

SECTION 27 41 20
THEATER AUDIOVISUAL SYSTEMS

PART 1 - GENERAL INFORMATION

1.1 OPERATIONAL SUMMARY

- A. This section of the specification describes the functional details of the audiovisual systems to be furnished and installed in the Theater and associated spaces – which include:
1. Theater 108 – A 520 seat house sectioned into six moderately raked seating sections with a large cross-aisle.
 2. Stage 2 – A roughly 1,450 square foot stage with an approximately 200 square foot apron, and a 450 square foot shallow uncovered orchestra pit in front of the apron.
 3. Control Room – A windowed control room for sound and lighting tech crew. This space will be modified by the District JOC to facilitate live mixing and include a new AV headend and equipment rack.
 4. The theater house features an open ceiling to the structural truss members and deck, with rows of acoustical reflectors and a catwalk roughly 10-12' upstage from the cross aisle.
 5. The Stage area has a relatively low barrier ceiling, approximately 2' above the proscenium opening, that limits the use of rigging and scenery, but is accessible above, from a spiral staircase in the stage left cheekwall, that also leads to the catwalk and provides access to the space above the house reflectors.
 - a. The design intent is that major cabling pathways between the Stage and Control Room, will make use of free-air pathway – using J-hooks or cable-tray to traverse this space, and feed systems onstage, at the pit, and in back-of-house spaces.
 - b. A new JOC provided system of surface raceway at the orchestra pit, will provide connectivity for AV systems at the pit and stage apron.
- B. The Theater space will provide audio program and reinforcement, as well as capture and routing, video display, capture, and routing, as well as control and management functions to serve an audience, classes and meetings – including outside events and users, with active participants on stage numbering up to 100+ persons. Each of the spaces, as noted in paragraph 'A', will operate in the following manner:
1. Theater Stage & House:
 - a. Audio Systems shall include:
 - i. A house main audio system, which includes:
 - a) A main reinforcement loudspeaker system consisting of a pair (2) of full-range 3-way horn-loaded vertical beamforming cabinets that are flown above the pit at the apron line, and may be configured to use as a mono-sum mix or as a stereo pair – particularly when used for reproduction of program audio accompanying video. This system will include DSP amplifiers which will feed individual driver channels with FIR filter sets to allow beamforming of the cabinet's output, as provided by the manufacturer.
 - b) A high-output subwoofer cabinet, flown from the ceiling structure, and located between each full-range cabinet, along a common time-aligned arc at the stage apron/pit.

- ii. A house mixing and routing system to include Dante IP audio networking, with a new 33 fader digital FoH mix console in the Control Booth position and new stage box(es) providing microphone/line and monitor speaker connectivity onstage or in the pit.
 - iii. A rack-mounted Dante IP audio networking DSP signal processing unit will provide automated mixing and signal processing, fixed signal flow for non-production work, as well as feeds to ADA assistive listening systems (ALS), and feeds to/from recording/streaming systems and other rooms in the facility – as needed.
 - iv. Wireless microphone systems will include digital RF systems, with house-mounted antennae, RF distribution/amplification, and multiple multi-channel receivers. Transmitters shall include handheld condenser, lavalier omni capsules with belt-packs, as well as head-worn condenser microphones.
 - v. An ADA-2010 compliant ALS system shall be provided, with network integration to allow use of personal Wi-Fi devices with the Owner's guest Wi-Fi network to provide ALS or supplemental audio to users with Android, iOS devices.
- b. Production Intercom (PIC) systems shall include:
- i. A two-channel rack-mounted party-line master station, and new shared 1.9 GHz wireless RF intercom system with master-station, wall-mounted transceiver and portable rechargeable belt-pack units and headsets.
 - ii. Two channel speaker/microphone wall panels as shown on the drawings.
 - iii. Two channel passive wall panels, for use with single and dual-channel belt-packs and headsets, at onstage operator/crew locations and in the control room and followspot booth.
- c. Display and Video Systems shall include:
- i. A replacement motorized, tab-tensioned large format projection screen, mounted in the proscenium soffit, replacing the existing 46-year-old square format, non-tensioned, borderless screen.
 - a) The AV Contractor shall coordinate the installation of the screen, and any re-wiring, trimming/cutting, patching and painting of the screen and surrounding soffit, with the District's project manager and assigned JOCs.
 - ii. A large format digital video projector with appropriate lens to provide projected content to the screen, mounted from the roof truss structure above, using new infrastructure, pathway and power provided under a separate JOC by the Owner.
 - iii. A PTZ HD video camera to provide situational awareness views to the back-of-house spaces, as well as provide streaming content to the campus network and existing signage players, as coordinated with the Owner.
 - iv. A variety of HD-Base-T and (portable) AV-over-IP transmitter/receiver or encoder/decoder devices, both fixed and portable, to allow transmission of source content from portable and user devices (laptops, computers, media players, etc..) to display systems in the room, or portable display device.
 - v. An OFE wireless presentation interface, to allow user connectivity through a local dedicated WAP or the enterprise Wi-Fi network, to be integrated at the direction of and coordination with District IT staff.

- vi. A desktop streaming encoder/recorder appliance to allow event and presentation streaming of video from the PTZ camera and presentation source simultaneously on a single stream or recording channel with audio from the House systems.
- d. Other Systems and Functions shall include:
 - i. A selection of portable devices, such as:
 - a) AV-over-IP encoders/decoders, for use on-stage and back-of-house.
 - b) Production intercom belt-packs and half-muff headsets, for two-channel wired party-line system, reusing the existing party-line master station and system wiring, where able.
 - c) Wireless production intercom systems, including wireless 2-channel belt-packs, single-muff headsets, Li-ion batteries and outboard battery chargers.
 - d) Sets of microphones, as per Appendix 'A' to provide instrumental and choir mic'ing capabilities, including on-stage pickup of dance and onstage movement.
 - e) Self-powered onstage wedge monitor speakers.
 - f) Dante I/O 'dongle' devices to serve as portable network connections for analog input/output, Bluetooth and USB-C/A sources.
 - ii. A number of input/output (I/O) panels at the plaster-line of the proscenium wall, upstage rear wall, house, and Control Booth will provide connectivity for audio and audio/video IP network devices, analog audio, production intercom systems (PIC), and feeds for media and videography recording.
 - iii. Dedicated IP networks for various AV networking functions, with associated IP patch-panels, managed layer-3 IP switches with SFPs and stacking capabilities with adequate bandwidth for future expansion. Networks to be broken down as:
 - a) AV-over-IP Network, for high-bandwidth time-critical video/audio/control/USB applications on 1G or 10G links. This network shall be dedicated and not shared or VLANed with other enterprise or AV networks.
 - b) Dante Audio (and/or AES67) Network, for use with Dante audio systems and endpoint connections. This network may be VLANed off with and share hardware with the AV Control Network.
 - c) AV Control Network, for use by AV unified control systems hardware and endpoint devices, for monitoring, control, and management, as well as low-demand content. This network may be VLANed off with and share hardware with the Dante Audio Network.
 - iv. Systems control shall include an integrated control processor which will provide control signals using legacy formats, or the IP control network to communicate with other devices in the system, including associated house lighting through an IP interface.
 - a) The user interface shall consist of a wired tabletop touch panel control, to be used in the Control Room, and a wall-mount touchpanel at the stage-right Stage Manager's position, as well as software to allow designated OFE computers and User tablets to emulate the functions of the Control Room Touchpanel from locations in the space over the Enterprise Wi-Fi.

2. The Control Room will include, as described in-part above, the following:
 - a. Production intercom panels for audio, and lighting/tech use.
 - b. A tabletop touch-panel controller.
 - c. The tabletop streaming/recording appliance as noted above.
 - d. Wireless microphone chargers and storage.
 - e. Production intercom belt-pack/headset storage and charging docks.
 - f. ALS receiver storage and charging docks/bases.
 - g. A replacement AV rack, to house new AV equipment, patching, wire management, power distribution, storage, blank/vent panels and required thermal management.
- C. Events hosted in this space will include, but not be limited to:
 1. Music performance: Orchestral, wind-band, ensemble, chamber and solo, acoustical instruments with some amplified or close miked instrumentation.
 2. Amplified music performance.
 3. Vocal performance: choral, ensemble and solo, with and without accompaniment
 4. Dramatic performance with or without talent-worn microphones.
 5. Musical theater with talent-worn microphones, with a live pit band/orchestra onstage or at the forestage apron area (pit).
 6. Public meetings, presentations and panel groups.
 7. Classroom and Lecture instruction.
 8. Cinema and video screening, with basic left/right program audio.
- D. All systems shall be dedicated and permanently installed as described above and, in the following, functional descriptions.

1.2 RELATED WORK

- A. Installation of all floor boxes and/or poke thru devices (excluding any plates and connectors to be provided by the contractor).
- B. Telephone and telecommunications jacks and special telecom outlets not related directly to AV, (LAN/WAN, Wireless access points (WAPs), PTSN/POTS, etc.).
- C. Provide in accordance with Section 27 41 00 – Audiovisual Systems.
- D. Work noted in the drawings to occur under separate JOC under the District, as described in 27 41 00.

1.3 SYSTEM INTERCONNECTION & FUNCTIONAL DESCRIPTION

- A. Display Systems
 1. Provide and integrate a large-venue video projector and long throw lens as shown on the drawings.
 - a. Provide and integrate a projector mount with a 1-1/2" NPT pipe, and suspend from the overhead ceiling structure, using approved means, as coordinated with the District structural engineer or JOC.
 - b. Field-verify and adjust the mounting height of the projector as required from the location referred to in the drawings. Provide appropriate extension pipe column to support mount from pipe-clamp.
 - c. Field-verify the lens specified in Appendix 'A' with throw distance and geometry requirements on-site.

2. Provide and integrate a new motorized tab-tensioned projection screen, as per the drawings and Appendix 'A'. Screen shall include integral low-voltage controller.
 - a. Coordinate demolition of the existing projection screen and projection screen case with the District project manager and their assigned JOC, to:
 - i. Disconnect existing power and remove screen and case.
 - ii. Mount new case is location of existing and reconnect 120V power.
 - iii. Run wiring for low-voltage control to AER-01.
 - iv. JOC to trim in new screen case and provide patching and painting as required upon completion and testing of new screen.

B. Video Systems

1. Provide and integrate a rack-mounted HD-Base-T AV matrix switcher as per the drawings and Appendix 'A'.
2. Provide and integrate HD-Base-T receivers and transmitters as per the drawings and Appendix 'A'.
3. Provide and integrate AV-over-IP encoder and decoder units as per the drawings.
 - a. Provide and integrate AV-over-IP encoder/decoder multicast manager/controller unit, for up to 50 endpoints, as per Appendix 'A'.
4. Provide and integrate a wall-mounted HD PTZ camera as per the drawings and Appendix 'A'. Provide all required mounting accessories to mount to the lighting bar at the Control Booth.
 - a. Provide connectivity to IP network for control and streaming of H.265 content.
 - b. Provide 12G-SDI converters to get camera signals into the Control Room, to the streaming encoder/recorder.
5. Provide and integrate a tabletop dual stream encoder/recording appliance, as per the drawings and Appendix 'A'.
6. Provide and integrate an Owner Furnished (OFE) wireless presentation appliance, as per the drawings and Appendix 'A'.
 - a. Coordinate with Owner to receive device and integrate to a free input at the AV matrix switch.
 - b. Provide input selection in the GUI to address device.
 - c. Owner to provide al network and Wi-Fi integration through District IT staff.

C. Audio Systems

1. Provide and integrate production intercom systems (PIC) as per the drawings and Appendix 'A'. Systems shall provide an analog 2-channel party-line system, operating on shared buses with a 2-channel wireless 1.9 GHz wireless intercom system, complete with:
 - a. New 2-channel rack-mounted master station, connected with:
 - b. 2-channel rack-mounted wireless base-station. Base station shall integrate with the analog party-line 'A' and 'B' buses, as well as:
 - c. Wireless IP splitter and power supply, installed in the AER-01 rack with the base station, and powering a:

- i. Wireless transceiver, supporting up to 8 registered wireless belt-packs and located at the stage right house-side-tormentor pipe – providing coverage to crew on stage, in the House and Back-of-House corridors and dressing spaces.
 - ii. Field verify the location of the transceiver with the use of wireless PIC belt-packs in the House and Stage, as well as BoH areas. Review this information with the manufacturer and provide proposal to add a second transceiver location if required for uniform coverage.
 - iii. Cabling from master station/head-end shall be free air from the transceiver at the tormentor bar, through the House ceiling space to the AER-01 equipment rack in the Control Booth.
 - d. Wall-mounted custom belt-pack panels, as dual-channel plug-in points, as per the drawings.
 - e. 1 channel wired belt-packs, with clip on accessories and required cables with adaptor or interface to panels.
 - f. 2-channel wireless belt-packs, with clip on accessories, extra batteries, and tabletop battery chargers as per Appendix 'A'.
 - g. Half-muff headsets for use with wired and wireless belt-packs or wall-stations.
 - h. New speaker/mic wall stations with volume controls and belt-pack/headset plug-in points, as per the drawings and Appendix 'A'.
2. Provide and integrate a full front of house (FOH) main loudspeaker system as per the drawings and Appendix 'A' manufacturer custom quotation. This system will provide the primary sound reinforcement system for live sources in the room.
 - a. Provide a left-right two (2) cabinet system, consisting of a 3-way horn-loaded active beamforming array cabinet, each, to provide uniform front-to-back coverage of the listening area. Coordinate exact layout and tuning of system with the Consultant and manufacturer's EASE5.0 file and adjust as required by field conditions and approved by the commissioning/tuning agent.
 - i. Include professional commissioning and tuning services by the manufacturer as included in the custom quotation.
 - ii. Coordinate provision and obtaining of custom asymmetric beamforming DSP files and FIR filter sets from the manufacturer to be implemented prior to systems tuning.
 - iii. Provide rigging supports to structure, as per the manufacturer's quote, Appendix 'A', and appropriate means and methods, as coordinated with the District's structural engineer or JOC. Support location shall follow modelling with speaker supports between the existing arc soffit above the stage apron and the first row of acoustical reflector 'clouds'.
 - iv. Contractor shall use a manufacturer-certified rigger and follow all recommended and statutory requirements for flying the loudspeaker systems over the stage and house.
 - b. Provide a flown subwoofer, with dual-18" drivers, as per the Appendix 'A' quotation, installed between the full-range main loudspeakers and separately rigged, as per the drawings and custom quotation.
 - c. Provide and integrate all amplification as per the custom quote and Appendix 'A'. Amplification must match manufacturer's quoted make and types.
3. Provide and integrate a rack-mounted audio DSP unit with 8x8x8 analog I/O, and

- Dante/AES67 64x64 (48kHz/24bit) channel I/O. DSP shall provide USB interface for use with computer and UC/Web-conference applications.
- a. Program and configure the DSP to provide loudspeaker management, and standard routing I/O for non-tech operator events, with touch panel control for non-tech events.
 - b. Provide integration with a mix of assigned fixed Dante channels and user-routable Dante channels using Dante Controller software. Provide a plan of Dante channel assignments for review by the Consultant and Owner to determine the best configuration for fixed and staged tech events.
 - c. Provide integration and programming to assign selection of (2) handheld and (2) belt-pack wireless microphone systems for use through systems control in 'non-tech' setting, reassigning these channels to/from the house mixing systems when used for non-tech mode through an auto-mixing module.
 - d. Provide integration and programming to assign the forestage apron Dante I/O panels to an Automix mode when system is used in a non-tech model as described above in paragraph 'c'.
 - e. Provide assignment of fixed IP audio routes to a AES-67 matrix, with the goal of freeing up as much of the available 64x64 Dante matrix license for user routes and I/O, which should be assigned to the console to/from stage boxes, Dante panels and wireless microphone systems. Other fixed auto-mix channels, feeds to amps, ALS, etc... should reside on a locked down AES-67 mix and not be available for production matrixing or assignment.
4. Provide and integrate audio amplifiers as per the drawings and Appendix 'A' manufacturer quotation.
- a. Provide and configure the manufacturer provided Armonia, FIR filter set files and incorporate into the amplifier DSP for loudspeaker control. Only the main system EQ tuning shall reside in the main DSP.
5. Provide and integrate a rack-mounted Assistive Listening System (ALS) to provide local Wi-Fi enabled ALS to users with 'smart' devices loaded with the appropriate 'app'.
- a. Provide all required accessories for a complete 'kit' including receivers, earphones, neck T-coil loops, charging base, and ADA-compliant signage.
 - b. Coordinate integration of Wi-Fi ALS services with district guest network services to allow users access to ALS with Port 80 pass-thru.
6. Provide and integrate digital wireless microphone systems as per the drawings and Appendix 'A'. Wireless microphone systems shall be installed in AER-01 and include the following:
- a. Wireless multi-channel rack mount receivers with integrated Dante networking, networked monitoring/management, and RF distribution amplifiers. Receiver channels to be shared between hand-held and belt-pack transmitters in unequal number (4 handheld units matched alongside 4 belt-packs) and will require owner training to mitigate misuse.
 - b. Rack mounted RF distribution amplifier. To provide primary distribution of RF to groups of cascaded receivers (2 receivers sets per primary feed)
 - c. New log-periodic antennae, with wall/arm mounts, , as required.
 - d. Wireless handheld transmitter units with cardioid condenser capsules and rechargeable battery.

- e. Wireless belt-pack transmitter units with thin-line omnidirectional lavalier condenser capsules, clips and rechargeable batteries.
 - f. New head-worn (over ear) thin-line condenser microphones for use with belt-pack transmitters, with compatible connectors.
 - g. Rack-mounted battery chargers with interfacing for battery types specified for transmitters in Appendix 'A'. Provide in quantity to allow charging of all batteries simultaneously. Install in AER-01
 - h. Provide wireless RF survey and assignment plan as per 27 41 00.
- 7. Provide and integrate a new 33-fader front-of-house (FoH) live digital mixing console with Dante audio interface.
- 8. Provide and integrate a new front-of-house (FoH) Dante digital stage-boxes in a 16 in x 8 out configuration for use with live instrumentation and microphones.
- 9. Provide and integrate a pair of desktop powered studio monitors to allow for monitoring of FoH audio within the Control Room, for use by crew in that position.
- 10. Provide and integrate Dante input/output panels as per the drawings and Appendix 'A'.
 - a. Confirm settings for XLR-3F inputs with Owner and Consultant, re: mic/line, level/attenuation, etc... prior to checkout and signoff.
- 11. Provide as loose portable pool equipment:
 - a. Provide intercom belt-packs and headsets as noted above.
 - b. Provide self-powered low-profile stage monitor loudspeaker systems as per Appendix 'A'.
 - c. Provide wired microphone and microphone kits with accessories, as per Appendix 'A'.
 - d. Provide input/output Dante interfaces and connectivity as per Appendix 'A'.
- D. Control Systems
 - 1. Provide and integrate a system of programmable systems control including a master processor with IP networking, as well as RS-232/422, GPIO, relays/contacts and IR control.
 - 2. Provide and integrate a wall-mounted 7" and tabletop 7" touchpanels as per the drawings and Appendix 'A'. Provide integration to allow use of the touchpanel at the following locations in the room:
 - a. In the Control Booth, at the countertop location.
 - b. At the stage-right wing position, adjacent to the existing lighting touchpanel control.
- E. User Interface
 - 1. Provide programming of control interfaces as directed by Owner's Representative and Consultant. Programming shall provide simple user interface to select local video and audio sources and adjust room and area volume to within predetermined limit.
 - a. Provide proposed layout based upon meeting with Consultant and Owner's end users to draft plan for and hierarchy of needed controls and configuration of pages/menus. This meeting will be used by the Contractor to formulate first round of GUI submittals as per 27 41 00.
 - b. Consultant will meet with Owner to review proposed GUI, and make comments as required, for return to Contractor for revision and resubmittal. Upon resubmittal a final round of review with the Contractor's programmer and any

submitted comments will be used to provide a finalized submittal for the GUI.

2. Provide and program software management/monitoring interface for Owner's technical staff, which will allow advanced system control and monitoring functions using a PC connected to the control system LAN.
 3. Provide control panel operations that are consistent from page to page.
 4. Provide feedback that indicates the current equipment and/or system status where possible.
- F. Software
1. Provide control capability for every function available on every piece of equipment being controlled by the system. Define and provide "macro" commands for the most used functions.
 2. Provide control capability to OFE Windows tablet devices, as well as end-user iOS and Android devices by providing the appropriate executable files and app deployment of the control system GUI for the space. Include all necessary programming and licensing costs for this feature.
 3. Provide password protection for any operations that can adversely affect certain room set-up functions. Provide for the ability for remote monitoring of system functions and adjustments via-TCP/IP. Capability for configuration will require password protection for use of facility management. Provide for the delivery of email fault alerts to facility management.
- G. The Contractor shall provide all interconnection cable, connectors, terminal strips, wireways, flexible conduit, etc., to facilitate the audiovisual systems as detailed within these specifications and drawings.
- H. Conduit and power systems are detailed in the Electrical Engineer's drawings.
- I. Miscellaneous
1. Provide and integrate a new equipment rack as noted in the Appendix 'A' document and drawings. Provide and integrate with rear door, rear-rails, wire-management, storage drawers with foam inserts, blank and vent panels, low-noise fans and thermostatic thermal management accessories, , lacing-bars, horizontal and vertical wire management, and power distribution as required per the specifications and drawings, as well as best practices defined by AVIXA, TIA/EIA, and BiCSi.
 2. Provide and integrate power conditioning and distribution as required with PDUs dedicated to low-demand equipment and separate PDUs and circuits to supply amplifiers.
 3. Integrate PoE+/++ network switches to support control, video and audio systems and VLANs at the main AV rack as shown on the drawings. Switch shall be Gigabit Ethernet, managed and allow integration with the Owner's IT network. Switches and VLANs will be configured to provide segmented networks that will be dedicated to systems control and monitoring, as well as transport of IP media content other than in-room audio (conferencing, streaming video, etc.) [Refer to paragraph 1.5.B below]
 4. Provide and integrate rack-mounted patch panel(s) at the IP switch in the main AV rack to allow patching and management of AV related IP devices in the rack.
 - a. Patch panels shall be located on the front face of the rack, between horizontal wire management and active IP switches, and allow user-access to patch endpoints in the stage and house areas unimpeded.
 - b. Omission of patch panels or installation of panels in the rear of the rack is unacceptable and will be rejected.
 5. Provide and install all hardware, cabling, connectors, faceplates, terminators, adapters, audio combiners, balanced-unbalanced audio converters, wall boxes, etc. required to ensure installation of a fully functional audiovisual system as depicted in

the attached AV Systems drawings.

1.4 EQUIPMENT LAYOUT

- A. The equipment in this area shall be as detailed on drawings.
- B. All equipment shall be installed with rack ears/mounts or custom rack-mounts/face-plates, using security screws.
- C. Where rack-mount kits are not available or practical, the Contractor shall provide a vented rack-mount shelf unit with the appropriate clamp-mount or Velcro wrap systems to secure devices within the rack and rack-shelf and provide adequate device spacing and cooling, allowing space for access and servicing.
- D. There shall not be any loose components in the audiovisual racks nor untrained cables or cables without appropriate service loops.

1.5 OWNER FURNISHED EQUIPMENT

- A. All room furniture will be furnished by the Owner (Unless otherwise noted in this specification).
- B. All Windows PC computers will be furnished by the Owner, along with wired and wireless keyboard/mice/trackpads and monitors. All software and licensing for PC computers will be OFE. Coordinate I/O connectivity requirements with Owner IT staff and provide any required adaptors, baluns or interfaces.
- C. Unless noted otherwise in Appendix 'A', All IP Network switches will be furnished by the Owner. Coordinate switch allocation with owner, including dedicated switches for AV-network-only applications.

1.6 RELATED WORK SPECIFIED ELSEWHERE

- A. The following systems and equipment are not provided under this contract. The Contractor is to coordinate with the base bid contractors as necessary to insure compatibility.
- B. Installation of all floor boxes and/or poke thru devices (excluding any plates and connectors to be provided by the contractor).
- C. Telephone and telecommunications jacks and special telecom outlets not related directly to AV, (LAN/WAN, Wireless access points (WAPs), PTSN/POTS, etc.).

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

- A. Included with Contract Documentation
 - 1. Provide in accordance with Appendix 'A' – 27 41 20.
- B. Pre-Approved Alternate Manufacturers
 - 1. Provide in accordance with Section 27 41 00.

2.2 AUDIOVISUAL SYSTEMS HARDWARE & COMPONENTS

- A. Provide in accordance with Appendix 'A' – 27 41 20, which includes the following:
 - 1. Equipment description, including parameters and options required.
 - 2. Manufacturer to be base-bid.
 - 3. Model number of equipment or series to be bid.
 - 4. Quantity of equipment, or reference to drawing quantities.
 - 5. Designation of any Owner-Furnished (OFE), Existing to Reuse (ETR), Not-in-Contract (NIC) or Future equipment.
 - 6. Custom Quotation numbers, where applicable, to be bid as a pre-approved dealer or

representative of the manufacturer quoted.

PART 3 - EXECUTION

3.1 PROVIDE IN ACCORDANCE WITH SECTION 27 41 00 – AUDIOVISUAL SYSTEMS: PART 3 - EXECUTION.

APPENDIX A – EQUIPMENT LISTS

See the attached Appendix for the equipment lists for the audiovisual systems. These lists are provided for the bidding process.

END OF SECTION 274120

Appendix A							
27 41 20 - AUDITORIUM: AUDIOVISUAL SYSTEMS							
Item #		Product	Manuf.	Model #	Unit	Qty	Ext.
CONTROL							
1	CP-01	Wall Mounted Touch Panel, 7" capacitive touchscreen with 1024x600 resolution. Provide with appropriately sized blank rack panel with 2-gang knockout to rack mount touchpanel. (color selection by owner, submittal process)	Q-SYS	TSC-70-G3		1	
2	CP-02	Tabletop Touch Panel, 7" capacitive touchscreen with 1024x600 resolution. (color selection by owner, submittal process)	Q-SYS	TSC-70-G3, w/ TSC-710t-G3		1	
3	IPSW-01	Ethernet Switch - Rack-mounted L3/4; 40 Port; 40 ports PoE+ (960W), 2x1G and 8xSFP+ Managed Switch	Netgear	M4250-40G2XF-PoE+ (GSM4248PX)		1	
4	IPSW-02	Ethernet Switch - Rack-mounted L3/4; 30 Port; 24 ports PoE+ (480W), 2x1G and 4xSFP+ Managed Switch	Netgear	M4250-30G2XF-PoE+ (GSM4230PX)		1	
DISPLAY & VIDEO							
5	CAM-01	Wall-mounted PTZ camera: UHD/4K type, 1/2.3" CMOS Sensor, 20x Zoom Lens, with 3G-SDI output, H.264/65 output, USB and RS-232 control, RJ-45, Provide with wall mount	Canon	CR-N300		1	
6	HBTX-01	HD-Base-T wall plate transmitter - HDMI, USB-C, Audio input, 4K/60/4:4:4	Extron	DTP3 T 212 D		2	
7	IPE-01	AVoIP protocol encoder, 1G bandwidth; Transmits and scales 4K/60 @ 4:4:4 video, audio, Ethernet, and USB over 1 Gbps IP networks. Portable	LibertyAV	IPEX5101		2	
8	IPD-01	AVoIP protocol decoder, 1G bandwidth; Receives and scales 4K/60 @ 4:4:4 video, audio, Ethernet, and USB over 1 Gbps IP networks. Portable	LibertyAV	IPEX5102		1	
9	IPE-01	AVoIP protocol encoder, 1G bandwidth; Transmits and scales 4K/60 @ 4:4:4 video, audio, Ethernet, and USB over 1 Gbps IP networks. Rack mounted	LibertyAV	IPEX5101		1	
10	IPM-01	Proprietary AVoIP protocol system manager, secure, troubleshooting and management network interface	LibertyAV	IPEXCB		1	
11	EPS-01	Electric Projection Screen - 146"x260", tab tensioned 16:9 HDTV format. XT1300X Matt White fabric.	Draper	Paragon V PN: 114614TH		1	
12	SENC-01	Streaming Encoder with 12G SDI input; streaming to 4K 60fps; RTMP in H.264, SRT in H.264 and H.265; ethernet control	Epiphan	Pearl Mini		1	
13	VMX-01	4K/60 Matrix Video Switcher, w/ 6 HDMI in; configurable: 2 DTP/HDMI in, 1 DTP out, 2 HDMI Out, Analog Audio I/O	Extron	DTP3 Crosspoint 662		1	
14	VP-01	Large Venue HD Video Projector - Ceiling Suspended, Laser-lamped 24,000 ISO Lumen HD/WUXGA Video Projector, with 2.00 - 4.00 Zoom Lens	Digital Projection	M-Vision 24000 WU w/ 120-627 Lens		1	
15	VP-01	Projector MOUNT ADAPTER. Universal, high capacity. Provide with 1.5" NPT pipe, interface, and any necessary mounting accessories to interface with wall.	Chief	VCMU		1	

Appendix A							
27 41 20 - AUDITORIUM: AUDIOVISUAL SYSTEMS							
Item #		Product	Manuf.	Model #	Unit	Qty	Ext.
AUDIO							
16	AMP-01A	2 Channel, 6400W Amplifier. Includes onboard DSP and Dante Network	Biamp / Community	ALC-3202D (Custom Quote: DQ002148-1)	[Provide lump sum per quotation, including professional services]	1	
17	AMP-01B	4 Channel, 1600W/Ch Amplifier. Includes onboard DSP and Dante Network	Biamp / Community	ALC-1604D (Custom Quote: DQ002148-1)		2	
18	AMP-01C	4 Channel, 400W/Ch Amplifier. Includes onboard DSP and Dante Network	Biamp / Community	ALC-404D (Custom Quote: DQ002148-1)		4	
19	S-01L, S-01R	Steerable Beamforming Main loudspeaker. 90 Degree fixed horizontal coverage. Include mounting U-bracket, to interface to	Biamp / Community	LVH-909/AP w/(2) LVH-900UB (Custom Quote: DQ002148-1)		2	
20	SUB-01	High Power, dual 18-inch Subwoofer. Black finish.	Biamp / Community	IS8-218B (Custom Quote: DQ002148-1)		1	
21		Pole mount and interface to suspend S-01 speakers, provide stem length and interface hardware as required (field verified Means & Methods)	Polar Focus	PY0 (or) PY1 series		2	
22	AMP-02	Audio Amplifier: Four Channel, 70/100V 200 W/Ch. @ 8Ω Peak, Analog I/O	Extron	XPA U 2004 FX		1	
23	DSP-01	Audio DSP Unit: 12x8 I/O with: Dante 64x64 I/O, USB Port, with AEC co-processor module w/16 channels	Q-SYS	Core 24F w/ SLDAN-64-P		1	
24	DWP-01	Dante Wall Panel - 2x2 mic/line I/O XLR-3F/M, 2-gang Decora opening [Black Finish]	RDL Labs	DDB-BN22		2	
25	DWP-02	Dante Wall Panel - 0x2 mic/line I/O XLR-3/M, 1-gang Decora opening [Black Finish]	RDL Labs	DB-RN02		2	
26	MIX-01	48 channel / 42 bus Dante-networked mixing console. 12 Analog I/O, 2x1 stereo. 33 faders, including 64x64 I/O card.	Allen & Heath	SQ7 w/ AH-M-SQ-SDANTE64-A & AH-AP11334		1	
27	MPIC-01	Production Intercom Master Station, 2ch.	Clear-com	MS-702		1	
28	PIC-02	Production Intercom Speaker/Mic Wall Station	Clear-com	KB-702		4	
29		Production Intercom Belt-Pack and Headset Combo: 1-Channel Belt-Pack, with half-headset	Clearcom	CC300 w/RS-701		3	
30	WPIC-01	Wireless Production Intercom Base Station, 2ch.	Clear-com	FSE-BASE-II		1	
31	TXC-01	Wireless Production Intercom Transceiver Unit. [Provide model based upon onsite RF survey]	Clear-com	FSII-TCVR-XX-US		1	
32		Wireless Production Intercom Belt-Pack and Headset Combo: 2-Channel Belt-Pack, with half-headset	Clear-com	FSII-BPXX		6	
33		Freespeak beltpack charging station. (5) bay.	Clear-com	AC60		2	
34	SB-01	16 input x 8 output stage box, Dante network, remote preamps.	Allen & Heath	DT168		2	
35	ANT-01	Passive log-periodic wide band UHF panel-type antenna.	Shure	PA805		2	

Appendix A							
27 41 20 - AUDITORIUM: AUDIOVISUAL SYSTEMS							
Item #		Product	Manuf.	Model #	Unit	Qty	Ext.
36	RFD-1	Wireless Microphone Antenna Distribution Amplifier - 1x4 (x2) with LV power supply and cascade output. [Provide model based upon onsite RF survey]	Shure	UA844+SWB	_____	1	_____
37	WMR-01	Wireless Microphone Receiver - Digital diversity FM unit, with dual-unit rack-mount ears [Provide model based upon onsite RF survey]	Shure	ULXD4Q-XXX	_____	8	_____
38	WMT-01	Wireless Mic Transmitter - Beltpack type, with miniature lavalier omni capsule, black	Shure	ULXD1 w/WL 93 (RK354SB)	_____	32	_____
39	WMT-01	Wireless clip-on lavalier omni capsule with Tie Clip	Shure	WL183 w/RK187T1	_____	4	_____
40	WMT-01	Wireless over-ear thin-line condenser microphone, IP-57 rated, 136 dB max SPL, in mix of colors, as noted	Point Source Audio	CO-8WS-XSH-BE (26) CO-8WS-XSH-BR (6)	_____	32	_____
41	WMT-02	Wireless Microphone Hand-held Transmitter and capsule - Super Cardioid Condenser; rechargeable Lion battery;	Shure	ULXD2/SM87	_____	4	_____
42		Rack-mounted Charger for ULXD system batteries - with modules to support belt-pack and handheld batteries	Shure	SBRC w/(4) SBC-AX	_____	3	_____
43	ALS-01	Assistive Listening Transmitter - Wi-Fi based system using Owner's guest network Wi-Fi. Provide rack-mount kit and necessary signage, including rigid/permanent QR code placard, Provide system that includes sixteen (16) receivers and Battery charging dock	ListenTech	LWS-16-A1	_____	1	_____
PORTABLE AUDIO HARDWARE							
44	MON-01	Self-powered floor-wedge 2-way monitor speaker - small/low-profile	DB Technologies	FMX10	_____	8	_____
45		Boundary Layer Microphone - PZM type for use on stage for free-field pickup	AKG	PZM6 D	_____	3	_____
46		Small-diaphragm condenser cardioid microphones, matched pair set	Audio Technica	AT4041SP	_____	1 (pair)	_____
47		Small-diaphragm condenser omnidirectional microphones	Audio Technica	AT4022	_____	2	_____
48		Small-diaphragm choir microphone with carbon fiber boom and floor stands, windscreens, accessories bundle (3-pack/LCR)	Acacia Audio	LizChoirLCR	_____	1 (kit)	_____
49		Piano Microphone Kit - matched pair of small-diaphragm condensers on short goosneck with plate clips, include clips for use with acoustic string instruments (guitar, violin)	Neumann	MCM114 set w/MC1, MC6 and MC9, mounts	_____	1 (kit)	_____
50		Set of Dante I/O 'dongle' units for I/O connection to Dante network infrastructure: Provide quantities noted to support USB-C, Bluetooth, analog XLR +4dBu I/O connections	Audinate Dante AVIO	(1) ADP-USBC-AU-2X2, (1) ADP-BT-AU-2X1, (2) ADP-DAI-AU-2x0, (2) ADP-DAO-AU-0x2	_____	Lot	_____
51		Microphone Stands - Full-height stands with telescoping boom attachments, for use with instrument microphones	K&M	KM21090	_____	4	_____
52		Microphone Stands - Low tripod stands with telescoping boom attachments, for use with instrument microphones	K&M	KM25900B	_____	4	_____
53		Microphone cables - 30' XLR-3F/M type	ProCo	Excellines XLR30	_____	8	_____
54		Microphone cables - 50' XLR-3F/M type	ProCo	Excellines XLR30	_____	4	_____
MISCELLANEOUS HARDWARE							

Appendix A							
27 41 20 - AUDITORIUM: AUDIOVISUAL SYSTEMS							
Item #		Product	Manuf.	Model #	Unit	Qty	Ext.
55	AER-01	AV Equipment Rack; 45 RU 32" Deep, 23" Wide; Provide: fan top, vented front door, split rear doors, side panels; fixed base, PDUs, lacing strips, rackshelves, blank and vent plates; vertical & horizontal wire mgmt; rear rack-rails and fan controller as required; (2) 2 RU Drawer	Middle Atlantic	BGR-4532; BGR-RD38; BGR-552FT-FC; BGR-RR41; PD-2420SC-NS; U4V; SSHD-28; Lace-40-OW-A; (2) D2; SSHD-28; plus required cable mgmt, blank & vent panels;		1	
56	PIC-01	Custom Wall Panel for AV I/O - Per Detail Drawings	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		5	
57	WP-01	Custom 4-Gang Wall Panel for AV I/O - Per Detail Drawings	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		2	
58	WP-02	Custom 4-Gang Wall Panel for AV I/O - Per Detail Drawings	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		2	
59	WP-03	Custom 2-Gang Panel for AV I/O - Per Detail Drawings - Mounted Within Wiremold 4000 Series Raceway	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		2	
60	WP-04	Custom 2-Gang Panel for AV I/O - Per Detail Drawings - Mounted Within Wiremold 4000 Series Raceway	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		2	
61	WP-05	Custom 2-Gang Panel for AV I/O - Per Detail Drawings - Mounted Within Wiremold 4000 Series Raceway	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		1	
62	WP-06	Custom 3-Gang Wall Panel for AV I/O - Per Detail Drawings	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		1	
63	WP-07	Custom 6-Gang Wall Panel for AV I/O - Per Detail Drawings	Pro-Co, RCI, Panelcrafters, etc...	Custom [Refer to Drawings]		1	
64	PP-01	CAT6A 10G Punchdown PatchPanel - Normal Density 48-port; Provide with 24" patch cables in quantity. 2 RU	Panduit	DP486X88TGY		2	
65	PP-02	CAT6A 10G Punchdown PatchPanel - Normal Density 24-port; Provide with 24" patch cables in quantity	Panduit	CP246X88BL		1	
66		Miscellaneous hardware, switches, relays panels, connectors, cabling, lamps, terminal blocks, etc., necessary to insure a complete and operating system.				LOT	
67		Set audiovisual systems functional drawings, shall be photo-reproduced laminated & stored in pocket, audiovisual equipment racks.				LOT	