 - .3 Rack to include following accessories:
 - .1 10-32 screws.
 - .2 Vertical lace strip, Lace 44-OWP.
 - .3 Lace bar, LBP.
 - .4 Locking, ventilated rear door.
 - .5 Lateral panels.
 - .6 Top ventilation.
 - .7 Power bar, a.c.
 - .4 Acceptable products:
 - .1 Model ERK 4425-AV of Middle Atlantic.

- .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Audio processor:
 - .1 DSP signal process, configurable 16 I/O. Open architecture compatible with HiQnet, Dante and BLU Link, and GPIO, Watchdog, Ethernet remote controls. Precise I/O configuration to be determined. Processor to be installed in wall rack.
 - .2 LED display for configuration instructions.
 - .3 Analog inputs: Sixteen analog Mic/Line Phantom Power, AES/EBU, S/PDIF, AEC, telephone.
 - .4 Analog output: Configurable, up to 16 AES/EBU, S/PDIF.
 - .5 Sample rate: 48 kHz or 96 kHz.
 - .6 Dynamic range: 20 Hz - 20 KHz.
 - .7 THD: <0.01% 20 Hz to 20 KHz, +10 dBu output.
 - .8 Dynamic range: 108 dB typical, 22 Hz-22 KHz unweighted.
 - .9 Output impedance: 40 ohms balanced and 20 ohms unbalanced.
 - .10 Bus audio: 256 channels, low latency (Fault Tolerant Digital Audio Bus).
 - .11 Bus audio digital: 2 RJ45 ports.
 - .12 Dante audio: 2 RJ45.
 - .13 Bidirectional function.
 - .14 Network: 1 Ethernet RJ45 Port.
 - .15 Control: 12 control inputs and 6 logic outputs (GPIO).
 - .16 DSP: Configurable with software.
 - .17 Configuration software.
 - .18 Quantity: 1.
 - .19 Acceptable products:
 - .1 Model BLU 806 of BSS.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .3 Audio processor:
 - .1 Signal processor, configurable 16 I/O. Open architecture compatible with HiQnet, Dante and BLU Link, and GPIO, Watchdog, Ethernet remote controls. Precise I/O configuration to be determined. Processor to be installed in wall.
 - .2 LED display for configuration instructions.
 - .3 Analog inputs: Sixteen analog Mic/Line Phantom Power, AES/EBU, S/PDIF, AEC.
 - .4 Analog output: Configurable, up to 16 AES/EBU, S/PDIF.
 - .5 Sample rate: 48 kHz or 96 kHz.
 - .6 Dynamic range: 20 Hz - 20 KHz.
 - .7 THD: <0.01% 20 Hz to 20 KHz, +10 dBu output.

- .8 Dynamic range: 108 dB typical, 22 Hz-22 KHz unweighted.
- .9 Output impedance: 40 ohms balanced and 20 ohms unbalanced.
- .10 Bus audio: 256 channels, low latency (Fault Tolerant Digital Audio Bus).
- .11 Bidirectional function.
- .12 Network: 1 Ethernet RJ45 Port.
- .13 Control: 12 control inputs and 6 logic outputs (GPIO).
- .14 DSP: Configurable with software.
- .15 Configuration software.
- .16 Quantity: 2, in extension to processor.
- .17 Acceptable products:
 - .1 Model BLU 120 of BSS.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .4 Audio Amplifier:
 - .1 Eight channel 300 W amplifier, not exceeding two spaces. DDCV, (Direct Drive Constant Voltage) 70 and/or 100 Vrms. Each channel available on high/low impedance (70 Vrms ou 100 Vrms). Channel pairing option. Must have remote control On/Off. To be installed in wall rack.
 - .2 Frequency response: (1 w i/ 80, 20 Hz - 20 khz): ± 0.25 dB.
 - .3 Noise ratio: (A-weighted) > 108 dB.
 - .4 Total harmonic distortion: (ThD: $< 0.35\%$).
 - .5 Maximum input level before compression: (+20 dBu).
 - .6 Maximum input level before saturation: +26 dBu.
 - .7 Voltage gain: 31 dB - 300 W.
 - .8 Input sensitivity: (1.4 V for 4/8 O and 70 V; 2.0 V for 100 V).
 - .9 Balanced input connectors: three points per channel.
 - .10 Output connectors: two forked contacts, 10 AWG compatible.
 - .11 BLU-Link input, 2 RJ-45 connectors.
 - .12 Quantity: 2.
 - .13 Acceptable products:
 - .1 Model DCI 8/300N of Crown.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .5 Switch:
 - .1 24-port switch, Web interface to simplify setup, security, and QoS traffic prioritization. Network Discovery Utility. Automatic VLAN and QoS configuration, configuration of ports according to type of connected device. To be installed in wall rack.
 - .2 STP protocol: 802.1d, 802.1w, 802.1s standards.

- .3 Port grouping: LACP IEEE 802.3ad VLAN.
- .4 VLAN: 4096 VLAN, PVE, guest, dynamic, CPE, multicast TV, Q-in-Q.
- .5 VLAN protocol: GVRP, GARP.
- .6 Link detection: UDLD (Unidirectional Link Detection).
- .7 Host protocol: DHCP (Dynamic Host Configuration Protocol), layer 2.
- .8 IGMP protocol: (Internet Group Management Protocol) versions 1, 2 and 3 and IGMP.
- .9 SSH protocol: Telnet and SCP traffic.
- .10 SSL protocol: HTTPS.
- .11 IPv4 routing: up to 512 static routes and 128 IP interfaces.
- .12 Inter-domain routing: (CIDR) support CIDR, layer 3. Configuration of layer 3 interface on physical port, LAG, VLAN interface or Loopback interface.
- .13 DHCP relay: Layer 3.
- .14 DHCP traffic relay across IP domains.
- .15 UDP relay (User Datagram Protocol).
- .16 Relay of broadcast information across Layer 3 domains for application discovery or relaying of BootP/DHCP packets.
- .17 DHCP server as DHCP IPv4 server serving IP addresses for multiple DHCP pools/scopes.
- .18 SSH (Secure Shell) protocol, SSL protocol (Secure Sockets Layer), IEEE 802.1X (authenticator role).
- .19 Web based authentication.
- .20 Network protection: BPDU, STP.
- .21 Quantity: 1.
- .22 Acceptable products:
 - .1 Model 300 of Cisco, 24 ports.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .6 DVD player:
 - .1 Digital player compatible with Blu-ray, CD, SACD and DVD.
 - .2 Audio. Streaming. Ethernet port. Integrated network functions for online diversity: YouTube, Leanback and VOD, Netflix; access to audio (MP3, WMA, FLAC HD 24 bits/192 kHz), image and video (including DivX) stocked on network device, PC or NAS (Network Attached Storage). To be installed in wall rack.
 - .3 PAL / NTSC video signal.
 - .4 S/B 115 dB Standby normal: 0.5 W.
 - .5 Total harmonic distortion: 0.0025%.
 - .6 Dynamic range: 100 dB, 4.9 kg.
 - .7 Video output: HDMI x 1.

- .8 Analogue audio output: (2 channels, L/R) x 1.
- .9 Ethernet x 1 control.
- .10 USB x 1 port.
- .11 (Remote In/Out) x 1 / x 1.
- .12 Quantity: 1.
- .13 Acceptable products:
 - .1 Model DBT-1713 UDP of Denon.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .7 Processor:
 - .1 Control processor for audiovisual equipment: video projector, lighting, security, audio, computer, smart phone, touch screen, TV screen, DVD Blu-ray and other. To be installed in wall rack.
 - .2 Versatile programming.
 - .3 512 MB RAM & 4 GB Flash memory.
 - .4 Memory up to 1TB.
 - .5 Space for memory card.
 - .6 High speed USB2.
 - .7 IP/Ethernet.
 - .8 XPanel with web-based Smart Graphics™.
 - .9 Compatible with iPhone®, iPad®, Android™, and Samsung Smart TV®.
 - .10 SNMP protocol.
 - .11 1 RS-232/422/485 COM.
 - .12 2 RS-232 COM.
 - .13 8 IR/serial, 8 relays and 8 Versiport I/O.
 - .14 Native BACnet®/IP support [1].
 - .15 Compatible with I Crestron Toolbox™ and Internet Explorer®.
 - .16 Compatible with SIMPL programs.
 - .17 Support les caractères Unicode (multi-langage).
 - .18 Secure access though Active Directory integration or stand alone account management.
 - .19 Hardware level security 802.1x authentication.
 - .20 JITC certification for secure network.
 - .21 IIS v.6.0 Web Server compatible.
 - .22 Quantity: 1.
 - .23 Acceptable products:
 - .1 Model CP3 of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .8 Wireless access point:
 - .1 Cisco Small Business Pro AP 541N access point, 802.11n dual band clustering access point for small businesses. Clustering capability makes it easy to set up, configure, and manage a growing wireless network. Multiple access points, single configuration to all devices within cluster, managing wireless network as single system without interference between access points, or configuring each access point as single device. To be installed in wall rack.
 - .2 802.11n - 2.4 or 5 GHz frequency band option.
 - .3 Configuration and administration facilitated by cluster technology.
 - .4 High security and quality service.
 - .5 Several access points on same network.
 - .6 Wireless network easy to deploy, manage and secure.
 - .7 Quantity: 1.
 - .8 Acceptable products:
 - .1 Model Pro AP 541N of Cisco.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .9 Video diffusion system:
 - .1 Switcher, 8 I/O modules, variety of video and audio: HDMI, Display Port, DVI-D, SDI, RGB, YPbPr, S-video, Y/C, composite, DM Cat, DM fibre, DM 8G+, DM 8G Fibre, and DM 8G SM Fibre. To be installed in wall rack.
 - .2 Data Rate: 12.5 Gbps.
 - .3 8 I/O.
 - .4 2 DM.
 - .5 8 24 V c.c.
 - .6 1 Ethernet 10/100/1 000 Gbs.
 - .7 HDBT compatible.
 - .8 H.264 video streaming.
 - .9 Modular.
 - .10 LCD display.
 - .11 8 input knobs.
 - .12 8 output knobs.
 - .13 Quantity: 1 of each.
 - .14 Acceptable products:
 - .1 Model DM-MD-8X8 of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

- .10 Complementary modules to video diffusion system:
 - .1 HDMI input card with audio extractor.
 - .1 Quantity: 2.
 - .2 Acceptable products:
 - .1 Model DMC-HD-DSP of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 Digital media input card 8G+.
 - .1 Quantity: 6.
 - .2 Acceptable products:
 - .1 Model DMC-C of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .3 Digital media output card.
 - .1 Quantity: 2.
 - .2 Acceptable products:
 - .1 Model DMCO-55 of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .4 Input card HDMI -VGA interface for digital media system.
 - .1 Quantity: 4.
 - .2 Acceptable products:
 - .1 Model DM-TX 200-C-2G of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .5 HDMI-VGA interface.
 - .1 Quantity: 2.
 - .2 Acceptable products:
 - .1 Model DM-TX-201-C of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .6 HDMI output with integrated video Scaler.
 - .1 Quantity: 6.
 - .2 Acceptable products:
 - .1 Model DM-RMC-SCALER-C of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .11 Wireless base for loges communication system.
 - .1 Refer to loges communication system.

- .12 Wired communication for loges communication system.
 - .1 Refer to loges communication system.
- .13 Additional equipment.
 - .1 Audio patch bay, 48 x 48 (quantity: 1) plus connection cable lot, 24-in length, appropriate type (quantity: 24).
 - .1 Acceptable products:
 - .1 Model AP-B248E2-L-NN-RPT of AVP.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 DMX patch bay, custom, TBD (quantity: 1), plus connection cable lot, 24-in length, appropriate type (quantity: 14).
 - .3 Opto = Multiplexer DMX-1 x 8 with integrated DMX (quantity: 1).
 - .1 Link: <http://www.pathwayconnect.com/content/view/44/29/>.
 - .4 Data patch bay, Belden or equivalent (quantity: 1).
 - .1 Link: <http://www.belden.com/techdatas/english/AX103255.pdf>.

2.3 CABINET AV002 IN ROOM 100-17

- .1 Wall rack:
 - .1 To EIA 19 standards. Dimensions: 81 in H x 22 in L x 25 in P. Usable height 44 spaces, usable depth 23½ in. Welded construction with 2,500 lb load capacity.
 - .2 Support: 16 gauge steel, black (powder coated) and accessories. Rack equipped with two pairs rackrails, numbered rackspaces, 16 gauges, tapped 10-32 mounting holes in EIA spacing. Provide 200 mm base accommodating wiring, load capacity to support rack including equipment.
 - .3 Rack to include following accessories:
 - .1 10-32 screws.
 - .2 Vertical lace strip, Lace 44-OWP;
 - .3 Lace bar, LBP.
 - .4 Locking, ventilated rear door.
 - .5 Lateral panels.
 - .6 Top ventilation.
 - .7 Power bar, a.c.
 - .4 Quantity: 1.
 - .5 Acceptable products:
 - .1 Model ERK 4425-AV of Middle Atlantic.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

.2 Audio amplifiers:

- .1 8-channel 300 W amplifier. Two spaces maximum. DDCV, (Direct Drive Constant Voltage) 70 and/or 100 Vrms. Each channel low and high impedance (70 Vrms or 100 Vrms). All channels paired. Remote control On/Off. To be installed in wall unit.
- .2 Frequency response: (1w i/ 8Ω, 20 Hz - 20 kHz): ± 0.25 dB
- .3 Noise ratio: (A-weighted) > 108 dB.
- .4 Total harmonic distortion : (ThD : < 0.35 %).
- .5 Maximum input before compression: (+20 dBu).
- .6 Maximum input before saturation: +26 dBu.
- .7 Voltage gain: 31 dB - 300 W.
- .8 Sensitivity: (1.4 V for 4/8Ω and 70 V; 2.0 V for 100 V).
- .9 Balanced connectors: three contacts per channel.
- .10 Output connectors: two forked contacts 10 AWG compatible.
- .11 BLU-Link 2 input, RJ-45 connectors.
- .12 Quantity: 2 (1 for the Lobby and 1 for the Memorial Hall).
- .13 Acceptable products:
 - .1 Model DCI 8/300N of Crown.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

.3 Audio processor:

- .1 Signal processor, configurable 16 I/O. Open architecture compatible with HiQnet, Dante and BLU Link, and GPIO, Watchdog, Ethernet remote controls. Precise I/O configuration to be determined. Processor to be installed in wall.
- .2 LED display for configuration instructions.
- .3 Analog inputs: Sixteen analog Mic/Line Phantom Power, AES/EBU, S/PDIF, AEC.
- .4 Analog output: Configurable, up to 16 AES/EBU, S/PDIF.
- .5 Sample rate: 48 kHz or 96 kHz.
- .6 Dynamic range: 20 Hz - 20 KHz.
- .7 THD: $< 0.01\%$ 20 Hz to 20 KHz, +10dBu output.
- .8 Dynamic range: 108 dB typical, 22 Hz-22 KHz unweighted.
- .9 Output impedance: 40 ohms balanced and 20 ohms unbalanced.
- .10 Bus audio: 256 channels, low latency (Fault Tolerant Digital Audio Bus).
- .11 Bidirectional function.
- .12 Network: 1 Ethernet RJ45 Port.
- .13 Control: 12 control inputs and 6 logic outputs (GPIO).
- .14 DSP: Configurable with software.
- .15 Configuration software.

- .16 Quantity: 2, in extension to processor (for the Lobby).
- .17 Acceptable products:
 - .1 Model BLU 120 of BSS.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .4 Audio processor:
 - .1 DSP signal process, configurable 16 I/O. Open architecture compatible with HiQnet, Dante and BLU Link, and GPIO, Watchdog, Ethernet remote controls. Precise I/O configuration to be determined. Processor to be installed in wall rack.
 - .2 LED display for configuration instructions.
 - .3 Analog inputs: Sixteen analog Mic/Line Phantom Power, AES/EBU, S/PDIF, AEC, telephone.
 - .4 Analog output: Configurable, up to 16 AES/EBU, S/PDIF.
 - .5 Sample rate: 48 kHz or 96 kHz.
 - .6 Dynamic range: 20 Hz - 20 KHz.
 - .7 THD: <0.01% 20 Hz to 20 KHz, +10 dBu output.
 - .8 Dynamic range: 108 dB typical, 22 Hz-22 KHz unweighted.
 - .9 Output impedance: 40 ohms balanced and 20 ohms unbalanced.
 - .10 Bus audio: 256 channels, low latency (Fault Tolerant Digital Audio Bus).
 - .11 Bus audio digital : 2 RJ45 ports.
 - .12 Dante audio: 2 RJ45.
 - .13 Bidirectional function.
 - .14 Network: 1 Ethernet RJ45 Port.
 - .15 Control: 12 control inputs and 6 logic outputs (GPIO).
 - .16 DSP: Configurable with software.
 - .17 Configuration software.
 - .18 Quantity: 1 (for the Memorial Hall).
 - .19 Acceptable products:
 - .1 Model BLU 806 of BSS.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .5 Processor:
 - .1 Control processor for audiovisual equipment: video projector, lighting, security, audio, computer, smart phone, touch screen, TV screen, DVD Blu-ray and other. To be installed in wall rack.
 - .2 Versatile programming.
 - .3 512 MB RAM & 4 GB Flash memory.
 - .4 Memory up to 1TB.
 - .5 Space for memory card.

- .6 High speed USB2.
- .7 IP/Ethernet.
- .8 XPanel with web-based Smart Graphics™.
- .9 Compatible with iPhone®, iPad®, Android™, and Samsung Smart TV®.
- .10 SNMP protocol.
- .11 1 RS-232/422/485 COM.
- .12 2 RS-232 COM.
- .13 8 IR/serial, 8 relays and 8 Versiport I/O.
- .14 Native BACnet®/IP support [1].
- .15 Compatible with I Crestron Toolbox™ and Internet Explorer®.
- .16 Compatible with SIMPL programs.
- .17 Support les caractères Unicode (multi-langage).
- .18 Secure access though Active Directory integration or stand alone account management.
- .19 Hardware level security 802.1x authentication.
- .20 JITC certification for secure network.
- .21 IIS v.6.0 Web Server compatible.
- .22 Quantity: 1.
- .23 Acceptable products:
 - .1 Model CP3 of Crestron.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .6 Wireless access point:
 - .1 Cisco Small Business Pro AP 541N access point, 802.11n dual band clustering access point for small businesses. Clustering capability makes it easy to set up, configure, and manage a growing wireless network. Multiple access points, single configuration to all devices within cluster, managing wireless network as single system without interference between access points, or configuring each access point as single device. To be installed in wall rack.
 - .2 802.11n - 2.4 or 5 GHz frequency band option.
 - .3 Configuration and administration facilitated by cluster technology.
 - .4 High security and quality service.
 - .5 Several access points on same network.
 - .6 Wireless network easy to deploy, manage and secure.
 - .7 Quantity: 2 (1 for the Lobby and 1 for the Memorial Hall).
 - .8 Acceptable products:
 - .1 Model Small Business Pro AP 541N of Cisco.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

.7 Switch:

- .1 24-port switch, Web interface to simplify setup, security, and QoS traffic prioritization. Network Discovery Utility. Automatic VLAN and QoS configuration, configuration of ports according to type of connected device. To be installed in wall rack.
- .2 STP protocol: 802.1d, 802.1w, 802.1s standards.
- .3 Port grouping: LACP IEEE 802.3ad VLAN.
- .4 VLAN: 4096 VLAN, PVE, guest, dynamic, CPE, multicast TV, Q-in-Q.
- .5 VLAN protocol: GVRP, GARP.
- .6 Link detection: UDLD (Unidirectional Link Detection).
- .7 Host protocol: DHCP (Dynamic Host Configuration Protocol), layer 2.
- .8 IGMP protocol: (Internet Group Management Protocol) versions 1, 2 and 3 and IGMP.
- .9 SSH protocol: Telnet and SCP traffic.
- .10 SSL protocol: HTTPS.
- .11 IPv4 routing: up to 512 static routes and 128 IP interfaces.
- .12 Inter-domain routing: (CIDR) support CIDR, layer 3. Configuration of layer 3 interface on physical port, LAG, VLAN interface or Loopback interface.
- .13 DHCP relay: Layer 3.
- .14 DHCP traffic relay across IP domains.
- .15 UDP relay (User Datagram Protocol).
- .16 Relay of broadcast information across Layer 3 domains for application discovery or relaying of BootP/DHCP packets.
- .17 DHCP server as DHCP IPv4 server serving IP addresses for multiple DHCP pools/scopes.
- .18 SSH (Secure Shell) protocol, SSL protocol (Secure Sockets Layer), IEEE 802.1X (authenticator role).
- .19 Web based authentication.
- .20 Network protection: BPDU, STP.
- .21 Quantity: 1.
- .22 Acceptable products:
 - .1 Model 300 of Cisco, 24 ports.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

.8 DVD player:

- .1 Digital player compatible with Blu-ray, CD, SACD and DVD. Audio. Streaming. Ethernet port. Integrated network functions for online diversity: YouTube, Leanback and VOD, Netflix; access to audio (MP3, WMA, FLAC HD 24 bits/192 kHz), image and video (including DivX) stocked on network device, PC or NAS (Network Attached Storage). To be installed in wall rack.

- .2 PAL / NTSC video signal.
- .3 S/B 115 dB Standby normal: 0.5 W.
- .4 Total harmonic distortion: 0.0025%.
- .5 Dynamic range: 100 dB, 4.9 kg.
- .6 Video output: HDMI x 1.
- .7 Analogue audio output: (2 channels, L/R) x 1.
- .8 Ethernet x 1 control.
- .9 USB x 1 port.
- .10 (Remote In/Out) x 1 / x 1.
- .11 Quantity: 1.
- .12 Acceptable products:
 - .1 Model DBT-1713 UDP of Denon.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .9 Additional equipment.
 - .1 Audio patch bay, 48 x 48 (quantity: 1) plus connection cable lot, 24-in length, appropriate type (quantity: 24).
 - .1 Acceptable products:
 - .1 Model AP-B248E2-L-NN-RPT of AVP.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
 - .2 DMX patch bay, custom, TBD (quantity: 1), plus connection cable lot, 24-in length, appropriate type (quantity: 14).
 - .3 Opto = Multiplexer DMX-1 x 8 with integrated DMX (quantity: 1).
 - .1 Link: <http://www.pathwayconnect.com/content/view/44/29/>.
 - .4 Data patch bay, Belden or equivalent (quantity: 1).
 - .1 Link: <http://www.belden.com/techdatas/english/AX103255.pdf>.

2.4 LOUDSPEAKER, 70 V, 100 W

- .1 Loudspeaker, 70 V 100 W.
- .2 Each 100 W loudspeaker equipped with 6 ft power cord and cabinet. Medium to high frequency 2.25 in driver, rotatable, and 5.25 in woofer. Designed for installation on walls and other solid flat surfaces.
- .3 Each loudspeaker shall have a nominal rated impedance of 8 ohms and shall be wired in parallel with a line voltage matching (step-down) transformer with an accessible, front-mounted level selector appropriate for setting various output taps. The loudspeaker input connections will allow for direct connection to 70 volt, 100 volt or low-impedance amplifiers. Each loudspeaker shall have a bandwidth of 75 Hz - 18 kHz and continuous acoustic output of 105 dB SPL. Power settings available shall be: 12.5, 25, 50, and 100 W to 70 V; 25, 50, and 100 W to 100 V; and 100 W at 8 ohms (when

referenced to IEC noise for 100 hours). The nominal dispersion shall be 180 ° H x 75 ° V à -6 dB (average 1 - 4 kHz).

- .4 Zoning:
 - .1 Multipurpose room:
 - .1 12 zones;
 - .2 Quantity: 30 loudspeakers (including 3 spares);
 - .3 Equipped with 1.9 in diameter Cheeseborough or C-clamps and security cable.
 - .2 Lobby:
 - .1 3 zones;
 - .2 Quantity: 14 loudspeakers (including 1 spare);
 - .3 Wall mount installation.
- .5 Acceptable products:
 - .1 Model DS100 SE of Bose.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.5 LOUDSPEAKERS, 70 V, 40 W

- .1 Loudspeakers 70 V, 40 W.
- .2 Each 40 W speaker equipped with 6 ft power supply cord. Ceiling mount. Suitable wall mount.
- .3 Frequency response: 80 Hz - 17 KHz (=/- 3 dB).
- .4 Nominal dispersion: 125° conical.
- .5 Power handling: 40 W (160 W peak).
- .6 Sensitivity: 87 dB SPL (1W@ 1m).
- .7 Maximum SPL: 103 dB SPL (109 dB SPL peak).
- .8 Loudspeaker: 4.5 full-range driver.
- .9 Nominal impedance: 8 Ohms.
- .10 70 V taps: 2.4 W, 5 W, 10 W, 20 W, 40 W.
- .11 100 V taps: 5 W, 10 W, 20 W, 40 W.
- .12 Zoning:
 - .1 Lobby:
 - .1 5 zones;
 - .2 Quantity: 10 loudspeakers (including 2 spares);
 - .3 Wall mount installation.

- .2 Memorial Hall:
 - .1 3 zones;
 - .2 Quantity: 12 loudspeakers;
 - .3 Wall mount installation.
- .13 Acceptable products:
 - .1 Model DS40F of Bose.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.6 COMMUNICATION SYSTEM FOR THE LOGES

- .1 Wall unit for loges, corridor and green room.
 - .1 Remote speaker station with speaker and Clearcom outlets.
 - .2 Headset input: Electret.
 - .3 Microphone input impedance: $\geq 2 \text{ K}\Omega$.
 - .4 Headset input type: dynamic.
 - .5 Headset input impedance: $\geq 1 \text{ K}\Omega$.
 - .6 Frequency response: 300 Hz-16 KHz.
 - .7 Wiring to AV001 cabinet.
 - .8 Quantity: 5.
 - .9 Acceptable products:
 - .1 Model KB-702 of Clearcom.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .2 Wireless intercom base:
 - .1 Wireless intercom station, rack mount 1 space, installed in AV001 cabinet. It allows to communicate using a headset with a microphone and including batteries for each beltpack helmets and a Quad Charger for all.
 - .2 Channels: 2 and 4 users.
 - .3 Frequency: 2.4 GHz.
 - .4 Security: Digital 64 bits encrypted.
 - .5 Relay: GPIO.
 - .6 Connects to: Phone combo XLR3F + Phone $\frac{1}{4}$ po.
 - .7 RF range: 2,400-2,483.5 MHz, 2,401.9-2,439.9 MHz, 2,443.4-2,481.4 MHz.
 - .8 Frequency response: 200 Hz-3.5 kHz.
 - .9 Distortion: $< 2 \%$.
 - .10 Wiring to AV001 cabinet.
 - .11 Quantity: 1.
 - .12 Acceptable products:
 - .1 Model BS-210 of Clearcom.

- .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .3 Wired communication:
 - .1 Master base for wired communication 2 channel with speaker and microphone including an amplifier and a 2 amp power source all mounted in AV001 cabinet.
 - .2 The base can support up to 40 helmets RS-701 model with belt case and up to 10 speaker station and 12 stations with helmet with 2 channels.
 - .3 Channels A-B-linkable.
 - .4 Individual channel inputs control.
 - .5 Remote control of microphone shutting.
 - .6 External relay circuit
 - .7 Quantity: 1.
 - .8 Acceptable products:
 - .1 Model MS-702 base of Clearcom.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .4 Wireless headset:
 - .1 Single muff headset, comfortable. Noise cancelling microphone.
 - .2 Flexible microphone.
 - .3 Quantity: 4.
 - .4 Acceptable products:
 - .1 Model HS15 of Clearcom.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.
- .5 Beltpack:
 - .1 Belt transmitter, compact, rechargeable, two-channel, concealed antennae.
 - .2 Quantity: 4.
 - .3 Acceptable products:
 - .1 Model BP210 of Clearcom.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.7 TV SCREEN

- .1 LCD screen, 47 in, portrait or landscape. 24/7 use, native resolution 1,920 x 1,080 pixels, slim design (Thin Bezel). Delivered with wall bracket and mounting hardware.
- .2 Dimensions: 47 in diagonal.
- .3 Frame: 20 mm.
- .4 Native resolution: 1,920 x 1,080 pixels.

- .5 High brightness: 7 cd/m².
- .6 Audio: 10w+10w Stereo.
- .7 Contrast: 1,300:1.
- .8 Aspect ratio: 16:9.
- .9 Viewing angle: 178° H x 178° V (CR>=10).
- .10 Pixel Pitch: 0.542 mm H x 0.542 V mm.
- .11 Video input: 1 HDMI, 1 BNC, Y, Cb/Pb, Cr/Pr, 1 Display port, 1 mini D-sub, 1 DVI-D.
- .12 Video output: 1 DVI-D.
- .13 Audio input: Mini stereo 3.5 mm RCA left/right.
- .14 Audio output: RCA (L/R) x 1.
- .15 Control: 1 10/100 Base-TX. RS-232 (In/Out).
- .16 Quantity: 4.
- .17 Acceptable products:
 - .1 Model PN-U473 of Sharp.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.8 VIDEO PLAYER

- .1 Digital signage player, wide range of Codecs graphic types, video, photo storage capacity
Signage applications: FEED RSS, multi-images and external control system. To be installed in wall rack.
- .2 Dimensions: 1 in x 6.25 in x 3.25 in.
- .3 Internal storage: 4 GB solid state.
- .4 External storage: Flash Drive via 1 port USB2.
- .5 Resolution: 720 P.
- .6 Codec video: MPEG4, MPEG2, MPEG1, H.264, MJPEG
- .7 Codec audio: MPEG audio layer 1/2/3 (MP3), ITU G.711, G.726, PCM, Microsoft WMA, AAC.
- .8 Media: AVI, WMV/WMA, VOB, AIFF, WAV, MP4, MOV (Quicktime).
- .9 Streaming media: MMS, RTSP, RTP, SDP, HTTP; Uni- & multicast.
- .10 Video output: HDMI (incl. digital audio): DVI via adapter, VGA (DB15 HD).
- .11 Audio output: stereo, mini-jack 3.5 mm.
- .12 Control: RS-232, up to 115200 bauds, mini-jack 3.5 mm.
- .13 Quantity: 4.

- .14 Acceptable products:
 - .1 Model ISPX 1300 of AMX.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.9 ADMINISTRATIVE COMPUTER

- .1 Rack mount 3, clone computer, equipped with i7 processor.
- .2 Mother board: ASUS H87M-E, Intel, H87, LGA 1150, microATX.
- .3 Processor: INTEL I7-4770 3.40 GHz Socket 1150.
- .4 Memory: DDR3 Kingston 8 GB 1 333 MHZ.
- .5 Video card: EVGA GTX 750.
- .6 Hard drive: INTEL SSD 120 GB model: 530.
- .7 Chassis: IStar USA 3U (D-313SE-MATX).
- .8 Rail: ISTAR USA 20 po TC-RAIL-20
- .9 Fan: FAN12025PWM Fan STARTECH 120 x 25 mm.
- .10 Power supply: SEASONIC SSR-450RM.
- .11 Chassis: Startech 2 Drive 2.5 in Trayless, SATA,(HSB220SAT25B).
- .12 Software: Windows 7 Ultimate French/English 64 bits.
- .13 Video operating software with license for 10 workstations AMX inspired signage.
- .14 One 19-inch monitor with a resolution of 1,440 x 900 including USB VGA DVI.
- .15 Monitor to be installed with a support on one side of the cabinet and to be articulated so as to be positioned in front of the cabinet.
- .16 One keyboard with wireless mouse Logitech K400.
- .17 Quantity: 1.
- .18 Acceptable products:
 - .1 Intel/Asus.
 - .2 Replacement materials or products: approved by addendum according to Instructions to bidders.

2.10 EQUIPMENT TO PROVIDE

- .1 Provide all equipment required in Section 27 51 17 - Provision of equipment.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for public address systems installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install equipment in accordance with manufacturer's instructions, and as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Test all equipment to be provided to ensure their proper functioning, then put them in their boxes or chests, in accordance with Section 27 51 17 - Provision of Equipment.
- .3 Conduct intelligibility test.

3.4 CLOSEOUT ACTIVITIES

- .1 Manufacturer's factory service engineer to instruct:
 - .1 Maintenance personnel in maintenance of system.
 - .2 Operating personnel in use of system.
 - .3 Training period to be at least 4 hours.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.

- .2 Repair damage to adjacent materials caused by public address and mass notification systems installation.

END OF SECTION