



Dutchess County Department of Public Works
626 Dutchess Turnpike
Poughkeepsie, NY 12603
Email: dpwcontracts@dutchessny.gov

**REBID Dutchess Stadium New Left Field Clubhouse, Seating Bowl & Restroom Building
RFB-DCB-18-22**

ADDENDUM # 2

To: ALL PROSPECTIVE BIDDERS

FROM: Dutchess County Department of Public Works

Date: December 19, 2022

Re: Bid due date change, Clarifications and Revised section 005000 Post Bid Requirements

The purpose of this addendum is to notify all prospective bidders of the following:

The **Bid Due Date** Changed to Wednesday, **January 4, 2023 at 11:00am** with the question deadline by December 28, 2022.

See the attached Clarifications and revised Section 005000 Post Bid Requirements.

**PLEASE INCLUDE A SIGNED COPY OF THE ADDENDUM IN YOUR BID
RECEIPT OF ADDENDUM**

END OF ADDENDUM #2

SECTION 005000 – POST BID REQUIREMENTS (BID CONTRACTOR EVALUATION FORMS)

FOR: RFB-DCB-18-22 REBID Dutchess Stadium New Left Field Clubhouse, Seating Bowl & Restroom Building

**TO: Dutchess County Department of Public Works
626 Dutchess Turnpike, Poughkeepsie, NY 12603**

FROM

Name of Bidder

Date Bid

Address

Telephone

Fax No.

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with the OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. Within 48 hours of notification by Owner, requested contractor will submit the following information:
 - A. 005100 – Subcontractor Listing
 - B. 005200 – Lump Sum Bid Breakdowns.
 - C. 005300-List of Substitutions

END OF SECTION 005000

ADDENDUM 002

TO THE

DLR Group
Architecture Engineering Design
33 East 33rd Street, Fourth Floor
New York, New York 10016
Telephone 913-897-7811

PROJECT MANUAL AND DRAWINGS

FOR

December 19, 2022

REBID DUTCHESS STADIUM NEW LEFT FIELD CLUBHOUSE,
SEATING BOWL, & RESTROOM BUILDING
FISHKILL, NEW YORK

DLR Group Project No. 57-21113-00

FOR COMBINED CONTRACT

NOTICE TO BIDDERS: The Construction Manager's & Owner's revisions to the Bid Documents are attached.

NOTICE TO BIDDERS: The Project Manual and Drawings for the above referenced project are hereby amended as follows:

PROJECT MANUAL

ITEM NO. 1 SECTION 000110-TABLE OF CONTENTS

- a. Section 000110 is revised and reissued with Addendum 002 dated December 19, 2022.

ITEM NO. 2 SECTION 274116-INTEGRATED AUDIOVISUAL SYSTEMS EQUIPMENT

- a. Add Section 011000 issued with Addendum 002 dated December 19, 2022.

END OF ADDENDUM 002

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REBID DUTCHESS STADIUM NEW LEFT FIELD CLUBHOUSE,
SEATING BOWL, & RESTROOM BUILDING
COUNTY PROJECT #RFB-DCB-18-22
FISHKILL, NEW YORK

57-21113-00
ADDENDUM 02
12.19.22

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SECTION 274116 – INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL NOTES

- A. Audiovisual Systems Designer herein shall be referred to as Designer.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including instructions to Bidders, General and Supplementary Conditions and Division 01 Specifications Sections apply to the work of this Section.
- B. ANSI-Infocomm standards (10:2013) Audiovisual Systems Performance Verification
- C. AVIXA S601.01:201X Energy Management for Audiovisual Systems (revises ANSI/INFOCOMM 4:2012)
- D. AVIXA F501.01:2015 (Formerly INFOCOMM F501.01:2015) Cable Labeling for Audiovisual Systems
- E. AVIXA V201.01:201X Projected Image System Contrast Ratio (replaces 3M: 2011)
- F. AVIXA A102.01:2017 (Formerly A103.01:2017 Audio Coverage Uniformity in Listener Area
- G. ANSI/AVIXA D401.01:201X Standard Guide for Audiovisual Systems Design and Coordination Processes (replace 2M: 2010)
- H. AVIXA F502.01:201X Rack Building for Audiovisual Systems
- I. AES 67-2015
- J. 2010 ADA Standards for Accessible Design

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Power, and all conduits for both power and low voltage, shall be furnished and installed by Electrical Contractor. All back boxes to be furnished and installed by Electrical Contractor as indicated in the Schedule of Responsibility on drawing TA0.01 unless otherwise noted.

- B. Coordination with the Electrical Contractor is required to assure correct audiovisual conduit routing, audiovisual back box locations, and technical power circuit locations as specified in Division 26 – Electrical.
- C. Requirements and materials that apply to the work of others related to audiovisual systems are listed here to define and establish audiovisual system requirements. Coordinate the work of this section with the work of other sections as required in order to maintain satisfactory progress of the work of other sections. Refer to schedule of responsibility on TA0.01.ii, UON.

1.4 WORK OF THIS SECTION

- A. This section covers all audiovisual (AV) systems as described for Dutchess Stadium New Left Field Clubhouse, Seating Bowl, & Restroom Building, Dutchess County, Fishkill, New York. The objective is to provide professional systems, installed, acceptance tested, and ready to use.
- B. This written specification and the large format TA series drawings shall be collectively referred to herein as the Contract Documents. System features that show up in one part may not be shown in others. In the case of conflict between written specifications and drawings, Contractor must seek written clarification from the Designer. In the event the Contractor fails to obtain such written clarification, the interpretation of the Designer will prevail. Where conflict exists with other specifications concerning such work or materials, this specification takes precedence unless otherwise approved in writing by the owner.
- C. This section includes all labor, materials, equipment, and services necessary to furnish and install the Audiovisual System in Dutchess Stadium as shown on the drawings, including but not limited to the following:
 - 1. System components
 - 2. Telephone Integration
 - 3. Hearing Impaired ADA Compliant.

1.5 PROJECT CONDITIONS

- A. All dimensions and equipment locations shall be verified in the field prior to fabrication by the Audiovisual Contractor, who shall make at least one (1) visit to the job site prior to preparation of shop drawings.
- B. Coordinate conduit placement, routing, and separation with the Electrical Contractor to ensure proper installation.
- C. No claims for additional compensation shall be allowed due to the Audiovisual Contractor's misunderstanding of the work involved or lack of a thorough investigation of the job site.

1.6 CONTRACTOR RESPONSIBILITY

- A. It shall be the responsibility of the Audiovisual Contractor to furnish and install equipment complete in all respects and to furnish and install any additional equipment required to fulfill the intent of the Contract Documents regardless of whether or not such items are herein specified or indicated without claim for additional payment or costs.
- B. The work specified herein shall be accomplished by a single Audiovisual Contractor who has complete responsibility for the systems described. The Audiovisual Contractor is required to have five (5) years' experience with systems of similar size and scope.
- C. The Audiovisual Contractor shall be responsible for coordinating with other trades a complete and suitable installation of electrical isolation equipment to meet the intent of this specification.
- D. No electrical equipment (except approved equipment) shall be located within the Acoustically Sensitive Spaces or installed on walls common to Acoustically Sensitive Spaces (Refer to Part 1 Paragraph 10). The Audiovisual Contractor shall report all discrepancies between this requirement and the Contract Documents to the Designer and Electrical Engineer prior to installation of such equipment.

1.7 FUNCTIONAL REQUIREMENTS:

- A. Assistive Listening System (ALS)
 - 1. Transmits an audio feed to receivers used by the hearing impaired. To comply with ADA standards; a quantity of hearing assistance receivers and a hearing assistance transmitter must be provided for a quantity of patrons based on the seated capacity of the space.
 - 2. Add-Alternate: Assistive Listening System over Wi-Fi in addition to ALS required system
 - 3. A Server installed in an IT closet to tie into select audio systems. The server leverages building Wi-Fi system enabling up to fifteen different presentation spaces with the ability for a participant to use their own listening device. This shall be an additional feature to the Assistive Listening Systems (ALS) programs as required by ADA outlined under basis of design for each space type and not an ALS replacement. Coordinate with Dutchess IT staff for configuration of the system and integration with new and/or existing audio system(s).
- B. Area A Base Bid Club Conference Center to tie into stadium sound system via Dante Sound System with 4K Flat Screen Displays (FSD) on the Second Floor Club Level. Wireless lavalier and handheld microphones shall be provided.
 - 1. Option A is tied into the stadium sound system for Area A with Rack AVR-A on first floor.
 - 2. Option B is a self-contained Audiovisual System for multipurpose use including presentations with the ability to connect to the stadium sound system via a rack in the second-floor storage closet.
 - 3. Alternate shall be an open Picnic Deck only with wiring device home runs to AVR-A location. Alternative items shall show Home Run Route as ALT_AVR-A on page TA7.03. ii schedule ALTERNATIVE CONDUITS AND WIRING DEVICE SCHEDULE - AREA A, PICNIC DECK

- C. All ceiling loudspeakers shall be zoned according to the drawings. Back of house and enclosed facilities with a Flat Screen Display (FSD) shall have the option of choosing which audio can be played independent of the FSD's. i.e., Audio in the Club Area, Picnic Deck, Weight Room and Batting Tunnel shall have the option to play Music utilizing either CD Player or Music Streaming Services, Game Announcements and in the Club shall have the ability to split off audio from FSD to play on overhead speakers. All Audio and Control Devices shall be White in Color unless otherwise noted.
- D. Video Distribution shall be housed in the Audiovisual Rack for Area A. A series of custom patch panel(s) shall allow for both RG6 as well as Category Cabling to each FSD location. End point FSD with Tuner shall be Owner Furnished Contractor Installed.
- E. All flat screen displays shall be Owner Furnished, Contractor Installed as outlined in the Equipment List Appendix. This section shall outline the space requirements for each space type. All video encoders, decoders, transmitters, and receivers shall be compatible with 4K signals. The system shall be capable of scaling video signals to the highest resolution available at owner furnished display devices.
- F. Requirements for the installation and configuration of AV equipment, per space
 - 1. Conference/Banquet Space (Club A203)
 - a. Video displays are distributed within the space to engage, to entertain, and to inform visitors, as well as serve direct presentation need for events. These displays are placed in locations for subtle, yet maximum impact to patrons welcoming them. Enabling Patrons to enjoy all the action on the field while enjoying the clubhouse environment. A networked digital signage player is provided for each display for centralized content deployment as designated by Design Partners.
 - b. A distributed ceiling loudspeaker system will support audio playback for field events and background music. Hardwired microphone connections and wireless microphones shall be supplied for the room when it is used as a conference space.
 - c. System functions and components include:
 - 1) Large Wall Mounted OFCI Flat Screen Display
 - 2) Wireless AV Connectivity to Display
 - 3) Small wall button control panel with power, source, and level controls
 - 4) Integrated audio system capable of receiving audio from the field
 - 5) Voice Lift
 - 6) Assisted Listening in Compliance with ADA occupancy requirements
 - 7) NOTE: There are three different Equipment packages for CLUB A203 space outlined in the Appendix OPTION A, OPTION B with Presentation Capabilities, and ALTERNATIVE FOR CLUB SPACE.
 - 2. Audio for premium club seating along the outfield wall
 - a. Speakers shall be installed on light poles where deck is located and mounted to the building unless otherwise noted. These speakers shall be used for background audio and microphone audio from existing Press box.

- b. Speakers shall be from the same manufacturer as the existing seating bowl and work as one system.
 - c. Zoned Distributed Audio System
3. Video Suite and Hawkeye
- a. Four Video Workstations with wall mounted displays at each station, with the ability to route video to larger display if working with more than one player. Cable tray overhead from Video Suite to Hawkeye.
 - b. Hawkeye to have Conduit to Administration Building, Press Box, the Stands in Left Field and Right Field (Adjacent IDF closets of each area).
 - c. Overhead Audio option to play audio from existing stadium sound system.
 - d. Assistive Listening System in Compliance with ADA occupancy requirements.
4. Weight Room
- a. Force Plate with a shelf/laptop for Coach location
 - b. Shall have (2) FSD equipment mounted on walls and (1) ceiling mounted
 - c. Shall have ceiling speakers to play music or combine with existing Facility sound system, and / or FSDs
5. Batting Tunnels
- a. Camera Infrastructure – Team to supply cameras, Coordinate with Owner
 - b. Fiber Network Infrastructure
 - c. Tracking system will hang over home plate.
 - d. 3 cameras per tunnel with OFCI large monitor. Camera behind home plate and on each side of home plate. (Provide 1 mound with a camera, lined up with rubber and directly behind the rubber, and overhead the rubber.)
 - e. Provide Waterproof cabinet with video monitor workstation adjacent to the mound in the Bullpen {Same locations as shown in interior batting tunnel. (except to the sides of home plate)}.

1.8 SCOPE OF WORK

- A. The Audiovisual Contractor shall furnish and install Infrastructure and Major Equipment for system including but not limited to wire, cable, equipment racks, wiring devices, and listed Major Equipment. Infrastructure, Major Equipment, and installation of Infrastructure and Major Equipment shall be bid as one portion of the project.
- B. Furnish shop drawings and receive approval, prior to fabrication and installation.
- C. Furnish all materials and labor and any engineering services to supply a complete and professionally installed system in working order as described herein. Labor furnished shall be specialized and experienced in audiovisual system installation.
- D. Furnish and install all wire and cable called out in the Contract Documents.

- E. Coordinate all back-box locations with the Electrical Contractor and appropriate general trades.
- F. Furnish any additional items, not specifically mentioned herein, to meet system requirements as specified, without claim for additional payment. Such items may include but are not limited to hardware, transformers, line/distribution amplifiers and other devices for proper installation, interface, isolation, or gain structure.
- G. Perform initial adjustments and verification tests. Submit verification test report to the Designer five days prior to commissioning.
- H. Participate in acceptance testing and perform final adjustments utilizing Audiovisual contractor furnished test equipment and project engineers.
- I. Furnish and participate in user training.
- J. Furnish system documentation including copies of all relevant drawings and equipment manuals in compliance with the Contract Documents.
- K. Furnish maintenance services for the specified period from the date of acceptance.
- L. Guarantee all new equipment, software, hardware, components, and workmanship for the specified period from the date of acceptance.

1.9 SUBMITTALS

- A. Pre-bid Submittals:
 - 1. Contractors must pre-qualify in order to bid on this project. Contractors must provide proof of the following qualifications and certifications and evidence of experience in similar audio and/or video installations. Submit listed qualifications to Designer for review ten (10) days prior to submission of a bid. Late submittal will result in exclusion from bid.
 - a. Credential for project manager, project engineer, and lead installer which must include EST, and/or CTS-I certifications.
 - b. Proof of the AV Contractor's membership in NSCA or AVIXA (Audiovisual and Integrated Experience Association). Indicate if the contractor holds current APEX certification.
 - c. Proof that the AV Contractor has been continuously engaged in the installation and service of AV equipment for at least the past five (5) years in systems of similar size, scope, and project type.
 - d. Proof that the AV Contractor holds current certifications necessary to perform Graphic User Interface Programming, Dante, and System Configuration.
- B. Bid Submittals:
 - 1. Contractors shall examine all drawings and read all divisions of this specification in order to avoid omissions and duplications and to ensure a complete job. No allowances shall be made for failure to read and understand the Contract Documents. Discrepancies between drawings and the specifications or obvious omissions shall be referred to the Designer prior

- to the bid date. Where discrepancies occur and pre-bid instructions have not been obtained, the Contractor agrees to abide by the Designer's decisions.
2. Bid proposals shall include all work and all equipment as specified, as well as any additional equipment and materials not listed here, to be used in assembling the system to fulfill the design intent.
 3. The Audiovisual Contractor shall furnish line-item pricing for each space with Infrastructure and Major Equipment List written in this specification.
 4. The bid submittal shall include the following:
 - a. Infrastructure and Major Equipment List and installation bid.
 - b. Major Equipment List line-item pricing by each space type and option / alternative.
 - 1) Installation costs for General Equipment including hardware and labor shall be furnished.
 - 2) Pricing shall include in-bound freight, shipping, and all delivery charges.
- C. Shop Drawings Submittals:
1. Within thirty (30) days of contract award, submit four (4) copies of detailed shop drawings to the Designer for approval. All shop drawings shall be marked with the related drawing number when submitted.
 2. System installation and fabrication shall not begin without written approval from the Designer.
 3. Review of shop drawings shall not constitute final approval of system function. Said review does not in any way relieve the Contractor from the responsibility of furnishing material or performing work as required by the Contract Documents.
 4. Failure of the Contractor to submit shop drawings in ample time for the evaluation shall not entitle the contractor to an extension of contract time, and no claim for extension by reason of such default will be allowed.
 5. At a minimum, shop drawings shall include:
 - a. Table of Contents
 - b. Itemized list of all equipment and materials to be used in assembling the system.
 - c. Catalog cut sheet or data sheet for each listed item.
 - d. One-line Signal Flow diagrams for all sound reinforcement systems, visual systems, and auxiliary systems showing point to point wiring interconnections of all equipment with wire run numbers and patch bay designations. Show all transformers, switches, relays, control circuits, and modifications to equipment. Show all equipment items which are required for realization of the functions described herein.
 - e. Complete lists of all wire run numbers along with the termination location of each end of each wire run.
 - f. Schematic diagrams for any custom circuitry and all typical connections between audio lines, patch bays, visual system lines and rack mounted equipment.
 - g. Drawings of all items which are to be custom fabricated or modified. Drawing shall be in scale suitable for fabrication. They shall show materials, finishes, hardware, back boxes, connectors, and panel/control markings. Submit samples of lettering/label size and typeface to be employed on custom plates, panels, and other equipment.

- h. Submit samples of custom work, finishes, or other materials as required by the Designer to verify appearance and quality. All costs for shipping samples shall be the responsibility of the Contractor.
 - i. Full size drawings illustrating the physical layout and labeling of patch bays.
 - j. Mechanical drawings of all assemblies, major and sub-assemblies, racks, cabinets, and enclosures, indicating provisions for proper cable management, power management, and thermal management.
 - k. Mechanical drawings showing all proposed mounting details of all major equipment (e.g., loudspeakers, cameras, projectors, video displays, projection screens), and associated rigging and interface with adjacent architecture.
 - l. Vibration and noise control information shall be included and coordinated with the Electrical Contractor.
 - m. Conduit Routing Plan, to be coordinated with electrical contractor prior to cable pull.
 - n. Cabling schedule providing information as detailed in AVIXA (formerly known as Infocomm) Standard F501.01:2015 to be coordinated with the Designer and Owner prior to cable pull and termination.
6. The above listed drawings shall be produced on AutoCAD 2018 min. or similar computer drafting program. Scans or photocopies of the Contract Documents are not acceptable.
 7. The use of electronic files from other sources (e.g., Architect's backgrounds, Architect's drawings, vendor-supplied panel drawings) shall not absolve the Contractor of the responsibility for ensuring that the Shop Drawings represent a completely engineered coordinated system. The Contractor has final responsibility for providing systems that conform to all requirements in the Contract Documents.
 8. The Contractor shall review Electrical Contractor shop drawings for all vibration and noise control equipment and systems information.
 9. Proposed Touch Panel Graphical User Interface (GUI) layouts shall be submitted for approval prior to the commencement of control system programming.

D. Substitutions:

1. Substitutions shall be submitted as per the General Conditions of the Contract Documents.
2. The proposed substitutes must be equivalent or superior to the specified products in quality, performance, construction, function, conformance to system objectives and not affect system functionality, signal type, distribution, and features.
3. All substitutions must receive the express written consent of the Designer and Owner.
4. The Designer reserves the right to substitute new products which become available subsequent to the issuance of the Contract Documents, provided that:
 - a. The contractor has not yet purchased the originally specified equipment.
 - b. The substitute equipment shall not materially increase the Contractor's cost.

1.10 JOB CONDITIONS

- A. Keep the job adequately staffed at all times. Unless illness, loss of personnel, or other circumstances beyond the control of the Contractor intervene, keep the same individual charge throughout.

- B. Cooperate with all appropriate parties to achieve well-coordinated progress with overall construction completion schedule and satisfactory results.
- C. Watch for conflicts with work of other contractors on the job and execute, without fair claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or to preserve acoustic or visual performance, symmetry, and pleasing appearance.
- D. Immediately report to the Designer any design or installation irregularities, particularly architectural elements that interfere with the intended coverage angles of loudspeakers, camera, or projection equipment, so that appropriate action may be taken.
- E. Perform all cutting, patching, and painting for proper and finished installation of the system and repair any damage caused during installation.
- F. Audiovisual System work areas are to be maintained in a clean and orderly condition. Clean up and dispose of trash from all audiovisual system work areas.

1.11 ACOUSTICALLY SENSITIVE SPACES

- A. The following areas have been designated as Acoustically Sensitive Spaces:
 - 1. Amplifier Rack Rooms
 - 2. Electrical Equipment Spaces
 - 3. Mechanical Equipment Spaces
- B. An acoustically sensitive space is defined as a room or space, which requires special construction consideration to meet room acoustic, acoustic isolation, and noise control or vibration control requirements.
- C. All conduit runs penetrating acoustically sensitive spaces shall have both ends sealed by means of removable closed cell neoprene foam after all cables have been run to prevent sound transmission from adjacent spaces.
- D. All audiovisual wiring devices in acoustically sensitive spaces shall have a gasket sealing the faceplate to the back box to prevent sound transmission from adjacent spaces.

1.12 DELIVERY AND HANDLING

- A. The Audiovisual Contractor shall coordinate delivery and installation of all equipment with the Construction Manager and/or Electrical Contractor.
- B. If required by the Construction Manager or Electrical Contractor, audiovisual equipment shall be delivered in a minimum of three (3) separate shipments that shall include:
 - 1. Shipment #1: All items in which conduit is terminated which includes backboxes, wiring device faceplates with receptacles, projection screen cases, etc.

2. Shipment #2: All items which require structural backing such as rigging components, monitor and projector mounts, etc.
 3. Shipment #3: All items that are not required until the building/area of work is secure and ready for electronic equipment. This shall include equipment racks, wiring device face plates, portable equipment, etc.
- C. Audiovisual Contractor shall deliver all material to the job site suitably crated, packed, and protected and bearing the label and the nomenclature of the product(s) found in each carton or crate.

1.13 QUALITY ASSURANCE

- A. Parts listed shall be complete and equipment furnished shall conform to manufacturer's specifications.
- B. All materials shall be new and shall conform to the applicable provisions of Underwriter's Laboratories (ULEQ) and American Standards Association (ASA).
- C. Procure and pay for all permits, licenses, and inspections, and observe any requirements stipulated therein. Conform in all trades with all local regulations and codes.
- D. Comply with federal, state, and local labor regulations and applicable union regulations.
- E. Installation shall conform to the latest federal, state, and local electrical safety codes of authorities having jurisdiction. Where conflict exists, the most stringent code or regulation shall apply.

1.14 GUARANTEE AND SERVICE

- A. The Audiovisual system shall conform to all applicable code requirements and shall be in conformance with industry standards of operation and practice.
- B. All new systems and components shall be guaranteed free of defects in materials and workmanship for a period of one (1) year from the date of acceptance and shall be repaired or replaced within forty-eight (48) hours following report of such defects by the owner.
- C. Installation of relocated existing equipment shall be guaranteed free of defects in materials and workmanship for a period of one (1) year from the date of acceptance and shall be repaired or replaced within forty-eight (48) hours following report of such defects by the owner.
- D. All audiovisual system software updates shall be automatically issued to the Owner free of charge during the warranty period.
- E. The Contractor shall be available on call and on eight (8) hour notice during the first month following acceptance of the system, to assist the Owner's representatives in any problems which may arise during the initial period of operation.

- F. The Contractor shall provide same day response to service requests, via 24/7 phone support.
- G. If during guarantee period any component is out of service for more than seven (7) consecutive days due to unavailability of parts or service, the contractor shall furnish and install identical new component. If an identical component is not available, the contractor will substitute equivalent equipment with written approval of the owner.
- H. During the course of the guarantee period, the Contractor shall provide a minimum of three (3) service visits to the site for inspection and adjustment of equipment and programming. Contractor shall submit proposed schedule for these visits and shall notify Owner and Designer in writing at least one (1) month in advance of each visit.

1.15 INSURANCE

- A. All equipment and materials shall be fully insured against loss or damage up until acceptance of the system by the Owner or until the Owner relieves the Contractor in writing of this responsibility, whichever is earlier.

PART 2 - EQUIPMENT

2.1 GENERAL

- A. Whenever any equipment is specified by manufacturer and model number, it is for the purposes of establishing a standard of quality, performance, construction, and function.
- B. All materials and equipment shall be new and of the latest design or model offered for sale by the manufacturer.
- C. Equipment models furnished shall operate at the required AC line voltage (i.e. 120 Volts) and frequency (i.e. 60 Hz) UON
- D. Contractor shall furnish at minimum, quantities as indicated in the Contract Documents as required for complete installation.
- E. Audiovisual Wire and Cable:
 - 1. Approved manufacturers:
 - a. Belden
 - b. Berk-Tek
 - c. Liberty
 - d. LeGrand, North America
 - e. Extron
 - f. West-Penn
 - 2. All wire numbers listed in the Contract Documents are Belden unless otherwise noted.
 - 3. Where required, install plenum rated cable listed and labeled for plenum installation.

- F. Electrical Wire and Cable (including ground conductors)
1. Where conflict exists with any codes or ordinances, such codes and ordinances shall take precedence.
 2. Where conflict exists with Electrical Specifications, the higher standard or more stringent requirement shall apply.
- G. Wiring Devices:
1. Specifications – Duplex Receptacles
 - a. Grade: Specification, Hubbel IG5362 or equal
 - b. Type: NEMA 5-20R
 - c. Color: Orange
 2. Specifications – Plug Mold
 - a. Grade: Wiremold V/G 2000 Series or equal
 - b. Size: As specified or required.
 3. Specifications – Outlet Strips
 - a. Grade: UL Listed, Wiremold or equal.
 - b. Size: As specified or required.
 4. Approved Manufacturers:
 - a. Waber
 - b. Wiremold
 - c. Hubbell
 - d. Bryant
 - e. GE
 - f. Leviton
- H. Electrical Plates and Panels:
1. Specifications – Rack mount panels
 - a. Material: 11-gauge steel or 1/8” aluminum, minimum thickness.
 - b. Finish: Black or to match adjacent equipment.
 - c. Size: 19” wide, standard EIA mounting hole spacing, height as specified or required.
 2. Specifications – Back Box Enclosures
 - a. Material: Code grade steel.
 - b. Finish: Black or Galvanized.
 - c. Size: As specified or required.
 3. Specifications – Plug Box and Termination Panels
 - a. Material: 11-gauge steel or 1/8” aluminum, minimum thickness.
 - b. Finish: Black (unless otherwise noted by the Designer).
 4. Any and all recessed face plates shall have a minimum 3/4” reveal beyond the back box to hide the intersection between the wall material and the back box excluding standard decorative plates.
 5. Approved Manufacturers:
 - a. Hoffman
 - b. Whirlwind
 - c. Pro-Co
 - d. Wireworks.

- I. Any equipment to be located outdoors or in damp locations must carry a NEMA 3R rating and be labeled accordingly.
- J. Audio Transformers:
 - 1. All transformers shall be selected for proper installation and load of the circuits as required by as-built conditions and per manufacturer's recommendations.
- K. Control System Programming:
 - 1. All control system programming, installation, testing, and debugging to be performed by a manufacturer certified programmer, supplied either directly by the AV Contractor staff or via a manufacturer authorized and certified independent programmer.
 - 2. AV Contractor shall furnish complete control system programming, including all source code and on-site coordination, testing, and debugging.
 - 3. AV Contractor shall furnish all programming of control system equipment including:
 - a. Nightly system shut down.
 - b. Janitorial/Off-hour maintenance control.
 - c. Emergency Life/Safety override.
 - d. Audiovisual source equipment selection (e.g. Audio Source, Video Source, Display Selection)
 - e. Audiovisual source equipment transport control (e.g. play, pause, stop, forward, reverse).
 - f. Master Volume control
 - 4. Touch Panel interfaces shall have two (2) modes of operation:
 - a. User Mode:
 - 1) Basic controls of all system components
 - 2) Streamlined user interface.
 - 3) Room modes available via single button presets
 - b. Tech Mode:
 - 1) Advanced control and configuration of system components.
 - 2) Setup of presets
 - 5. Touchpanel Capabilities
 - a. Video Mode:
 - 1) Display of a video source through the audiovisual system to the display.
 - 2) Audio from the same video source through the audiovisual system through the system to the loudspeakers.
 - b. Aux Mode:
 - 1) Display of a video source through the system via an auxiliary input.
 - 2) Audio from the same video source through the system via and auxiliary input to the loudspeakers.
 - c. Source Selection Control, which provides the ability to:
 - 1) Select any source equipment to be displayed on any video display in the system and routing audio from that source through the system to the loudspeakers.
 - d. Source Transport Control, which at minimum provides the ability to:
 - 1) Play, pause, stop, forward, reverse and source equipment in the system.
 - e. Master Volume Control of the system.

6. In rooms where a volume control system connected to a digital signal processor (DSP) exist, the control system shall be programmed such that:
 - a. The appropriate preset on the DSP system and display system shall be selected based on that activity taking place.
 7. Provisions for control via web interface (e.g. Remote APP) shall be included. Coordinate w/ Owner.
 8. Control system programming shall accommodate future addition of touch panels and mobile applications (e.g. Crestron Mobile Pro) for Apple iPhone/iPad and Android devices.
 9. AV Contractor to schedule meeting with owner and Designer to review control system functionality and operational requirements prior to the commencement of work.
- L. Intelligent Building Technology (IBT) Integration:
1. Coordinate with the Building Automation System (BAS) programmer to gather the appropriate protocols, addressing, and systems.
 2. Coordinate with the manufacturer of the IBT system to obtain proper configuration of IBT equipment and components.
 3. Create a dashboard for display of building energy management information including these components at minimum:
- M. Audio DSP System:
1. Audio Inputs
 - a. All system audio inputs shall be programmed with limiters.
 - b. It shall be possible to matrix any input to any output within the system.
 2. Audio Outputs:
 - a. All audio outputs shall be programmed with high pass filters, parametric equalization, delay, and limiters.
 - b. It shall be possible to matrix any input to any output within the system.
 3. Assistive Listening System (ALS):
 - a. ALS shall receive the same signal as being heard via the loudspeakers.
 - b. ALS shall be set up in accordance with ADA requirements.
- N. The DSP software shall be installed as specified in the Major Equipment List.
- O. Equipment furnished shall be that specified herein.
- P. Detailed performance specifications shall be those published by the manufacture effective on the date of this document for all equipment specified herein.
- Q. The AV Contractor shall verify all projection screen dimensions, surface type, and frame style with the Contract Documents and submit the information with the required shop drawings for approval by the Designer prior to ordering any material. Failure to coordinate screen information shall not result in additional costs to the Owner.
- R. The AV Contractor shall verify all projector lenses for appropriate focal length and intended image size with the Contract Documents, based on field measurements of actual throw distance. Failure to coordinate lens information shall not result in additional costs to the Owner.

- S. All miscellaneous materials including brackets, pole extensions, mounting hardware, electrical connectors, and other items to properly install the equipment specified shall be included as part of this project whether it is listed or not.
- T. Existing structural mounting to be reused as conditions permit.
- U. If required, Cost Reduction and/or Value Engineering shall be conducted by the Designer and Owner based on final bid amounts.

2.2 MAJOR EQUIPMENT

- A. Major Equipment List:
 - 1. The major equipment list itemizes system components and their quantities to provide the systems as shown in the contract documents. It is the responsibility of the contractor to provide any additional accessories, patch cabling, interfaces, and other miscellaneous equipment not described herein to provide a working system as called out in the functional requirements section of this specification (1.8), unless otherwise noted as owner furnished or future equipment. For items not given specific quantities in these documents, it is the responsibility of the contractor to verify those quantities with the owner and Designer prior to system installation.
 - 2. See Equipment Appendix at the End of Specification 274116
 - 3. Selected Vendor shall be required to coordinate with Owner's IT Department prior to purchasing equipment connected to the Owner's IT Infrastructure.

PART 3 - EXECUTION

3.1 INSTALLATION OF SYSTEMS

- A. Locate all apparatus requiring adjustments, cleaning, or similar attention so that it will be accessible for such attention. Equipment racks shall be positioned to permit full access for operation and service.
- B. Furnish and install brackets, braces, and supports. Minimum fastening or support safety factor shall be at least five (5). Design shall be approved by the Designer.
- C. All supporting structures supplied by the Contractor not having standard factory paint finish shall be painted. Paint specifications shall be supplied by the architect or indicated herein.
- D. Provide custom color or finish for any equipment or materials supplied which are exposed to public view. Color and finish of all such equipment or materials shall be approved in writing by the Designer. This does not exclude equipment or materials where standard colors or finishes may be specified herein.
- E. Finish of blank panels and custom assembly panels shall match adjacent equipment panels.

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- F. Switches, connectors, jacks, receptacles, outlets, cables, and cable terminations shall be logically and permanently marked. Custom panel nomenclature shall be engraved, etched, or screened. Markings for these items are detailed in the contract documents to ensure consistency and clarity. Verify any changes in working type size and/or placement with the Designer prior to marking.
- G. The equipment specified herein is designed to operate in environments of normal humidity, dust, and temperature. Protect equipment and related wiring where extreme environmental conditions can occur.
- H. Coordinate with millwork fabricator for installation of audiovisual equipment into credenzas, lecterns, etcetera.
- I. Review and coordinate Graphic User Interface Control System appearance and functionality:
 - 1. QSC Q-Sys Certified
 - 2. AMX AV Control System: AV Control system shall be installed, configured, and tested by an ACE-P certified technician and/or engineer, in accordance with the guidelines set forth in the AMX Solutions Master program. The Resource Management Suite shall be installed, configured and tested by an ACE-RMS certified technician and/or engineer, in accordance with the guidelines set forth in the AMX Solutions Master program.

3.2 CONDUIT

- A. Review and coordinate audio installation with the Electrical Contractor to ensure proper operation of the audio system.
- B. All wiring shall be in conduit unless authorized by the Designer, approved by the Designer in writing, and permitted by code. Exceptions are short runs at equipment terminations where there is no means of connecting conduit to the equipment.
- C. Where installed exposed, conduits shall be parallel with or at right angles to walls or ceiling and /or follow surface contours and shall be supported from walls or ceilings by means of approved clamps or hangers. Conduit connections to equipment racks shall be insulated.
- D. Minimum size conduit shall be trade size 3/4". All conduits shall be sized for maximum 40% fill or less if required by code.
- E. Conduits carrying high voltage or high amperage wiring serving equipment subject to abrupt start-up and possible slapping of wiring within conduit shall not pass through Acoustically Sensitive Spaces.
- F. Conduits connected to dimmer racks or to transformers shall not pass directly into Acoustically Sensitive Spaces. Conduits connected to dimmer racks or transformers shall not penetrate walls, floors, or slabs of Acoustically Sensitive Spaces within thirty (30) feet of those equipment room walls or slabs. All penetrations in the path of conduits within thirty (30) feet of electrical rooms containing dimmer racks or transformers shall be resilient penetrations.

- G. Large numbers of conduits penetrating walls of Acoustically Sensitive Spaces shall be individually sleeved and shall pass through walls, floors, slabs, and ceilings perpendicularly.
- H. Conduits shall not be installed to connect or contact rigidly other non-electrical equipment or building systems which are vibration isolated.
- I. Coordinate all conduit sizes, locations, and quantities with the Electrical Contractor to provide proper routing, signal separation, and wire group type. Failure to do so shall not allow for additional compensation. Provide a conduit routing plan for approval by the Designer prior to installation. Routing plan shall include intended sizes, separation, and cable fill chart.
- J. Existing conduit and cabling infrastructure to be reused is to be done so to the maximum extent possible without compromising audiovisual system performance.

3.3 RESILIENT PENETRATIONS OF WALLS AND SLABS

- A. All conduit and cable penetrations shall be sleeved, packed, and caulked airtight to form a resilient penetration at the following locations:
 - 1. Mechanical Equipment Rooms
 - 2. Electrical and Dimmer Equipment Rooms
 - 3. Acoustically Sensitive Spaces
 - 4. Rooms with Acoustically Isolated Construction.
- B. Openings shall be oversized and sleeved to provide an inner diameter of one (1) to two (2) inches greater than the outside diameter of the duct or pipe. The conduit shall be centered in the opening and shall not rigidly contact the wall, floor, or ceiling. The resulting gap shall be packed with glass fiber packing material and foam rod. The gap shall be caulked to an airtight seal using permanently flexible acoustical sealant.
- C. Acoustical sleeves may be used in lieu of resilient penetrations described above. Multiple conduit penetrations may be constructed following the detail for multiple penetrations identified in the Contract Documents.

3.4 ELECTRICAL POWER

- A. Review and coordinate electrical power system installation including grounding with the Electrical Contractor to ensure proper operation of the audiovisual system.
- B. Verify that All AC power circuits designated for audio equipment are wired with the correct polarity and ground. Report in writing any discrepancies found to the Designer for corrective action.
 - 1. Provide distribution of electrical power within the equipment racks with a minimum of one space AC receptacle for each four (4) in use per branch circuit.
 - 2. The Electrical Contractor shall ensure that all audio grounding does not intersect with any building ground except at earth.

3.5 STEEL SUPPORTS

- A. Fabricate and install any supports so that the installation does not weaken or overload the building structure. Do not impose the weight of equipment or fixtures on supports provided for other trades or systems. No drilling or cutting of concrete beams, joists, or structural steel, nor welding to structural steel, shall be permitted except as authorized in writing by the Designer.

3.6 SEISMIC RESTRAINTS

- A. All hanging or free-standing equipment and cabinets furnished, including but not limited to racks, loudspeakers, projection screens, and mounts shall be secured to substantial building structures. The equipment described herein shall resist seismic acceleration in any direction up to a limit of the greater of 1.0G or the limit prescribed by the local governing codes.
- B. Loudspeaker hanging details, rack bracing, and other seismic restraints may not be shown on the Contract Documents. The Contractor is responsible for development of these drawings to be submitted and approved by the Structural Engineer.

3.7 BOXES

- A. With the exception of portable equipment, all boxes, conduits, cabinets, equipment, and wiring shall be held in place and the mounting shall be plumb and square.
- B. All boxes shall be securely mounted to building structure. All boxes shall be installed so that wiring contained in them is accessible. Install blanking devices or threaded plugs in all unused holes.
- C. Wiring groups and circuits shall be isolated as indicated herein. Common pull or junction boxes are not permitted except as authorized in writing by the Designer.
- D. Clean all box interiors prior to installing plates, panels, or covers.

3.8 WIRING METHODS AND PRACTICES

- A. Furnish and install all audiovisual wire and cable ensuring proper pulling tension, bend radius, quantities, types, lengths, routing, wire group separation, and identification.
- B. Spare wire runs of each group and type shall be pulled to each termination location. The number of spares shall be ten (10) percent of those in actual use or one, whichever is greater
- C. Splicing of cables is not permitted between terminations of specified equipment.

- D. Do not pull wire or cable through any box fitting or enclosures where change of raceway alignment or direction occurs; do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, and rollers to protect cables from excess tension, abrasion, or damaging bending during installation.
- E. Use wire pulling lubricants and pulling tensions in accordance with the wire and cable manufacturer's recommendations.
- F. All wires shall be permanently identified at each wire end by marking with adhesive on crimp-on markers and a chart kept of each wire's function. This applies to wire within a rack assembly as well as wire running in conduit.
- G. Wire ends shall be wrapped with appropriate heat shrink tubing. Each shield or drain wire shall be covered with heat shrink to avoid unintentional connections.
- H. Use ring or tongue lugs on all barrier strip terminals. Do not exceed two (2) lugs per terminal. Use crimping tools that are designed for the application or solder. Do not cut strands from conductors to fit lug terminals. Spare terminal blocks, equivalent to ten percent (10%) of those in actual use shall be furnished.
- I. Form in an orderly manner all conductors in enclosures and boxes, wire ways, and wiring troughs, furnishing circuit and conductor identification. Tie using tie wraps of appropriate size and type. Limit spacing between ties to twelve (12) inches and furnish and install circuit and conductor identification at least once in each enclosure.
- J. When the audiovisual cables are pulled, leave a five-foot (5') tail at each end to all field locations and a fifteen-foot (15') tail at all equipment rack locations. Temporary labels shall be applied at both ends of each cable. Permanent labels shall be applied when the cables are cut back and terminated.
- K. All labeling of audiovisual cables shall comply with AVIXA F501.01:2015 (Formerly INFOCOMM F501.01:2015) Cable Labeling for Audiovisual Systems Standard.
- L. . The numbering system used in compliance with this standard shall be verified with the owner prior to implementation. A schedule of all cabling and its labels shall be provided to the owner and Designer for review prior to pulling and termination of cables.

3.9 GROUNDING

- A. Audiovisual system wiring shall conform to the following procedures:
 - 1. Audio equipment AC ground pins shall connect to AC ground.
 - 2. Audio equipment chassis shall connect to rack frames.
 - 3. Audio rack frames shall connect to AC ground bus in panel board by means of #2-gauge (minimum) conductor
 - 4. Audio shields between AC powered pieces of equipment shall be connected to ground at one end only. Terminate capacitance as required.

5. Audio signal paths between AC powered pieces of equipment shall be connected using balanced lines and/or transformer isolation as required.
 6. No unbalanced signal paths may be connected to patch bays.
 7. Isolate all audiovisual system wiring from racks, back boxes, and conduit.
 8. Isolate all audiovisual system racks from conduit and other conductive surfaces. Use insulated bushings for conduit connections and a dielectric plinth between racks and conductive flooring.
 9. AC isolated ground system shall be isolated from all other facility grounds.
- B. All metallic conduit, boxes, and enclosures shall be grounded in accordance with the current National Electric Code (NEC).
- C. Metallic enclosures containing active equipment shall be grounded with due regard for the minimization of electrical noise. This may include the provisions of grounding conductors separate from AC ground.

3.10 EQUIPMENT RACKS

- A. The equipment racks shall be considered as custom assemblies and shall be assembled, wired, and tested in the Contractor's shop. Final assembly of racks shall take place on site after transportation but will conform to the same test results achieved in the shop.
- B. Placement of equipment in equipment racks, as shown in the drawings, is for maximum operator convenience. The insertion of additional equipment not indicated herein or any changes of placement of the equipment must be indicated in writing to the Designer before assembly.
- C. Racks shall be installed plumb and square without twists in the frame or variations in level between adjacent racks.
- D. All wire, cable, terminal blocks, rack mounted equipment, and active slots of card frame systems shall be clearly and logically labeled as to their function, circuit, or system. Labeling on manufactured equipment shall be by engraved plastic laminate or by thermal printer on adhesive tape, with white lettering on black background or dark background that is similar to panel finish.
- E. Provide stiffeners to custom panels to prevent panel deformation during normal plugging or switching operations.
- F. All field termination shall enter the rack via a bulkhead panel(s) mounted to the rear-rails of the equipment rack.
- G. All wires and cable used in assembling custom panels and equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted engineering practice.

- H. Harnessed cables shall be combed straight, tie wrapped every eight (8) to twelve (12) inches, and attached to the structure as necessary. Each cable that breaks out from the harness for a termination shall be provided with ample service loop to permit equipment removal from the racks without disconnecting.
- I. Harnessed cables shall be formed in either a vertical or horizontal relationship to equipment, controls components, or terminations.
- J. Cables shields shall be connected to the isolated ground system with due regard for the ground loops.
- K. All system components and related wiring shall be located with due regard from the minimization of induced electromagnetic and electrostatic noise, for the minimization of wiring length, for proper ventilation, and to provide reasonable safety and convenience of the operator.
- L. All rack mounted equipment with front panel controls, shall be furnished with security covers to avoid tampering with preset levels. If specific security covers are not included in the equipment list, the Contractor will furnish the manufacturers suitable alternate.
- M. Every device shall be installed with regard for proper polarity. Absolute polarity shall be maintained through the entire audio chain.

3.11 INITIAL ADJUSTMENT

- A. Verify all circuits and extensions for correct connection, continuity, and polarity. Absolute polarity shall be maintained between all points in the system.
- B. Connector polarity shall be maintained except for terminations at equipment manufactured to other standards. Verify that polarity connections are consistent throughout the system.
- C. Verify that the audio system is operational, and the system gain structure is within the recommendations of major component manufacturers.
- D. Verify that the all-video sources (cameras, players, etc.) and that all video destinations (Projectors, displays, recorders, etc.) are sending and receiving video signals. EDID parameters for all digital video devices shall be reviewed with the owner to verify resolution requirements at all video output devices. Confirm all equipment managed by the audiovisual control system can receive and send control signal as applicable, and that all control parameters and functionality as requested by the owner in the meeting prior to the beginning of work identified in section 2.1.K.9 of this specification have been implemented.

3.12 VERIFICATION TESTS

- A. Confirm that each individual wire and cable run has been labeled and documented in compliance with AVIXA F501.01:2015 (Formerly INFOCOMM F501.01:2015).

- B. Confirm that all system outputs are free of spurious signals including oscillations and radio frequency signals. Contractor shall furnish a wide band oscilloscope in order to verify this condition.
- C. Confirm that the system is free of audible clicks, pops, hums, and other noises when any operating control is activated, with or without an input signal
- D. For all audio and video lines, confirm:
 - 1. Proper circuits appear at each termination location.
 - 2. Proper circuits appear at each jack bay location.
 - 3. Continuity of all conductors.
 - 4. Proper polarity is maintained.
 - 5. Absence of shorts between conductors within each circuit.
 - 6. Absence of shorts between circuit conductors and conduit.
- E. Confirm that the loudspeakers and mountings are free of buzzes and rattles when the speaker is swept with sine wave tones over its rated bandwidth at one-half (1/2) its maximum rated power.
- F. For all permanently mounted loudspeaker terminations, furnish impedance measurement of each pair of loudspeaker lines with all loudspeakers connected and all amplifiers disconnected. These measurements shall be documented in a table listing impedance for each third octave from 20 Hz to 20 kHz and shall be accurate to the nearest 0.1Ω.
- G. For each installed data network cable or fiber optic cable, verify that performance conforms to the relevant TIA/EIA specifications.
- H. For all electronic devices mounted in racks and connected to patch bays confirm:
 - 1. Every audio input and output is balanced.
 - 2. Proper polarity is maintained throughout the entire audio signal path.
- I. Confirm that there are no short circuits between the neutral and isolated ground conductors for each clean power circuit.
- J. Confirm every input and output for video system including:
 - 1. Proper signal to displays.
 - 2. Proper sync to playback and recording equipment.

3.13 VERIFICATION TEST REPORT

- A. Submit five (5) copies of a written report detailing the results of Initial Adjustments and Verification Test including all relevant drawings, charts, test instrument data and photographs. This report shall be completed and submitted to the Designer for review a minimum of five (5) days prior to Acceptance Testing and final tuning. With this report, submit written certification that the installation conforms to the requirements stated herein, is complete in all respects, and is ready for inspection, testing, and tuning.

3.14 ACCEPTANCE TESTING

- A. Acceptance Testing shall be performed by the Designer during a period designated by the Designer. Contractor shall furnish a minimum of two (2) technicians for the acceptance testing period.
- B. All systems shall be compliant with AVIXA (standard 1M:2009 Uniform Distributed Audio Standard as applicable).
- C. The minimum time required for Acceptance Testing is two (2) working days of dedicated quiet. Coordinate this time period so that free access, work lighting, and electrical power are available on site.
- D. The AV Contractor shall bear any costs incurred for additional Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the time scheduled for Designer's Acceptance Testing and Tuning.
- E. Ensure that audiovisual areas are in a clean and orderly condition ready for Acceptance Testing.
- F. At the time of Acceptance Testing, submit one (1) copy of the operation and maintenance manual to the Designer (refer to Paragraph 3.15).
- G. Furnish test equipment meeting the following minimum specifications on site, at all times during the Acceptance Testing. Prior to Acceptance Testing, provide the Designer with a listing of the equipment model numbers and their software versions (if applicable) to be made available.
 - 1. Oscilloscope: 1GHz bandwidth sensitivity – 1mV/cm
 - 2. Digital Multi-meter: 1% accuracy
 - 3. Function Generator: 1GHz bandwidth, distortion <1%
 - 4. Real Time Analyzer: 1/3 octave with microphone.
 - 5. Pink Noise Source: 20 Hz – 20 kHz
 - 6. Impedance Sweep Meter: 20 Hz – 1 kHz range, 1 Ω - 50 Ω .
 - 7. Polarity Checker: Microphone level, Line Level, and Loudspeaker Level.
 - 8. NTSC bar graphs and other test patterns for video verification.
 - 9. Ultra-High definition (4K60) Video test generator with VGA, DVI, HDMI 2.0, SDI, and 3G-HDSDI outputs
- H. Be prepared to verify the performance of any portion of the system by demonstrations, listening, and viewing tests, and instrumented measurements.
- I. Make additional mechanical and electrical adjustments within the scope of the work which may be deemed necessary by the Designer as a result of the Acceptance Test. This may include realigning and re-aiming of video or audio systems, changes in system gain structures, grounding, filtering, or interfaces.
- J. Final acceptance will be contingent upon issuance by the Designer of a letter of acceptance stating that the work has been completed and is in accordance with the Contract Documents. The warranty period will begin upon issuance of said letter.

3.15 SYSTEM DOCUMENTATION

- A. Within fifteen (15) days of the Acceptance Testing, prepare and submit digital copy as well as five (5) neatly bound copies of the operations and maintenance manuals to the Owner. Manuals shall be placed in an orderly fashion into a three-ring binder with spine labels indicating contents. These copies are in addition to the one (1) copy furnished to the Designer during Acceptance Testing.
- B. Manual shall include but not be limited to the following:
 - 1. Table of contents
 - 2. Written Guarantee and Service Policy
 - 3. Basic power on/off and operational procedures.
 - 4. All Available manufacturer's operation and service literature for each major system component
 - 5. A one-line signal flow diagram with all cable runs and patch points identified by alphanumeric characters
 - 6. A copy of the Verification Test Report
 - 7. Two (2) copies of as-built conduit riser diagram obtained from the Electrical Contractor
 - 8. A copy of the final tuning settings as furnished by the Designer
 - 9. Electronic versions of all documents included in the manual and electronic back up of all software, firmware, and files to restore initial install presets for all applicable devices copied on to (2) USB storage devices.
- C. Furnish a framed copy of the as-built signal flow diagram to be mounted by the RACK. This diagram shall have all cable runs and patch points identified by alphanumeric characters.

3.16 TRAINING

- A. The AV Contractor shall provide up to forty-eight (48) hours instruction in the safe and proper operation of the equipment, in particular the audio DSP, sound console, and control systems, to the owner's designated representatives.
 - 1. AV Contractor shall schedule instruction with the Owner's designated representatives.
 - 2. Instruction shall not necessarily follow immediately after the system commissioning.
 - 3. Instruction shall be independent of the system check-out and activation. Duration of system commissioning shall not affect the length of instruction time.
 - 4. Instruction, at Owners discretion, may occur in multiple time blocks of less than eight (8) hours each.
 - 5. AV Contractor shall be responsible for making and furnishing video documentation of instruction for future viewing to the Owner. Video documentation can be requested by the owner up to the entire (48) hours of instruction as detailed in this section and shall be furnished to the owner as individual .mp4 files per training session. Files shall be labeled by the contractor indicating the date of training and a brief description of the content of the video. All files shall be furnished to the owner on a USB storage device provided by the contractor.

EQUIPMENT LIST APPENDIX:

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>VIDEO (A115)</u>				
(CUSTOM)	INFRASTRUCTURE ONLY	Video Workstations		Coordinate w/ Owner
(Visionary)	Duet	Encoder / Decoder PAIR	1	
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	3	Contractor installed and tested
(OFCI)	UNIVERSAL BRACKET		3	

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>(BASE BID) AREA AVR - A</u>				
(Blonder Tongue Labs, Inc.)	AQT8-QAM/IP Stock# 6281B	8x8VSB/QAM Input and QAM/IP Outputs	2	
(Blonder Tongue Labs, Inc.)	SPLITTER	8	2	
(markertek)	CUSTOM PANEL	Allows for SMPTE and Fiber tie-in from Camera locations / Existing Press Box	2	Home run route to existing Press Box
(CISCO)	550 G – 16 PORT STACKABLE	10 GIG ETHERNET STACKABLE	3	
(Denon)	AVR-X6500H	11.2-channel AVR with Wi-Fi®, Apple® AirPlay® 2, and Amazon Alexa compatibility	2	
(Marantz)	M-CR612	NETWORK CD RECEIVER FEATURING HEOS, FM/AM,	1	BLUETOOTH, AIRPLAY 2 AND VOICE CONTROL

(JBL)	Crown DCi 4 1250DA	Amplifier w/ Dante	10	
(K-Array)	KA-84	Amplifier	1	
(CROWN)	DCi 4 600 DA	Amplifier	8	
(QSC)	CX - Q 8 CH. 70V	Amplifier	2	
(QSC)	CDN64	DANTE Interface Card	2	
(AMX)	DX-TX-DWP-4K	DXLink™ 4K HDMI Decor Style Wallplate Transmitters	4	
(VISIONARY)	DUET	ENCODER	4	
(MIDDLE ATLANTIC)	BGR-4532-AV	45 RU Rack	2	
(ALLOWANCE)	MISCELLANEOUS PATCH CABLES, AND BREAKOUT CABLES	BUNDLE	1	

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>BATTING TUNNEL (A117)</u>				
(K-Array)	KP-102	Line Array	4	Batting Tunnel
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Denon)	RCD-N7	Built-in wi-fi, AirPlay support	1	Integrated iPod dock
(Fusion Research)	Solo	Encoder / Decoder	1	
(Visionary)	Duet	Encoder / Decoder	4	
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	4	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	4	Contractor installed and tested
(OFCI)	CAMERA W/ MOUNT	INFRASTRUCTURE ONLY, PROVIDE PULL STRINGS Coordinate w/ Owner	3	Owner installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>LAUNDRY (A118)</u>				
(QSC)	ADP6T	6" Pendant Speaker	2	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Solo	Encoder / Decoder PAIR	1	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	1	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	1	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>FEMALE LOCKER (A102)</u>				
(QSC)	ADP6T	6" Pendant Speaker	2	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	1	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	1	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	1	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>COACHES LOCKER (A104)</u>				
(QSC)	ADP6T	6" Pendant Speaker	4	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	1	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	1	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	1	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>MANAGERS OFFICE (A106)</u>				
(QSC)	ADP6T	6" Pendant Speaker	1	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	1	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	1	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	1	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>LOUNGE (A108)</u>				
(QSC)	ADP6T	6" Pendant Speaker	4	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	1	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	2	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	2	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>LOCKER ROOM (A109, A109B, A109C)</u>				
(QSC)	ADP6T	6" Pendant Speaker	8	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	3	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	3	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	3	Contractor installed and tested

<u>Basis of Design</u> <u>(Manufacturer</u> <u>Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>SPORTS MED (A130)</u>				
(QSC)	ADP6T	6" Pendant Speaker	4	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Visionary)	Duet	Encoder / Decoder PAIR	2	Home run to AVR-A
(OFCI)	CEILING MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	2	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	2	Contractor installed and tested

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>WEIGHT ROOM (A112)</u>				
(QSC)	ADP6T	6" Pendant Speaker	6	
(QSC)	ADP.SUB	6" Pendant Speaker Low frequency SubwoOFCIr	2	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Denon)	RCD-N7	Built-in wi-fi, AirPlay support and an integrated iPod dock	1	
(Fusion Research)	Duet Encoder	Duet features three discrete sources housed in a fanless 1U chassis with included rack ears. It also supports premium streaming music apps or a digital music collection. Along with the streaming apps, it also syncs to iTunes accounts as well as backing up those accounts on to any attached USB hard drive.	1	Home run to AVR – A (weight room sound system)
(Visionary)	Duet	Encoder / Decoder PAIR	2	Home run to AVR-A
(OFCI)	WALL MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	2	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	2	Contractor installed and tested
(OFCI)	CEILING MOUNTED FLAT SCREEN DISPLAY	Coordinate w/ Owner	1	Contractor installed and tested
(OFCI)	UNIVERSAL MOUNT	Coordinate w/ Owner	1	Contractor installed and tested

<u>Basis of Design (Manufacturer or Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>(PICNIC DECK, BASE BID)</u>				
(JBL)	70 J+E	PASSIVE SPEAKER	3	2 STACKED FOR EACH MOUNTING LOCATION
(JBL)	70 J	PASSIVE SPEAKER	11	ANGLED FOR FIELD MOUNTED TO POLES AND TO BUILDING STRUCTURE
(VISIONARY)	Duet	Encoder / Decoder PAIR	2	OFCI Mobile cabinet Home run to AVR-A
(Listentech)	LT-800	FM Transmitter for Assistive Listening System	1	
(Listentech)	LR-4200	FM Belt pack Receivers	16	AV Contractor to confirm total quantity is compliant with ADA standards prior to purchase and provide at minimum the recommended amount. To be furnished with standard LA-401 earpiece for each receiver.
(Listentech)	LA-430	FM Neck Loops	4	AV Contractor to confirm total quantity is compliant with ADA standards prior to purchase and provide recommended minimum..
(Listentech)	LA-313	Charging Station for 16 FM Belt packs	1	
(OFCI)	86" Flat Screen Display	OUTDOOR RATED WALL Mounted	2	COORDINATE WITH OWNER'S IT TEAM
(OFCI)	Universal FSD Mount		1	COORDINATE WITH OWNER'S IT TEAM
(OFCI)	65" Flat Screen Display On mobile cart	Adjustable Cart with Tilt capability	2	COORDINATE WITH OWNER'S IT TEAM TO ASSEMBLE
(OFCI CUSTOM)	OUTDOOR RATED CART	ONE FOR EACH SIZE DISPLAY BACK-TO-BACK	2	Recommend 75" Outdoor Rated OFCI Display. Confirm with Owner
(VISIONARY)	DUET	Encoder / Decoder PAIR	2	Home run to AVR-A

(LeGrand, North America)	XCSPP3G-BK	Outdoor Charging Station 3-Gang Unwired – Black	2	
(LeGrand, North America)	XCSLOCK-BK	Locking Door – Black	2	
(LeGrand, North America)	XCSANCHORKIT	Anchor bolt subpack	2	
(LeGrand, North America)	CG37098	Six Port Keystone Double Gang Wall Plate – Stainless Steel Face plate	2	
(LeGrand, North America)	SS26	Decorator Openings, One Gang, 302/304 Stainless Steel Face Plate	2	
(LeGrand, North America)	CG35201	Keystone: 90° Cat5E RJ45 UTP Keystone Jack – White	4	2 per pedestal
(LeGrand, North America)	CG03824	Keystone: Snap-In F-Type Keystone Insert Module – White	4	2 per pedestal
(LeGrand, North America)	CG03820	Keystone: Snap-In Blank Keystone Insert Module – White	4	2 per pedestal
(LeGrand, North America)	2097TRWRGRYCCD4	radiant® Spec-Grade 20A Weather-Resistant Self-Test GFCI Receptacle	2	

<u>Basis of Design</u> <u>(Manufacturer</u> <u>Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>(AREA A). CLUB LEVEL BASE BID. OPTION A</u>				
(MERSIVE)	SOLSTICE (GEN POD 3)	Wireless Interactive Collaboration tool	1	
(NETGEAR)	AC1200	Wireless Router	1	
(Visionary)	Multiview	Encoder	1	
(Visionary)	Duet	Decoder	7	
(Fusion Research)	Solo	Music Transport Encoder	1	
(QSC)	ADP6T	6" Pendant Speaker	16	
(QSC)	ADP.SUB	6" Pendant Speaker Low frequency Subwoofer	6	
(QSC)	Axon C1	Volume Control	1	Selectable Sources
(Shure)	ULXD4Q	4 Channel Wireless Receiver	1	
(Shure)	ULXD2/SM58	Handheld Wireless Microphone	4	
(Shure)	ULXD1-G50	Wireless Microphone Beltpack	4	Provided with lavalier elements, coordinate with owner for lavalier requirements.
(Shure)	UA864 (White)	Directional Wireless Microphone Antenna, SET AMP TO +10db on ANT	2	LINE OF SIGHT IN CLUB Furnish with adapters, splitters, and signal amplification as required
(Listentech)	LT-800	FM Transmitter	1	for Assistive Listening System
(Listentech)	LR-4200	FM Beltpack Receivers To be furnished with standard LA-401 earpiece for each receiver.	6	AV Contractor to confirm total quantity is compliant with ADA standards prior to purchase & provide recommended minimum.
(Listentech)	LA-430	FM Neck Loops AV Contractor to confirm total quantity	4	compliant w/ ADA standards prior to purchase & provide recommended minimum.

(Listentech)	LA-313	FM Backpack Charging	1	Station for 16 units
(Extron)	60-1517-03 ACI 22AT D	Dante Wall Plate	2	
CISCO)	16 Port Stackable Network Switch	Layer 3, 10 Gig	1	
(OFCI)	55" FSD W/ TUNER	Coordinate w/ Owner	6	Infrastructure to be provided
(OFCI)	Universal Wall Mount	Coordinate w/ Owner	6	
OWNER FURNISHED	85" + FSD W/ TUNER	Coordinate w/ Owner	1	Infrastructure to be provided
(OFCI)	Universal Wall Mount	Coordinate w/ Owner	1	
(CHIEF)	526 PACFWP BACKBOX		1	

Basis of Design (Manufacturer Equivalence)	Model/Part#	Description	Qty	Notes
<u>AREA A, LOBBY, CORRIDOR, RESTROOMS ON CLUB LEVEL</u>				
(QSC)	ADP6T	6" Pendant Speaker	16	Coordinate with ceiling feature in Lobby
(OFCI)	Universal Wall Mount	Coordinate w/ Owner	1	Lobby Digital Signage
(CHIEF)	526 PACFWP BACKBOX		1	Lobby Digital Signage

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>BATHROOM BUILDING, BASE BID</u>				
(QSC)	ADP6T	6" Pendant Speaker	7	

<u>Basis of Design</u> <u>(Manufacturer</u> <u>Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
(AREA A). CLUB LEVEL BASE BID. OPTION B with PRESENTATION CAPABILITIES				
(MIDDLE ATLANTIC)	C5 single bay, 27" deep	27" deep rack in Credenza to house AV equipment 1		Wilsonart – Mission Maple Locate in Storage A202C
(MIDDLE ATLANTIC)	POWER CONDITIONING & SURGE PROTECTION	8 OUTLETS	1	
(AMX)	FG1906-0401	DVX-3266 Presentation Switcher	1	
(AMX)	MT-1002	10.1" Modero 5G Rack mount Touch Panel	1	Can sit on a shelf or on top of C5 – Owner to confirm
(AMX)	Portable Transmitter / Receiver Pair	Video Connectivity	3	
(AMX)	FG1010-330-WH (White)	DXLink™ 4K HDMI Decor Style Wall plate Transmitters	1	
(Visionary)	MultiView	Encoder	1	
(Visionary)	Duet	Encoder / Decoder Pair	7	Homerun to AVR-A
(Fusion Research)	Solo	Music Transport Encoder	1	
(MERSIVE)	SOLSTICE (GEN POD 3)	Wireless Interactive Collaboration tool	1	
(NETGEAR)	AC1200	Wireless Router	1	
(JBL)	MTU-16-WH U-Bracket	U-Bracket	2	
(JBL)	C67P/T-WH	WHITE – 70V w/TAP @ 60	24	BOTTOM EDGE OF SPEAKER TO ALIGN W/ LIGHTS AT +12' AFF
(CROWN)	DCI-DA Model 4 600DA	AMPLIFIER	3	DANTE
(BIAMP)	DANVT	DSP W/ DANTE	1	
(Shure)	ULXD4Q	4 Channel Wireless Receiver	1	
(Shure)	ULXD2/SM58	Handheld Wireless Microphone	4	
(Shure)	ULXD1-G50	Wireless Microphone Beltpack	4	Provided with lavalier elements, coordinate with owner for lavalier requirements.

(Shure)	UA864 (White)	Directional Wireless Microphone Antenna, SET AMP TO +10db on ANT	2	LINE OF SIGHT: Furnish with adapters, splitters, and signal amplification as required
(ATLAS)	IP-ZCM1RMK	Single Output Kit - Includes (1) IP-ZCM W/(1) PA702-RMK	1	COORDINATE WITH OWNER'S IT TEAM TO CONNECT PA SYSTEM
(Listentech)	LT-800	FM Transmitter for Assistive Listening System	1	
(Listentech)	LR-4200	FM Beltpack Receivers	16	AV Contractor to confirm total quantity is compliant with ADA standards prior to purchase and provide at minimum the recommended amount. To be furnished with standard LA-401 earpiece for each receiver.
(Listentech)	LA-430	FM Neck Loops	4	AV Contractor to confirm total quantity is compliant with California ADA standards prior to purchase and provide at minimum the recommended amount.
(Listentech)	LA-313	Charging Station for 16 FM Beltpacks	1	
(Extron)	60-1517-03 ACI 22AT D	Dante Wall Plate	2	
(CISCO)	16 Port Stackable Network Switch	Layer 3, 10 Gig	1	
(OFCI)	55" FSD W/ TUNER	Coordinate w/ Owner	6	Infrastructure to be provided
(OFCI)	Universal Wall Mount	Coordinate w/ Owner	6	
OWNER FURNISHED	98" + FSD W/ TUNER	Coordinate w/ Owner	1	Infrastructure to be provided
(OFCI)	Universal Wall Mount	Coordinate w/ Owner	1	
(CHIEF)	526 PACFWP BACKBOX		1	

<u>Basis of Design (Manufacturer Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
PORTABLE EQUIPMENT OPTION ALTERNATIVE BID PACKAGE (PICNIC DECK)				
(OFCI)	75" Flat Screen Display On mobile cart	Adjustable Cart with Tilt capability	4	COORDINATE WITH OWNER'S IT TEAM TO ASSEMBLE
(OFCI)	65" Flat Screen Display On mobile cart	Adjustable Cart with Tilt capability	4	COORDINATE WITH OWNER'S IT TEAM TO ASSEMBLE
(OFCI CUSTOM)	OUTDOOR RATED CART	ONE FOR EACH SIZE DISPLAY BACK-TO-BACK	4	Recommend 75" Outdoor Rated OFCI Display. Confirm with Owner
(VISIONARY)	DUET	Encoder / Decoder PAIR	4	Home run to AVR-A
(LeGrand, North America)	XCSPP3G-BK	Outdoor Charging Station 3-Gang Unwired - Black	14	
(LeGrand, North America)	XCSLOCK-BK	Locking Door - Black	14	
(LeGrand, North America)	XCSANCHORKIT	Anchor bolt subpack	14	
(LeGrand, North America)	CG37098	Six Port Keystone Double Gang Wall Plate - Stainless Steel Face plate	14	
(LeGrand, North America)	SS26	Decorator Openings, One Gang, 302/304 Stainless Steel Face Plate	14	
(LeGrand, North America)	CG35201	Keystone: 90° Cat5E RJ45 UTP Keystone Jack - White	28	2 per pedestal
(LeGrand, North America)	CG03824	Keystone: Snap-In F- Type Keystone Insert Module - White	28	2 per pedestal
(LeGrand, North America)	CG03820	Keystone: Snap-In Blank Keystone Insert Module - White	28	2 per pedestal
(LeGrand, North America)	2097TRWRGRYCCD4	radiant® Spec-Grade	14	20A Weather-Resistant Self-Test GFCI Receptacle

<u>Basis of Design</u> <u>(Manufacturer</u> <u>Equivalence)</u>	<u>Model/Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
<u>ALTERNATIVE BID (PICNIC DECK & CLUB)</u>				
(JBL)	70 J+E	PASSIVE SPEAKER	18	2 STACKED FOR EACH MOUNTING LOCATION
(JBL)	70 J	PASSIVE SPEAKER	10	ANGLED FOR FIELD SEATING BOWL POLE MOUNTED

END OF SECTION 274116