

## SECTION 27 41 00 - INSTRUCTIONAL MEDIA SYSTEMS (IMS)

### PART 1 – GENERAL

#### 1.01 SCOPE-OF-WORK SUMMARY

- A. This specification section includes work consisting of Renovations and Additions, in Franklin Independent School District (ISD) for the following project(s):

Franklin Elementary School

Franklin Middle School

Franklin High School

- B. Described herein are the scope-of-work requirements, criteria, and equipment necessary for the successful Proposer to:

1. Furnish and install campus wide Audio & Video Systems, what is commonly referred to as an Instructional Media System, hereafter referred to as (IMS), with subsystems to include:

- a. IP based Public Address System
- b. Bell & Audio Signaling System
- c. Master & Slave Synchronized Clock System
- d. Campus Central Control & Automation System
- e. Classroom Audio & Video Media Systems

2. Provide Public Address system with analog 70v distributed common area, corridor and outside loudspeakers.
3. Deliver and install a small venue Performance Sound Reinforcement System for the competition Gymnasium.
4. Deliver and install a multi-channel small venue Performance Sound Reinforcement System for the Cafetorium & Stage with distributed pendant speaker system.

- C. The work performed shall be of professional quality and installed in a manner as would typically be delivered by professional Audio & Video Contractors regularly engaged in the primary business of installation of equivalent systems.

- D. The Contractor shall provide a 100% performance bond, payable to the Owner, until written acceptance by the Owner of all work and materials. The cost of these bonds shall be included in the Contractor's proposal price by separate line item.
- E. The Proposer shall furnish their lump sum price offer to provide a turn-key package in response to the Audio & Video specific work found in the Construction Documents and specifically for the work contained herein.
- F. This document is intended to provide the hopeful Vendor/ Contractor, hereafter referred to as Proposer, with information it needs to submit a complete turnkey solution and proposal for The Franklin Independent School District. The Franklin Independent School District shall evaluate the submitted proposals to select a best value Vendor to supply and install the Instructional Media System (IMS) for this project as described herein.
- G. The successful (IMS) Proposer shall provide materials & labor to install new equipment as described herein and as depicted in the construction drawings.
- H. The Franklin Independent School District shall accept proposals from authorized resellers and desires to have a competitive choice of local authorized resellers / manufacturers' representatives to find the best value for delivery of the systems.
- I. The Successful Proposer's responsibilities shall include but are not limited to the following:
  - 1. Provide necessary services to integrate each component into a fully functional package with seamless functionality as described herein
  - 2. Install and make ready for use cabling and devices as described or depicted in the construction package necessary for a complete installation, along with accepted alternates.
  - 3. Integrate into the construction any owner furnished equipment and miscellaneous hardware as may be described herein.
    - a. Example: Interactive Video Projector (depending on accepted Alternates).
  - 4. Maintain timely installations according to the project construction schedule.
  - 5. Provide Owner System Training, As-Built documentation, and project manuals as required by this specification section.

## 1.02 DEFINITIONS

- A. General Construction common words, acronyms, and phrases found in this specification and construction documents shall be as defined by and in accordance with AIA Document A201, Fifteenth Edition, 1997

B. Specific special use of common words, acronyms, and phrases found here in this document shall use the following definitions:

1. “Owner” shall refer to the Franklin Independent School District.
2. “Successful Contractor” shall imply the Vendor or Contractor that is awarded the project scope of work described herein and enters into a written contract with the Owner or General Contractor to deliver said work.
3. “Proposer” shall mean Vendor, Contractor or Subcontractor that submits a proposal to deliver the scope of work described in this construction document package.
4. “Lump Sum” shall refer to a total amount to deliver the full scope of work described herein, inclusive of all materials and labor.
5. “Turn Key” shall refer to all work required to provide the full scope of work described herein, inclusive of all materials and labor, and deliver to the Owner a fully functional system.
6. “IMS” shall be an acronym for Integrated Media System

### **1.03 RELATED DIVISIONS, SECTIONS, AND DOCUMENTS**

A. References to the following related documents do not limit or release the Contractor from the responsibility of having the necessary knowledge of other non-referenced related documents that makeup the Construction Document Package.

1. The following are hereby made a part of this Section:
  - i. Division 27 documents that collectively make up this Construction Specification Package.
  - ii. Section 27-41-00 shall govern the work under this section whether attached hereto or not.
  - iii. Section 27-41-00 Submittal Requirements
  - iv. Work diagrammatically depicted or noted on Construction Drawings

### **1.04 RELATED WORK**

A. References to the following specific related work does not limit or release the Contractor from the responsibility of coordination with other trades, or from having the necessary knowledge of other related work.

- i. Work by the General Contractor
  - ii. Work by the Electrical Subcontractor
- B. The IMS Contractor shall examine construction documents for provided Electrical Rough-in.
- C. The Project Electrical Contractor shall install electrical rough-in for use by the IMS Contractor. The IMS Contractor shall have the specific responsibility to fully coordinate their needs with the Electrical Contractor for their equipment, including AC Power, Back Box Type & Dimensions, Raceway & Pathways. Needed Electrical back boxes, raceways, and pathways not provided by the Electrical Contractor, but needed for the IMS scope of work shall be the responsibility of the IMS Contractor

### **1.05 ALLOWANCES**

- A. The Contractor shall include in their proposal amount a 5% (based on total lump sum proposal) contingency allowance. This allowance shall be shown as a clear line item amount in the proposal and on all cost breakdown documents. Any unused portion at the end of the project shall be deducted from and returned to the Owner in the final application for payment.
  1. Use of the contingency allowance shall only be authorized in writing by the Owner and on the proper Change Order to Contract.

### **1.06 UNIT PRICES**

- A. The Proposer shall provide unit pricing breakdown for all equipment as a line item materials list submitted with their proposal. In the event the Proposal form does not specifically provide a worksheet for requested unit pricing, the Contractor shall provide the unit price list by separate attachment along with their Proposal.
  1. The unit price may be used to add or deduct, by change order, quantities of units as represented by the unit price.
  2. Failure to provide requested unit prices may result in the rejection of the proposal.

### **1.07 ALTERNATE & ALTERNATIVE PROPOSALS**

**Alternates (Not USED) Typical System Alternates have been made part of the base scope of work. No alternatives will be considered. AMX | SchoolView is the district standard.**

### **1.08 SUBMITTALS**

- A. Requirements:

- i. Submittal requirements shall include a full electronic copy in PDF format of all paper document submittals. The PDF Files shall be delivered on DVD or CD format.
- ii. The Contractor shall submit System Shop Drawings as described herein to the General Contractor and Consultant for review within (30) thirty days from the date of the contract. Failure to comply with this requirement may be cause for cancellation of the contract without penalty or cost to the Owner/ General Contractor.
- iii. Contractor shall provide three (3) copies of submittals required by each specific section to Consultant prior to procurement of equipment or commencement of work.
- iv. Present submitted documents in a clear and thorough manner, include original drawings that illustrate diagrammatically Contractor's intent to assemble, construct, fabricate, build, and supply the systems and equipment as described by the collective specifications.
- v. Title each drawing with the Project name, Drawing name, Consulting firm's name and Contractor's name.
- vi. Identify each element of drawings by reference to sheet number and detail, schedule, or room number of Contract Documents. Identify field dimensions; show relation to adjacent or critical features of Work or products.
- vii. Product Data- submit only pages that are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, capacities; wiring, system, control, and plate diagrams; component parts; finishes; dimensions; and required clearances. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable
- viii. Contractor shall not consider the Consultant or Owner's review of submittals to be exhaustive or complete in every detail. Approval of shop drawings or submittals including substitutions indicates only the acceptance of the Contractor's apparent intent to comply with general design or method of construction and quality as specified. The finished product must meet functional requirements, operations, arrangements, and quantities and comply with the contract documents unless specifically approved to the contrary.
- ix. Contractor shall be held responsible for delivery of systems as specified any errors or omissions in the submittals shall not relieve said Contractor of responsibility to deliver complete systems as specified, and that fully meet or

exceed the minimum requirements set forth by the specifications, drawings and contract documents.

- x. The Contractor shall be responsible for deviations in submittals from the requirements of Contract Documents, unless Consultant gives specific written acceptance specifically identifying such deviation. The Consultant shall review and stamp submittals for general conformance to design intent only. This stamped review alone does not imply any specific written acceptance of deviations.
- xi. Submittals that, in the Consultant's opinion, are incomplete, deviate significantly from the requirements of the Contract Documents, or contain numerous errors shall be returned, without review, for rework and are to be re-submitted.
- xii. Submittals of shop drawings and other items shall not be in more than two (2) partial submittals, or as allowed by the Consultant due to the complexity of the systems. If shop drawings are rejected for any reason, Contractor shall correct and resubmit within seven (7) working days. The Contractor shall always be required to obtain stamped approval of submittals prior to any fabrication or installation of equipment.
- xiii. The submittals must be received and stamped reviewed by the Consultant prior to procurement of equipment or commencement of work. Any work performed prior to approved submittals is at the Contractor's own risk.
- xiv. Failure to obtain shop-drawing approval within forty five (45) days of contract award, where the delay is due to the poor performance of the Contractor, may be cause for cancellation of the contract without penalty to Owner / General Contractor.
- xv. Do not fabricate products or begin work that requires submittals until return of stamped reviewed submittals with Consultant acceptance. If work does progress prior to this the contractor shall have proceeded at his or her own risk.
- xvi. Prior to work, corrections and additions, as necessary, shall be made to the design documents and submittals shall clearly show any such changes by a noted cloud around the change
- xvii. Submittals shall include at a minimum:
  - i. Provide complete project material list for each furnished device. The Materials List is required to include the following categories: Quantity provided, Manufacturer, Model number, Description and Value.
  - ii. Provide 8-1/2" by 11" product catalog specification sheets for each furnished device. The product specification sheets shall be neatly bound in a three-ring binder and divided by manufacturer with tab dividers. The

front of the binder shall include a material list as described above. The products shall be organized in the binder such that they match the materials list order. Where more than one item appears on a page, the Contractor shall mark the appropriate item, for easy identification.

- iii. The equipment / material list shall identify equipment quantity, equipment manufacturer, equipment model, and equipment description, along with equipment list provide datasheets.
- iv. Product Reference Sheets (cut sheets):
- v. Construction Drawings:
  - i. Comprehensive system drawings with device locations overlaid on project floor plans, system schematic diagrams in block format, and detail of all custom fabrications including but not limited to device wall plates. Drawings shall be prepared and submitted on E Size 24" x 36" paper
  - ii. Drawings shall be executed at an appropriate scale as required to clearly read pertinent detail, but for equipment layouts not smaller than 1/4" = 1'- 0" and the floor plans and reflected ceiling plans not smaller than 1/16" = 1'-0"
  - iii. The shop drawings shall include: Identification of equipment manufacturer, equipment model numbers, cable types, cable identification numbers, cable color codes, cable paths, plate and panel details, consoles and enclosure details. Additionally include equipment rack layouts showing locations of all rack-mounted equipment, comprehensive system schematic block diagrams (one-line drawings showing device connectivity), equipment rack elevations and custom fabricated equipment
  - iv. Shop drawings that depict all devices and device locations to be installed
  - v. Shop drawings that depict all cabling infrastructure to be installed. Cabling shall be overlaid on floor plan drawings
  - vi. Comprehensive system schematic wiring diagrams showing detailed point-to-point connections to and between all equipment
  - vii. Elevation drawings showing intended equipment room layouts
  - viii. Elevation drawings showing intended equipment rack layouts. The equipment rack layouts shall show locations of all rack

mounted equipment and identification of equipment as shown on the system schematic diagram

- ix. Detail drawings showing intended fabricated equipment, custom work, and wall plates, etc.
- x. Complete wire and cable riser diagram showing path and location of all cable to and between equipment; this cable shall be overlaid on facility floor plan. Include cable types, cable identification numbers and color codes
- xi. Plate or panel details
- xii. Drawings shall include examples of proposed nomenclature and labeling scheme intended for use in labeling plates, equipment, cables, etc.
- xiii. Detail drawings of custom plates or panels
- vi. Consoles, enclosures or support tables.
- vii. Wire and Cables
- viii. The Contractor shall provide their intended Wire and Cable color code strategy for the premise cabling. The Contractor must receive approval of color code prior to ordering cabling. Example: Data Cat. 5-E (Blue), Data Fiber (orange), Telephone (Green), Audio (Gray), RF (Black), etc.
- ix. Provide complete wire and cable riser diagram showing pathways and locations of all wire and cables to and between equipment. The cabling infrastructure shall be overlaid on facility floor plan
- x. Owner Training
  - i. Contractor's proposed owner training plan for installed systems
  - ii. Training plan shall comply with training requirements herein
- xi. Provide complete shop drawings for all systems specified and / or furnished. Each drawing shall have a descriptive title with all parts of each drawing completely described.
- xii. All drawings shall have the name of the project Architect, and installing contractor in the title block.

## B. RE-SUBMITTALS

1. Assemble re-submittals under procedures specified for initial submittals
2. Identify changes made since previous submittal by clouding or highlighting.

#### C. SYSTEM DOCUMENTATION

- i. Prepare the following system manuals and other information to accompany the finished installed system:

#### D. System Service Manual shall include the following:

- i. Maintenance Instructions: Include clear statements of the terms and coverage period of the Contractor's warranty; Contractor's service department phone number(s) and hours; maintenance schedule; description of products recommended or provided for maintenance purposes and instructions for the proper use of these maintenance products.
- ii. Instructions for Owner to obtain service on installed systems and equipment.
- iii. A list of all equipment with manufacturer, model, serial number and physical location, that cross-references to the system schematic diagrams.
- iv. A list of correct settings for all semi-fixed controls (this shall be finalized after acceptance testing).
- v. Any other pertinent data generated during the project or required for future service.
- vi. Manufacturer's Instruction / Technical Service Manuals for all items of equipment, along with manufacturer's warranty statements. Instruction manuals shall be printed originals, not photocopied, unless more copies of a manual are required than the number of units provided. For custom circuits or modifications, provide a thorough description of the purpose, function, specifications, and operation.

#### E. Warranty Information

- i. Warranty information: Include clear statements of the terms and coverage periods for all equipment. Provide Contractor's service department phone number(s) and hours, maintenance schedule and description of products recommended for use in maintenance. Contractor shall complete and

deliver to Owner a warranty card for each piece of equipment covered by manufacturer's warranty.

## 1. CLOSEOUT SUBMITTALS

- a. Provide the following system documents prior to the final acceptance walkthrough. System Operations Manual(s)
- ii. System Equipment Reference Manual(s)
- iii. System Service Manual(s)
- iv. As-built Drawings and other Documents
- v. Proposed training documentation and materials
- vi. Test reports and results
- vii. Statements of Contractor's Warrantee
  - a. When Contractor considers installation substantially complete, provide to Consultant a written report listing all known system deficiencies compared to specified requirements. Also furnish a timeline for correction of any deficiencies.
  - b. Contractor shall provide written request, requesting a final acceptance walkthrough and demonstration. This request shall certify Contractor's declaration of completion with the project and that to the best of their knowledge all systems are installed and fully functional and ready for review by Consultant
  - c. Submit a written report detailing the results of initial adjustments and verification tests including all relevant drawings, charts, and photographs. This report shall be completed and submitted for review at least five (5) days prior to acceptance verification walkthrough by the Owner and Consultant.
  - d. Submit one complete copy of each manual and other closeout documents for review ten (10) days prior to the final acceptance walkthrough.
  - e. At the time of the walkthrough, the Contractor shall transfer and turnover to the Owner's or Owner's represent

the following: All ancillary and portable equipment such as; microphone cables, patch cables, microphones, camcorders, spare equipment, etc.

- f. An installable and actual copy of all software used in the system. Including AMX source code.
  - g. Passwords
  - h. Keys
- F. After the walkthrough review, make any noted corrections and / or additions required by Consultant. Provide corrected copies of final as-built documents.
- G. Closeout Submittals shall be bound in three-ring binders with clear vinyl pockets on cover and spine for title cards with project name and manual volume numbers. Provide table of contents and tabular dividers with legends for each section.
- H. Closeout Submittals shall be printed originals, not photocopied, unless more copies of a manual are required than the number of units used in the system. For custom circuits or modifications, provide a thorough description of the purpose, function, specifications, and operation.
- I. The System Operations Manual shall assume the reader to be technically inexperienced and unfamiliar with the operation of the system. This manual shall step a user through common and typical use of each system or subsystem. The manual shall include the following:
- a. Overall system operation and instructions
  - b. Complete and typical operating procedures for the equipment by activity
  - c. "Quick Setup" instructions for use by inexperienced users working under time pressure
  - d. The System Equipment Reference Manual
  - e. Provide an equipment quick reference manual
  - f. The Contractor may reuse the original submittal of product reference sheets for this purpose. Include a cut sheet for each piece of equipment.

1. System Service manual shall include the following:

- g. A list of all equipment, furnished or installed, indicating manufacturer, model, serial number, and description
- h. Warranty information: Include clear statements of the terms and coverage periods for all equipment. Provide Contractor's service department phone number(s) and hours, maintenance schedule and description of products recommended for use in maintenance.

1. Maintenance Instructions

- i. Instructions for the Owner of how to obtain service on installed systems or equipment
- j. Original Manufacturer's Instruction / Technical Service Manuals for all items of equipment
- k. A list of settings for all semi-fixed controls (to be finalized after Acceptance Testing)

i. SYSTEM AS-BUILTS

- 1. Provide complete and corrected as-built drawings at the time of final system testing and Consultant / Owner demonstration.
  - 2. Original submittals shall be updated to become As-built drawings at the closeout of the project.
  - 3. Prior to final walkthrough of completed job, Contractor shall supply one (1) corrected as-built set of Drawings showing the work as installed. Consultant, with any necessary noted corrections that may be required, shall return this drawing set to Contractor. Contractor shall have corrected the installation work as noted and have updated the drawings and have them present at final walk-through. Upon final acceptance by Owner, Contractor shall provide five (2) copies of as-built drawings and manuals.
  - 4. Contractor shall also furnish to Owner a copy of the complete set of electronic CAD files, in DFX or DWG format, along with a complete PDF file copy of all As-Builts
  - 5. Include as part of the As-built drawings the original submittals with updates to reflect the actual installed work.
1. Any other pertinent data generated during the project or required for future service

- m. System training documents and materials
- n. Provide all documents and materials to be used by the contractor for owner training.

## **1.09 DELIVERY, STORAGE, AND PROTECTION**

### **A. General**

- a. The Project General Contractor shall have final approval authority for any Subcontractor's needs regarding material Delivery, Storage, and Protection.
- b. Installed materials- The installed materials remain the responsibility of the Contractor until the Owner accepts the completed system in writing. The Contractor shall take necessary precautions to ensure the safety of installed materials Delivery
- c. The Contractor shall have full responsibility for delivery of all materials needed to meet requirements of the IMS specification package.
- d. The Contractor shall coordinate with the General Contractor any delivery requirements they may have
- e. Storage of materials shall remain the full responsibility of the Contractor, until the Owner has accepted the work and materials in writing.
- f. The Contractor shall coordinate with the General Contractor any need for storage requirements at the site of work.
- g. The Contractor shall take necessary steps to protect all materials from:
  - i. Dents
  - ii. Scratches
  - iii. Dust
  - iv. Temperature
  - v. Moisture or Weather
  - vi. Cutting
  - vii. Other hazardous conditions

- h. The Contractor shall replace any damaged material as required by the General Contractor or Consultant.

## **1.10 PROJECT CONDITIONS**

### **A. Existing Conditions**

- a. This work is All NEW Construction.
- b. The IMS Contractor shall be responsible to closely coordinate with the:
  - 1. Electrical Contractor
  - 2. Data Contractor
- c. Electrical rough-ins shall be provided by the electrical contractor, including conduit, raceways and electrical back boxes or box eliminators. Any exceptions shall be specifically noted in the construction document drawings.
- d. Locations not requiring electrical rough-ins where (IMS) contractor requires a special device shall be placed in fishable walls. This shall include control system touch panel, push to talk microphone plate, and other device locations noted to need final coordination with the Owner or Consultant
- e. In locations where electrical conduits or raceways are shown and not provided by the Electrical Contractor, the installing IMS contractor shall provide their sleeved penetrations, raceways, and cable pathways, including coring as may be required.

## **1.11 WARRANTY**

### **A. Warranty/Maintenance Program**

- i. All materials, equipment, parts and labor shall be guaranteed (warranted) for a minimum warranty period of two years (24 months).
- ii. Warranty period shall begin immediately following the date of final acceptance in writing by Franklin Independent School District and / or project Consultant.
- iii. During the first two (2) year Warranty period all warranty repairs shall include parts & labor.
- iv. The Proposer shall, upon notification of any malfunction, make the necessary repairs, including labor and materials, at no cost to Franklin Independent School District.

B. Contractor's Warranty shall include the following provisions:

- i. Contractor's statements of long-term commitment to the sales and service of their products in the project's geographic location.
- ii. The Contractor shall warrant that the system(s) shall be provided free from defects and shall perform under usual usage and with continued service for a period of two years after written final acceptance by the Owner or Consultant.
- iii. The Contractor guarantees replacement of all defective materials, parts, components, equipment, including labor, free of charge to the Owner during the Warranty period, when made necessary from normal usage and / or wear.
- iv. The Contractor shall provide on and off sight technical support, software patches, and labor for any necessary site repairs
- v. The Contractor shall provide a full service office, capable of troubleshooting and repairing any system failure in a timely fashion as required by these specification documents.
- vi. Warranty service shall be delivered within regular facility access hours set forth by the Owner.
- vii. More specifically Warranty service shall be provided in accordance with the following:
- viii. For major system failures: "major system failures" are failures that prohibit the use of a typical system function in one or more instructional spaces or pose a life safety concern. Such failures are considered a major impact to the Owner. The Contractor shall provide service correcting the impact within eight (8) hours after notification by the Owner or his representative and no later than the next business day if the notification falls after noon of the notification date.
- ix. For minor system failures: "minor system failures" are failures that do not inhibit typical system usage in an instructional space or pose no life safety concern. The Contractor shall provide service within forty-eight (48) hours, after notification by the Owner or his representative.
- x. The Owner reserves the right to make the final determination of major or minor system failures and the right to coordinate the best times for service of any system failure. The Contractor shall supply Service Request forms and or proper contact procedure to the Owner with instructions for proper

notification of the Contractor for warranty service. By following said instructions, the Owner shall constitute proper notification for any need warranty service.

- xi. The Contractor shall provide an optional extended one-year limited warranty as an Owner Alternate option. The extended one-year warranty shall extend the warranty as defined in the base proposal for one additional year and cover all technology systems that are a part of this specification package. The warranty shall be equal to the base 2 year warranty described above and shall include on and off sight technical support, materials, software patches, and labor for any necessary site repairs.
- xii. The Contractor shall offer this extended warranty price to the (FISD) for their acceptance up to and including thirty days after basic warranty expiration. The Contractor shall be responsible for contacting the (FISD) in writing 30 days prior to the expiration of this offer. Failure to do so shall constitute an extension of the extended warranty offer.

## **1.12 OWNER'S TRAINING**

### **A. Training Requirements**

- a. Provide, at a minimum, training as required herein for each Division 27 specification section Scope of Work.
- b. Prior to scheduling or delivering Owner Instruction / Training confirm the following:
  - i. System as-built documentation must be provided for review to Owner and Consultant. System final walkthrough inspection and punch list must be completed.
  - ii. The Contractor proposed training materials and program outline must be provided and approved by the Owner / Consultant.
  - iii. Training schedule dates must be coordinated and approved with the Owner and Consultant.
- c. System Training for Software Applications
  - i. The Contractor and the software developer SchoolView, LLC or their agent, shall provide the IMS system training as specified herein.
  - ii. Training is to include:

- i. Detailed training plan and hand out materials that have been reviewed and approved by the Consultant or Owner
- ii. Practical and comprehensive operation of system
- iii. Basic system troubleshooting techniques
- iv. Videotape of each training session. Furnish two final edited copies to the Owner after training

d. Training Hours

- i. Provide each group of users, as defined below, with the minimum training hours as specified.
- ii. Training time is defined as those hours specifically set-aside for the sole purpose of training school personnel. Credited time shall not be given for time spent providing instructions to the Owner's staff for a system not completed or that has not passed final acceptance by the Owner and Consultant, or training performed outside of the approved training plan.
- iii. The Contractor shall issue a certificate of training completion to the trainees, upon completion of their training. Both the trainer and trainee(s) must sign the certificate before Contractor shall receive training credit. Unless otherwise noted, provide a minimum of (8) eight hours of training for Owner selected trainees.
- iv. This training shall be divided into training session "Blocks" as coordinated with the Owner. The first training session shall occur after final acceptance of the system installation and before first Owner scheduled use of the system.
- v. The first-training session block shall consist of training intended for the common system operators. The training shall include use of the administration control functions of the PA, Bell, and Clock system.
- vi. The second-training session block shall target the classroom systems for the common system operators. The training shall be sufficient to provide Teachers and staff with the necessary knowledge to use the technology systems and equipment found in each classroom and shall include the Teacher's classroom control interface software.

- vii. The third-training session block shall consist of training for the IP Video Delivery System and Portable Video Broadcast cart. The training shall be sufficient to provide Administrators, Librarians, and staff with the necessary knowledge to use the technology systems and equipment of the video delivery system, including software functions.
- viii. The fourth-training session block shall consist of a training session structured for high-level users, for example staff champions that shall provide instruction to other users and shall include Advance System Configuration and Operational Knowledge needed to maintain and manage all technology systems.
- ix. Training sessions shall cover at a minimum:
  - 1. Basic System Configuration and Operation Knowledge
  - 2. Advance System Configuration and Operation Knowledge
  - 3. Typical system usage
  - 4. Typical User troubleshooting skills
  - 5. Service and maintenance requirements

## 2.1 GOVERNING WORK CLAUSES

### A. General

- a. All equipment furnished for this project shall be new and unused and shall be designed for the intended use and for uninterrupted duty cycle.
- b. Acceptance or implied approval of submitted products, product cut-sheets, or substitutions of equipment, equipment manufacturers, or system designs other than that specified herein does not relieve the Contractor of the responsibility to provide the functions and detail of the systems as found in the specified system.
- c. The Contractor shall not receive final written acceptance of work and materials until the Contractor provides written release of any and all liens to the Owner.
- d. Any equipment using IR control must have a discrete control function for the function to be controlled. Example: Power on as a separate button function to

Power off. A toggle on and off shall not be acceptable. This shall apply to power functions, input switch functions, or other necessary positive state functions. The contractor shall confirm any proposed equipment to be consistent with this need before it is used in this installation.

e. Software Terms & Conditions

- i. The successful Contractor providing software for this project affirms that it possesses complete and valid title and rights to furnish the said software. Further that it possesses legal right to sell, transfer, or license the software to the Owner.
- ii. The Successful Contractor hereby agrees to protect, indemnify, and hold the Owner harmless against any and all claims, suits, or proceedings for patent, trademark, copyright, or franchise infringement arising out of, or resulting from, the installation or use of software or any part of the Contractor provided materials or equipment.
- iii. Provide the Owner with an installable and exact copy of each software program installed and running on any system furnished. The copy must be a user installable version and be provided on a CD or other format acceptable to the Owner.

f. Ancillary and Accessory Items

- i. The Proposer shall provide ancillary and required accessory items necessary to furnish to the Owner a complete and fully functional system.
- ii. The exclusion of / or limitation in the language used in the drawings or specifications shall not be interpreted as meaning that ancillary or accessories items of work or equipment necessary to complete or make the installed system fully functional can be omitted.
- iii. The mention in writing or representation by depiction materials, services, or operations within this specification document and or Proposal package is binding upon the Proposer to include and provides such items, services, and operations without additional charge to Owner. Exceptions shall be noted by the acronym (NIC) "Not In Contract" or (OFE) "Owner Furnished Equipment". If this notation does not appear then the Proposer shall assume the need to provide the item in question.
- iv. The Proposer shall receive no allowances because of omissions in work due to unfamiliarity or their misunderstanding of Proposal package documents.

g. Drawing Symbols

- i. The project scope drawings utilize symbols and schematic block diagrams to indicate various items of work. Neither of these have any dimensional significance nor do they delineate all items that may be required for the intended construction and installation.
  - ii. The work shall be installed in accordance with the intent diagrammatically expressed on the drawings and described in the written specifications. The Proposer shall not make limiting interpretation that provides for incomplete work or a nonfunctioning system.
- h. Document Discrepancy
- i. In the event of an inconsistency or discrepancy that may exist in or between parts of these Construction Documents, the following direction shall be followed and shall govern:
    - 1. The document, section, phrase, or requirement with better quality, more stringent requirement, or greater amount or quantity of work or material shall apply and shall be expected, delivered and used. Such work or material shall be provided by the Contractor and installed at no additional cost to the Owner
    - 2. Omissions - The omission of or express reference to any part(s) necessary for or reasonably incidental to a complete and fully functional system and installation as intended shall not be construed as a release from the Proposer providing and installing such parts

## **2.2 THE (IMS) SYSTEM DESCRIPTION**

- 1. General
- 2. The (IMS) system shall provide for an "Open Architecture Approach" to the Audio & Video Multimedia Systems of the campus that considers flexibility, and is future ready for growth.
- 3. At the core of the IMS shall be a multi-functional, microprocessor based, highly flexible, centralized control / automation system that shall integrate much of the facility's disparate technologies and unifies them into a single interactive communication platform with control and system signals over a common IP based data network infrastructure. The overall system flexibility shall be the result of shared system communications and a wide range of optional control devices to interface with the outside world for both current and future needs

4. The IMS shall provide encompassing unified user control from an easy to use graphical user control interface for controlling traditional and usually disparate school technology systems.
5. The IMS equipment rack shall consist of:
  - a. IMS Central Control System (AMX Netlinx NI-3100 loaded with SchoolView Campus SV software)
  - b. Audio Digital Signal Processor / Matrix Mixer for routing and processing of audio signal paths
  - c. IP Audio Encoder for creating Bell signaling and event audio (Exstreamer)
  - d. Remote IP Audio Decoder Receivers (Exstreamers) for distribution of audio over IP
  - e. Master Clock system to synchronize secondary clocks
  - f. Telephone Audio Interface for PA announcements from POT Line
  - g. Background and foreground Music Sources
- b. AM & FM Radio Tuner
- c. Programmable CD / MP-3 Player
  - i. IP audio encoding devices (Annuncicomms)
  - ii. Zoned Public Address, Bell, Background Music, and other communications audio shall be delivered to the classrooms and other far points via the IP network and through the local room IP audio decoders with amplification and over ceiling speakers
    1. Power amplifiers for common area analog distributed speaker zones
    2. UPS Power for battery Back-Up
      - a. Emergency power from a rack mounted UPS to energize necessary equipment when commercial power is out. The emergency power back-up shall provide the distributed 70v common area ceiling speakers for the Administration, Hallways, and other common areas including outside speakers (if any), as shown in the construction drawings.

The emergency power shall maintain live PA for a minimum of 30 minutes.

B. IMS functionality

1. The basic (IMS) Campus System described herein and diagrammatically shown in the construction drawings shall provide at a minimum, but not limited to, the following functionality and features:
2. User Touch Panel and control system Interface
  - a. A 10” wall mount touch panel shall be located in the front office at the reception desk and shall provide the main user interface of the (IMS) control system.
  - b. The IMS control software and GUI shall include the ability to import a “BMP” or JPEG image file for use as custom graphic screens, such as the school logo, school floor plans, and menu icons, etc to create an user friendly campus specific interface
  - c. A secondary remote virtual control panel that shall mimic the main user control panel via networked workstation computer and webbrowser software such as “Real” VNC
3. Campus IP based P.A. Bell, & Clock Systems

C. Campus wide IP based Public Address (PA), Bell, & Clock functions. Audio Public

- D. Address shall be either from a gooseneck microphone, Desk cabled Push-to-Talk microphone, Remote “RA1” portable IP Push-to-Talk microphone or telephone interface. The PA system shall include the ability for remote IP audio only zones to send and return audio through the PA or from the PA to a remote local sound system. This feature shall include IP virtual Push-to-talk functionality and the ability to control the power up of the local sound system carrying the announcement
- E. Programmable Bell or audio event scheduler that uses common MP3 audio files stored on a USB Thumb-Drive shall provide the user endless choice of sound for classroom changes or scheduled announcements Master clock system with single and double sided 4” digital LED bar display clocks that communicate over RS-232 for synchronization
- F. Networked PC and centralized Administration Control Interface for campus wide access of features and functions.

G. Typical Classrooms

- i. Classroom Video display shall utilize a ceiling mounted video projector. The video projector shall be provided by Owner and Contractor installed. The Contractor shall interface the IMS with the Video Projector for typical control functions as follow:

H. Power on and off

I. Input selection

J. Video Mute (if available on the Owner provided projector)

K. Video Freeze (if available on the Owner provided projector)

L. Security Alert (projector missing)

M. Projector Statistics (telemetry of use and power state)

- i. Teacher's PC and other video sources shall connect to the Classroom video projector through a wall input plate with location shown as "AV1" on the construction drawings. This input plate shall have one VGA module that converts analog video and matches it to a UTP / RJ-45 jumper cable. The UTP jumper cable shall connect available video input modules to a media switcher.

N. The Media Switcher shall switch both audio and video signals to the classroom video projector.

- i. Located in the "AV1" wall plate box shall be a spare UTP / RJ-45 jumper cable (Cat. 5e cable) for a future HDMI audio & video module.
- ii. Classroom audio playback shall be switched and amplified with the unified Audio & Video media switcher as describe above. The amplified audio signal shall be distributed in the classroom over "S2" type ceiling mounted loudspeakers. The "S2" speakers are 2 x 2 format that replace a typical ceiling tile in the classroom drop ceiling grid. The Contractor shall provide "S2" speakers as shown on construction drawings and field coordinated final location to provide the best coverage of the classroom student seating area.
- iii. The 4.3" Wall mounted Touch Panel control interface shall provide for teacher's common control of classroom A/V devices. This is shown as the "CP2" locations on the construction drawings.
- iv. The classroom multimedia audio & video devices shall be controlled either by a wall mounted 4.3" touch panel controller or a web browser control interface installed on the teacher's workstation computer.

Additionally, the Contractor shall provide a quick tool bar on the teacher's computer for quick access to typical room control functions such as:

- O. Selection of input
- P. Volume up and down
- Q. Projector power
  - i. The Web-browser control interface shall allow teacher's ability to remotely control Audio & Video features via a networked PC from any data drop location and shall emulate the 4.3" touch panel control from the PC.
  - ii. Teacher's shall have the capability of classroom delivery from remote IP video streaming sources such as DVD players, Direct TV receivers, Video Storage Servers, and other local origination IP video sources
  - iii. The IMS shall provide for communication with the classroom video projection systems and network video delivery devices, to provide remote automated control for zoned video content delivery and video broadcast to the classrooms
  - iv. IP Streaming Video content shall be delivered to the video projectors and other video display devices via MPEG 2/4 IP video streaming and decoded by a hardware Set Top Box (STB) located at each video display device
- R. CATV Distribution to the CATV RF Jacks
  - i. The Contractor shall extend the CATV Cable Company Service from the service building DMARC to the TR closets as needed to furnish CATV to identified cable TV jacks.
  - ii. The Contractor shall at their discretion utilize 75 ohm 1/2" hardline or 75 ohm RG-11 cable as needed to maintain adequate signal strength to a multi-port tap(s) to be located in the TRs serving areas requiring CATV service.
    - 1. From the CATV RF multi port taps located in the TR closets, the Contractor shall feed the CATV RF jacks shown on the project drawings as "T1" symbol locations using RG-6 cable.
    - 2. The Contractor shall provide any necessary CATV amplification or equalizer for balancing the signal to supply the CATV jacks with a minimum of +2Dbm signal.
    - 3. The Contractor shall be responsible for calculating the CATV RF distribution system necessary to meet the above requirements. The

system shall be part of the submittal package for the project. Blonder Tongue equipment or equal shall be acceptable.

## 2.3 MANUFACTURERS

### A. Governing Clauses

- a. It is not the intent of these specifications to limit or restrict submission of proposals for products or systems by manufacturers other than those specified. The products specified are intended to establish a minimum baseline of operational, functional, and performance based system expectations that all proposed products must meet or exceed by features, functionality and quality. The Owner reserves the right to govern over and proclaim whether proposed products are equal to the specified system standards.
- b. If the proposed system does not meet all of the following features or functions described herein then the Proposer shall identify and list those exceptions in their proposal submittal by separate cover titled "System Exceptions" in red letters. The Proposer shall not be automatically disqualified for not meeting one or more requirements. The Owner shall evaluate Proposals on their overall value; all proposals shall be fully considered for best value.
- c. Reference to a manufacturer that may appear in this specification is not intended to imply that all products available from said manufacturer meet in full all requirements of this specification. The Proposing Vendor shall be responsible for full compliance or the specification requirements.

## 2.4 EQUIPMENT

### A. Governing Clauses

- i. The following sets forth the minimum IMS equipment requirements. Described are both technical performance specifications along with certain desired features and functions that the Contractor must provide with their proposed system solution.
  - a. The Proposer must state clearly in their proposal any exceptions to the equipment and or requirements found in the construction documents to that offered in the Contractors proposal.
  - b. Additionally to exceptions, the Proposer shall list clearly any value added features and or functions their proposed equipment may offer over and above the stated minimums.
  - c. IMS equipment provided and installed shall be as depicted or shown on the construction drawings, described herein or more specifically under the System Description above.

d. The Contractor shall be aware that the construction documents in totality identifies the requirements and equipment required to deliver the desired performance, this means the written specifications, drawings, and associated equipment list or generally known in totality as the “Construction Documents”.

ii. Proposal Equipment List

a. The Proposer shall provide along with their Proposal Bid Form the following:

1. Provide complete project material / equipment list for each device to be furnished. The Materials List is required to include the following completed categories:

- a. Quantity of item provided
- b. Manufacturer of item
- c. Model number of item
- d. Description of item
- e. Value of item in the form of Amount declared for item or device

b. The Project Material / Equipment List shall be completed on the provided spreadsheet. See Attachment “C” Equipment List.

c. Attachment “C” Equipment List

1. The Proposing Contractor hereby acknowledges and agrees to be bound by the understanding the Attachment “C” Equipment list is provided as a courtesy worksheet only and further understands that dimensional values, quantity counts, and ancillary items required remain the responsibility of the Proposer.
2. The itemized equipment list found as Attachment “C” in the construction documents along with the described equipment that follows in part 2.5 “BASE(IMS) EQUIPMENT” is typical expected IMS equipment and sets forth standards for the primary equipment items or devices required in this project.
3. The Attachment “C” list does not include every equipment item needed or that may be described herein and depicted on the construction drawings. The Proposer is responsible for determining their complete equipment list needed for a successful project.

4. The list is intended only as an aid and provides supplemental information of certain devices to assist the Proposer with developing a complete list of all items needed. All equipment items on the construction drawings or in the written specifications is required to be provided by the Proposer for this project. Review the construction documents and provide equipment as written herein and / or depicted on construction drawings
5. On the Attachment “C” spreadsheet where item quantities are shown by actual number count or has a ”\*” in the quantity column, the Contractor shall determine for themselves the required device quantities based on the Construction Documents in totality.
6. The Contractor shall be solely responsible for all equipment needed for a turnkey project based on their lump sum proposal and the construction document’s descriptive requirements.

C. Provide

- a. All Equipment and Systems as depicted on the project Construction Drawings
  - b. All features and functions as described herein
  - c. All Equipment listed in the Attachment “C” Equipment List
- D. The Proposer shall complete the “Attachment A.” as part of the Proposal Form in its entirety and provide added completed worksheets for devices, equipment, ancillary items, cable and products that they determine required for a complete installation but not currently listed on the Attachment “C” document.
- E. The Proposer shall provide one lump sum price for a complete turn-key system installation per the construction documents. This lump sum price shall be inclusive of all work and material needed for fully functional systems.
- F. Provide unit pricing on the Attachment “C” Equipment List and submit as a part of the Proposal form document

## 2.5 CLASSROOM ADDITIONS - AUDIO VISUAL EQUIPMENT

### A. Required Hardware for SchoolView Head End

- a. SchoolView Headend Rack
  - i. Equipment Floor Rack appropriately sized to house all required Headend Equipment
  - ii. Rackmount UPS
    1. Tripp-Lite 2200VA/1650W, Includes Outlet Ctrl & NIC, 2SP, BI Smart UPS
    2. Part #: SMART2200RM2U
    3. Or Approved Equal
  - iii. Power Strip
    1. Middle Atlantic 24 Outlet, 15A, Basic Surge
    2. Part #: PD-2415SC
    3. Qty – As Needed
    4. No Substitutions
  - iv. Rack Fan
    1. Middle Atlantic Fan Kit, 114 CFM, Slim 5 Series
    2. Part #: 5-FAN-K
    3. Qty – As Needed
    4. No Substitutions
  - v. Rack Rails
    1. Middle Atlantic Rackrail Recessor, 2 RU, 3"D
    2. Part #: RR2-3RCN
    3. No Substitutions
  - vi. Rack Shelf
    1. Middle Atlantic 1RU Rackshelf
    2. Part #: U1
    3. No Substitutions
  - vii. Custom Input Panel
    1. Liberty Input Panel for USB Connectivity
    2. AV Contractor-Designed Rack Panel
- b. SchoolView Headend
  - i. AMX/SV Unified Campus Headend Package
    1. AMX/SV Part #: FG1701-23KW
    2. No Substitutions
- c. AMX/SV Room Controller
  - i. AMX NX1200 NetLinx® NX Integrated Controller
    1. AMX Part #: FG2106-01
    2. Qty – As Needed based on Number of AMX/SV Rooms
    3. No Substitutions
  - ii. AMX AC-RK Accessory Rack Kit
    1. AMX Part #: FG515

2. Qty – As Needed
  3. No Substitutions
- d. Custom Rack Power Control Panel
    - i. 1RU Rack Panel with DB9, Power On, Power Off and Data Connectivity  
Designed and Provided by AV Contractor
  - e. Audio Decoder/Encoder
    - i. AMX/SV SV-ADE-2 Audio Decoder Encoder
      1. AMX Part #: FG1702-21
      2. Qty – As Needed
      3. No Substitutions
  - f. Digital Signal Processor
    - i. Biamp Nexia CS Digital Signal Processor
      1. Biamp Part #: Nexia CS
      2. Qty – As Needed
      3. No Substitutions
  - g. Distribution Amplifier
    - i. Extron DA-6A Distribution Amplifier
    - ii. Extron Part #: 60-692-20
    - iii. Qty – As Needed
    - iv. No Substitutions
  - h. Common Zone Power Amplifier
    - i. Ashly Power Amplifier
    - ii. Ashly Part #: ne4250.70pe
    - iii. Qty – As Needed
    - iv. No Substitutions
  - i. Telephone Interface
    - i. JK Audio AutoHybrid Telephone Interface
    - ii. Part #: AutoHybrid
    - iii. Or Approved Interface – Contractor Responsible for Determining  
Appropriate Equipment
  - j. Passive Audio Divider/Combiner – 10KOhm
    - i. Radio Design Labs STD-10K
    - ii. RDL Part #: STD-10K
    - iii. Qty – As Needed
    - iv. Or Approved Equal
  - k. Desktop Mic
    - i. AKG Gooseneck Mic

- a) AKG Part #: DGN99-E
  - ii. CAD Audio 40-119 Desk Type Push to Talk Base with Cable
    - a) Astatic Part #: 40-119
  - iii. Mic Plate, 5-Pin XLR
  - iv. Qty – 1 Each
  - v. No Substitutions
- l. Wall-Mounted Mic
  - i. AKG Gooseneck Mic
    - a) AKG Part #: DGN99-E
  - ii. Mic Plate, 3-Pin XLR
  - iii. Qty – 1 each
  - iv. No Substitutions
- m. AV Receiver, Rack Mounted
  - i. Onkyo AV Receiver
    - a) Onkyo Part #: TX-8050
  - ii. AV Receiver Rack Shelf
    - a) Middle Atlantic Part #: RSH4A4M
  - iii. Qty – 1 each
  - iv. Or Approved Equal

## **B. Required Hardware for Video Headend**

- a. SchoolView Video Rack
  - i. Equipment Floor Rack appropriately sized to house all required Video Headend Equipment
  - ii. Rackmount UPS
    - 1. Tripp-Lite 2200VA/1650W, Includes Outlet Ctrl & NIC, 2SP, BI Smart UPS
    - 2. Part #: SMART2200RM2U
    - 3. Or Approved Equal
  - iii. Power Strip
    - 1. Middle Atlantic 24 Outlet, 15A, Basic Surge
    - 2. Part #: PD-2415SC
    - 3. Qty – As Needed
    - 4. No Substitutions
- b. AMX/SV Master Controller
  - i. AMX NX1200 NetLinx® NX Integrated Controller
    - 1. AMX Part #: FG2106-01
    - 2. Qty - 2
    - 3. No Substitutions
  - ii. AMX AC-RK Accessory Rack Kit
    - 1. AMX Part #: FG515
    - 2. Qty – As Needed

- 3. No Substitutions
  - iii. AMX PSN6.5 Power Supply
    - 1. AMX Part #: FG423-41
    - 2. Qty – As Needed
    - 3. No Substitutions
- c. Custom Rack Power Control Panel
  - i. 1RU Rack Panel with DB9, Power On, Power Off and Data Connectivity Designed and Provided by AV Contractor
- d. Video Encoder
  - i. AMX NMX-ENC H.264 Video Encoder
    - a) AMX Part #: FG3201-01
  - ii. AMX NMX-VRK, V Style Rack Mounting Shelf
    - a) AMX Part #: FG3201-60
  - iii. Qty – As Needed
  - iv. No Substitutions
- e. Clamping Shelf for Video Sources
  - i. Middle Atlantic Clamping Shelf
  - ii. Middle Atlantic Part #: RC-3
  - iii. Qty – As Needed
  - iv. No Substitutions
- f. Preview Video Decoder
  - i. Amino Part #: 140H
  - ii. Qty – As Needed
  - iii. No Substitutions
- g. Rack Mounted Preview Monitor
  - i. Viewsonic 16" (15.6" Viewable) Commercial-Grade
    - a) Viewsonic Part #: VT1602-L
  - ii. LCD Rackmount
    - a) Middle Atlantic Part #: RM-LCD-MK
  - iii. Qty – 1 each
  - iv. Or Approved Equal
- h. Controller, Network
  - i. ICSLan IR/S Interface, 4 IR/S and 4 Inputs
  - ii. AMX Part #: EXB-IRS4
  - iii. Qty – As Needed
  - iv. No Substitutions
- i. DVD Player with RS232 Control
  - i. TASCAM DV-D01U 1-rackspace DVD Player w/RS-232 Control Port
  - ii. Tascam Part #: DV-D01U

- iii. Qty – 1
  - iv. Or Approved Equal
- j. Volume Controls
- i. Lowell Attenuator-25W, 70V/25V, 1-gang Stainless Steel
  - ii. Lowell Part #: 25LVC
  - iii. Qty – As Needed in Office Areas
  - iv. Or Approved Equal
- k. Signage Displays
- i. LG Commercial Series - SuperSign 55LY540S Digital Signage Display - 55"
  - ii. LG Part #: 55LY540S
  - iii. Qty – As Needed
  - iv. No Substitutions
- l. Signage Display Mounts
- i. Chief Large Height-Adjustable Tilt Wall Mount
    - a) Chief Part #: LTMU
  - ii. Chief Large In-Wall Storage Box; WALL ENC,16X16,MTI-D,PRE INST
    - a) Chief Part #: PAC526
  - iii. Qty – As Needed, One of Each per Signage Location
  - iv. No Substitutions
- m. Signage Players
- i. AMX IS-SPX-1300 Inspired Signage Xpress Player
    - a) AMX Part #: FG1231-11
  - ii. High Speed HDMI to DVI Cable
  - iii. Inspired Xpress Serial Cable, mini-jack 3.5mm to DB9 Female
    - a) AMX Part #: FG1231-60
  - iv. Surface Mount Bracket
    - a) AMX Part #: FG525
  - v. High Speed HDMI Cable
  - vi. CAT6 Network Drop, Including Patch Cables, Inserts, Wall Plates and all other materials required to implement a fully functional End-to-End Network Drop
  - vii. Qty – As Needed

**C. Required Hardware for all SchoolView Classrooms:**

- a. SchoolView Unified Classroom Kit
  - i. AMX/SV SV-UCVK-3, UNIFIED CLASSROOM - ENZO, VIRTUAL KEYPAD with Touch Panel
  - ii. AMX/SV Part #: FG1701-38K
  - iii. Qty – One for Each SchoolView Room Location
  - iv. No Substitutions

- b. Ceiling Equipment Enclosure
  - i. AMX Ceiling Equipment Enclosure
  - ii. AMX Part #: FG1700-01E
  - iii. Qty – As Needed
  - iv. No Substitutions
  
- c. Wall Input Plate
  - i. 2 Gang Wall Plate with HDMI, VGA and 3.5mm and CAT6 Feed-Thru for USB Extender
  - ii. Custom Wall Plate by AV Contractor
  - iii. Qty – As Needed
  
- d. Projector Pass-Through Plate:
  - i. 1-Gang Recessed Low Voltage Cable Wall Plate - White
    - 1. C2G #40594
    - 2. Qty – As Needed
  
- e. USB Extender
  - i. USB Over Cat5e/6 Extender
  - ii. Qty – As Needed
  
- f. Installation AV Cables
  - i. Active High Speed HDMI® Cable with RedMere® Technology
  - ii. Super VGA HD15 M/M CL2 Rated Cable w/ Stereo Audio and Triple Shielding (Gold Plated)
  - iii. FLEXboot Series Cat6 24AWG UTP Ethernet Network Patch Cable, Purple
  - iv. End-User Cables, 15ft, Matching Each Input Type
  - v. Qty and Lengths – As Needed
  
- g. Interactive Classroom Projector
  - i. Boxlight 3100 ANSI Lumens Interactive WXGA Projector
  - ii. Boxlight Part #: P5 WX31NST
  - iii. Qty – As Needed
  - iv. No Substitutions
  - v. Provide Boxlight Lamps for Life Lamp Replacement for Each Projector
  
- h. Projector Ceiling Mount
  - i. Chief RSMAU Universal Mount
  - ii. Chief CMS440 Ceiling Plate
  - iii. Chief CMS018
  - iv. Qty – One Each per Projector, As Needed
  - v. No Substitutions
  
- i. Projection Surface
  - i. Boxlight 16:10 95" Diagonal (80.56" x 50.33" ) Wet Erase Marker Board with Projection Surface

- ii. Boxlight Part #: BOXWB-95W
- iii. Qty – As Needed
- iv. No Substitutions

j. AV Cables:

- i. High Speed HDMI® Cable with Ethernet, ENZO to Projector
- ii. DisplayPort to HDMI Adapter (Male to Female) with Audio in Black
- iii. High-performance EZ-strip broadcast audio 22 AWG 1 pair
  - a) Liberty High-performance EZ-strip broadcast audio 22 AWG 1 pair
- iv. Commercial grade general purpose 16 AWG 2 conductor plenum cable
  - a) Liberty 16-2C-P-WHT
- v. Qty – As Needed
- vi. Or Approved Equal

k. Demo Existing Rack Rooms and Equipment Rooms

- i. AV Contractor shall be responsible for removing all existing equipment that will not be used in the AMX/SV Upgrades.

l. Raceway

- i. Panduit Surface Mount Raceway and Low Voltage Boxes
- ii. Qty – As Needed

**D. Required Additional Hardware for all New AMX/SchoolView Rooms**

a. White Board for Projection Surface

- 1. Boxlight 16:10 95" Diagonal (80.56" x 50.33" ) Wet Erase Marker Board with Projection Surface
- 2. Boxlight Part #: BOXWB-95W
- 3. Qty – As Needed in Each New AMX/SchoolView Room
- 4. No Substitutions

b. Classroom Speakers

- 1. Lowell Speaker Package-8in Spkr, 2 x 2 Tile System, 50W, 8 ohm, .8cu ft
- 2. Lowell Part #: LT2-8A-VB
- 3. Qty – Two per New SV Classroom
- 4. No Substitutions

c. Projector Mount

- 1. Chief Ceiling Projector Mount Kit
- 2. Chief CMS440, RSMAU, CMS006
- 3. Qty – As Needed
- 4. No Substitutions

d. Network Drops for SchoolView Equipment

- i. CAT6 Network Drop, Including Patch Cables, Inserts, Wall Plates and all other materials required to implement a fully functional End-to-End Network Drop
- ii. Qty – As Needed

**E. Additional Requirements:**

- a. Training, Up to (2) 2-Hour Sessions on System Use, Troubleshooting and Basic Maintenance

**3.1 CONTRACTOR REQUIREMENTS AND RESPONSIBILITIES**

**A. General**

- a. The Contractor shall provide, furnish, deliver, transport, erect, install, configure, and connect completely all of the material and equipment described herein or depicted on any Proposal package construction document or Drawing. The Contractor shall supply all other incidental material required, such as interconnecting cables, connectors, and hardware to make the work complete and leave all systems in first class operating condition.
- b. The Contractor shall considered this a “Turnkey Project” for use by the Owner
- c. The Contractor shall coordinate with all other trades to avoid causing delays in the installation schedule.
- d. In the event of any conflicts, delays or improper preparatory work by other trades, notify the General Contractor, Consultant and Owner.
- e. Equipment and enclosures shall be mounted plumb and square in relation to the structure.
- f. Provide cut-in boxes or approved clamping rings where back boxes are required but not provided by electrical Contractor.
- g. The Contractor shall coordinate their requirements for proper ground system to all equipment
- h. Coordinate and verify with the Electrical Contractor, the installation of needed cable raceways.
- i. Devices, wire raceways, and equipment, except for portable equipment, shall be permanently attached to equipment racks or building structure and held firmly in place with screws or fasteners. Adhesives alone shall not be accepted as fasteners.
- j. The Contractor shall not use any other trade’s work or material for support or fastening. Example: ceiling grid support wires cannot be used to support cable hangers, etc. Any exceptions shall be noted or coordinated in writing with the General Contractor.
- k. The Contractor cannot shoot, fasten, or screw hangers to the roof deck. Any exceptions shall be noted or coordinated in writing with the General Contractor.
- l. The Contractor shall coordinate clearance for cable paths and coordinate clearance for access above cable tray to easily add or remove cable from the Cable tray they install.
- m. A Contractor installing any equipment shall be responsible for providing all interconnecting cables to and / or between same equipment that may be required to make equipment fully operational.
- n. Equipment shall be fabricated with equipment mounted into racks, enclosures, and consoles and be fully wired and tested, before delivery to job site.

- o. Consideration shall be given not only to operational efficiency of installed equipment, but additionally to overall aesthetic factors Contractor shall comply with industry standard practices in the installation of equipment and the wiring of the equipment cabinets.
- p. Contractor's construction, fabrication, installation, or delivery of materials must comply with applicable standards and practices.
- q. The Contractor shall coordinate and field-verify the electrical rough-ins provided for their use by the Electrical Contractor.
- r. The Contractor shall exercise care during installation. Damage to cables or equipment shall not be accepted. Damaged cable or equipment must be replaced.
- s. The Contractor shall remove and replace cabling that is found to have been stretched or pulled past the recommended pulling tension during installation.
- t. The Contractor shall install all operational software, as required by equipment and ensure that such software is fully functional and operational. In the event of software conflicts due to upgrades, bugs, or other reasons, the Contractor shall provide solutions suitable to Owner at no additional cost.
- u. The Contractor shall be responsible for coordination with Owner's staff the software configuration options of software configurable systems.
- v. The Contractor shall provide, the Owner, installable and exact copies of all software used by or running on any system installed.
- w. The Contractor shall provide to the Owner keys for all lockable equipment installed.
- x. The Contractor shall provide all passwords for any system or equipment that may use or be locked with a password.
- y. The Contractor shall provide to the owner a completed warranty card with filled in information for every installed device where the original manufacture provides a product warranty over and above the Contactor's required warranty.
- z. The Contractor must have CTS-I and CTS-D on Staff with current certification.

#### B. Local Sound Reinforcement System Specific Requirements and Techniques

- a. All cabling located above ceilings shall be tied off to and supported by ceiling supports or other structures at a minimum of eighteen inches above the ceiling.
- b. Cabling shall be placed in conduit where exposed in gym roof joist. Exposed cables shall not be allowed.
- c. Provide shaft locks or security covers, as required by the Consultant, on non-user operated equipment having front panel controls. Install at the conclusion of Acceptance Testing.
- d. Install XLR type connector wired pin 2 high, pin 3 low, and pin 1 shield.
- e. Loud-speaker suspension
  - i. Speakers shall be suspended in a safe, secure and permanent manner

f. Special Audio Techniques

- i. The Contractor shall float cable shields at the output of source devices for line level and audio signals and connect it at inputs. In the installation of equipment and cables, consideration shall be given not only to operation efficiency but also to overall aesthetic factors. Coordination of personnel and subcontractors associated with any part of construction, delivery, installation or testing. Tests and adjustments, written reports, system demonstration to Owner or Owner's agent and final system as-built documentation

g. Audio System Adjusting

- i. Prior to energizing or testing the system, ensure the following:
  1. All products are installed in a proper and safe manner per the manufacturer's instructions.
  2. Dust, debris, solder, splatter, etc., is removed.
  3. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
  4. All products are neat, clean and unmarred and parts securely attached.
  5. Electronic devices re properly grounded.
- ii. Prior to energizing the system, perform the following tests in compliance with applicable EIA standards. Record the results of each test in the Project Record Manual. Test each AC power receptacle with a circuit checker for proper hot, neutral and ground connections. Measure the impedance of each speaker line leaving the equipment racks. For full range devices, use a frequency of 1000 Hz, for band limited devices, use a frequency appropriate for the operating range of the transducer. When documenting the results of these tests, include the calculated impedance based on number of units on a line and the size and distance of the run. Correct any field readings that differ more than 20% from the calculated impedance.
  1. Speaker Polarity Verification Test

- i. Use an electronic polarity checker to test each reinforcement speaker. All speakers should have the same relative polarity.

## 2. Remote Input Verification Test

- (1) Using a microphone or portable signal generator, connect to each microphone receptacle throughout the facility.
- (2) Verify that the receptacle under test appears at the correct position on the microphone mixer and is operating properly.
- (3) In a similar manner, check all remote line inputs for correct wiring and labeling.

## iii. System Equalization

1. Using a TEF 20, SYSID, or a spectrum analyzer with both 1/3 band and narrow band display, equalize all loudspeaker systems to provide a suitable frequency response as follows:
2. Flat from 45hz to 2khz with a 1db per 1/3 octave roll off.
3. Mark normal settings for each device and record settings in the Project Record Manual.
4. Verify system gain and amplifier levels.
  - (1) When all the above tests have been completed and the system is ready for inspection, formally notify the Owner's Representative at least seven working days prior to inspection. Include in this notice copies of all data recorded, date each test was completed and the results of each test. All test data shall be available during the inspection process.

## h. Test Equipment

- i. Prior to start of testing, provide a list to the Owner's Representative of test equipment make, model numbers and calibration dates that shall be used. Furnish the following equipment as requested during final test verification by the Contractor and Owner's representative. The Equipment is to be available for the entire test period through the final system testing.
- ii. Sound-Level Meter: ANSI S1.4-1971 Type S1A with digital or analog display. Meter to provide ranges of 40 to 120 dBA.

- iii. Pink Noise Source – Equal energy per octave bandwidth 20 HZ to 20,000 Hz, □ 2 dB per day.
- iv. Impedance Meter – Capable of testing audio lines at three frequencies, minimum, between 250 Hz and 4k Kz. Measurement Range: 1 ohm to 100 kohms.
- v. Multimeter – Measurement range, DC to 20kHz, 100mV to 300V, 10ma to 10A.
- vi. Provide two portable VHF or UHF business band radios for use during acceptance testing with transmission range sufficient to cover entire project. Include rechargeable batteries and re-charger along with holster for wearing on belt. Radios to be available for duration of testing process, including any follow-up visits required prior to final acceptance

### 3.1 EXAMINATION

#### A. The Contractor's responsibilities:

- a. This is both new Construction and Additions and Renovations
- b. The Contractor shall examine all related construction documents and ensure compliance to them.
- c. The Contractor shall coordinate their installation schedule to comply with General Contractor’s timeline.
- d. The Contractor shall examine the project construction schedule against their need for sequences of completed spaces and coordinate those needs with the General Contractor. Example: MER and TR closets, etc.
- e. The Contractor shall coordinate their work with other trades to facilitate a seamless installation.

### 3.2 PROTECTION

#### A. Equipment

- a. The Contractor shall coordinate with other trades to provide an acceptable environment for installed equipment. For example, provide a dust free environment for VCRs, laser disk players, CD players, etc.
- b. Cover installed equipment racks for protection during high dust periods.
  - ii. Do not operate equipment with fans during high dust periods.

- iii. Coil and protect cabling from damage prior to termination to equipment.

### 3.3 INSTALLATION & CONSTRUCTION

#### A. Procedures & Methods

1. The Contractor shall provide rack shelves or rack mounting ears for any equipment that is not rack mountable. All equipment installed using shelves shall be fastened to the rack shelf. If Velcro is used to fasten any equipment the Velcro must be affixed with self-fastened screws. Adhesive is not an acceptable means to fasten any equipment.
2. All equipment installed within the equipment racks shall be fastened in an approved manner with serviceability in mind.
3. Supplementary equipment within equipment racks, such as special assemblies that are not rack mountable or fastened to rack shelves shall be mounted on painted black high grade wooden boards running vertically on side rails of equipment racks. The same wooden strips shall also be used to support cable tie support bars for lacing cables to equipment.
4. All equipment mounting boards in head-end rooms, MER's, electrical, or TR closets shall be painted white or black as location dictates with fire retardant paint. The mounting boards shall be made of high-grade plywood.
5. Equipment shall be mounted into racks and consoles, and fully wired and tested, before delivery to job site.
6. With the installation of equipment and cables, consideration shall be given not only to operation efficiency but also to overall aesthetic factors to comply with industry standards and practices.

#### B. Special Techniques & Requirements

1. The Contractor shall build a typical classroom mockup complete in detail for review by the Owner and Consultant prior to their final equipment install in the rest of the facility. Once reviewed and accepted this mockup shall be the approved configuration model to install in the remaining typical classrooms.
2. Programming the Control System.
  - i. SchoolView provides a project checklist of items that must be completed prior to software install. This checklist should be used. It includes needed information for preload prep of the software and but not limited to device IP programming requirements, etc. The Contractor shall adhere to this checklist.

- ii. The Consultant makes periodic site progress inspections. Schedule one of these inspections to coincide with and just before software installation.
- iii. Coordinate with the Independent School District IT staff the assigned data port numbers for use with the IMS system. There shall be two V-LANs one shall be for IP Video and the other Control and IP Audio. The Contractor shall know the port numbers and make sure the patch cables are connected to the correct ports.
- iv. Be sure to have a Laptop computer with SchoolView “Campus Tools” loaded.

### 3. Equipment Programming and Configuration

- i. Most of the network devices (black boxes) that makeup the IP signal platform is what is commonly called “Network Appliances”, these devices are relatively ease to configure and connect. Each box has very similar needs and requires the same basic understanding to configure. In most every case where the device you are installing has a data network port you shall need to configure the following:
  - a. Device IP Address (This shall be assigned by the School Independent School District)
  - b. Network Subnet Mask (This shall be assigned by the School Independent School District)
  - c. Default Gateway (This shall be assigned by the School Independent School District)
- ii. The School Independent School District’s IT department shall provide you with the above needed information in IP ranges it shall be up to the contractor to assign and track what box got what IP address and what room it went into.
- iii. When the boxes have been configured and are live on the network additional configuration shall be loaded via the network. SchoolView shall provide a CD with Campus Tools and additional CD or Thumb Drive that contains an automated load process. Following the load instructions shall upload final configuration to the individual boxes across the network.

### 4. Wire and Cable Requirements

- i. Cable installation must follow related TIA/EIA standards and recommendations, including methodology as noted in TIA/EIA 569 - Part

4.6 Ceiling Pathways. Specifically, including sections 4.6.1 General, 4.6.2 Design Guidelines, and 4.6.5 Cable Support.

- ii. All cables, regardless of length, shall be marked with indelible color-coded labels at each end. Labels shall be directly hot stamped or factory-stamped, closed sleeve method. Adhesive strip labels may only be used if protected by transparent heat-shrink tubing.
- iii. There shall be no unmarked cables at any place in any part of any system this includes both in equipment racks and outside of equipment racks. Label markings codes used on cables shall correspond and be shown clearly on as built drawings.
- iv. All cables shall be separated into like groups according to signal or power levels and routed separately to eliminate signal contamination and cross-talk, this includes both in equipment racks and outside of equipment racks.
- v. All power cables, control cables, and high level cables shall be grouped to one side of the equipment rack while low level cables shall be grouped to the other side.
- vi. All equipment rack wiring and cabling shall be neatly laced, ends dressed with heat shrink tubing, and all cables shall have service loops between the horizontal tie bar and the connection to equipment. Rack cabling shall be adequately supported with tie wraps or Velcro wire wraps and horizontal support bars to rack frame as it enters or exits the front or back of equipment.
- vii. Cables between cable support bars and equipment shall have a minimum of 3” of sag between the bar and connector and be consistent with other cables installed in the rack.
- viii. All cables within equipment racks shall use Velcro wire wraps to manage and bundle cables. Velcro strips shall be no more than a ¼” wide.

5. Equipment and Cable Labels:

- a. All Cables shall be labeled each end and referenced on the As-Built Drawings
- b. All wall plates shall be labeled with Input and Output identifications and referenced to corresponding operational software or hardware it serves.
- c. Provide all proposed wording and / or numbering scheme for labeling to the Consultant for review and written approval prior to procurement or installation.

- d. All labels used must be permanent and secure. Provide labeling as follows unless otherwise noted in a specific section.
- e. Provide engraved Lamacoid labels at the front of all equipment mounted in the racks.
- f. Labels shall indicate equipment type and model number and correspond to the As-Built drawings for equipment identification. Mount labels on the equipment rack, not on the equipment, and attach in a neat, plumb, and permanent manner. The labels shall be placed on the equipment rack vertical frame (post). If the equipment rack vertical posts have a recessed mid section, then match label width to fit this recessed section.
- g. Labels shall be uniform in size.
- h. All adjacent labels shall be sized to match the other labels used for same purpose.
- i. Similarly, provide engraved labels of like size in other locations.
- j. Provide engraved Lamacoid labels on each equipment rack rear door or console rear panel reading "No user serviceable parts. Refer service to qualified technician".
- k. All label lettering shall be a minimum of .08" high.
- l. Embossed adhesive labels are not acceptable.
- m. Position at the left side front top rack space of each equipment cabinet a label that states the name of system **Installer** with contact information.
- n. Unless otherwise noted, labels on dark panels shall be black with white letters. Labels on stainless steel or brushed natural aluminum plates or light colored panels shall be white with black lettering.
- o. All wall plates shall have input and output connectors labeled in a professional and permanent manner, no hand written labels shall be accepted.
- p. Cable and Jack labels shall include room identification with unique cable number, jack location within the room, and MER or TR number.
- q. The Contractor shall use actual room identifications in their labeling scheme. Contractor shall obtain written approval from the Owner for the actual room numbers, and labeling scheme, to be used prior to installation.

- r. Switches, connectors, jacks, receptacles, outlets, cables and cable terminations shall be logically and permanently marked in a manner approved by the Consultant. Custom panel nomenclature shall be engraved, etched, or screened. Markings for these items are purposely detailed in the construction drawings to ensure consistency and clarity. Verify markings and placement with the Consultant prior to procurement. Submit label sample layouts for Project Consultant's review.
  - s. All labeling information shall appear on the As-Built drawings.
6. Service Loops
- a. Provide ample service loops at each termination so that plates, panels, and equipment can be removed for service, re-termination or inspection. Provide the following as a minimum:
    - b. Wall plate outlet box: minimum of ten (10) inches from wall surface to jack.
    - c. Termination panel: Six (6) inches behind termination panel from cable tie to jack.
7. Connections and Connectors
- a. Connections shall be made with approved connectors on cables, terminal blocks, or punch blocks. Crimp style connectors shall be made with proper crimping tool.
  - b. Cables shall be terminated with the proper connector specifically produced for use with each type of cable.
  - c. Connector adapters shall not be allowed in any part of the system.
  - d. RF cable connectors shall be made with hex crimp.
  - e. Two point crimps shall not be accepted.
  - f. Solder joints shall be made with rosin-core solder.
  - g. Mechanical connectors must be specially made for type of cable or wire used.
  - h. Twist on connectors shall not be allowed

### **3.4 CLOSE-OUT QUALITY CONTROL**

- A. The following should be complete and in place before final system inspection & demonstration is scheduled and performed with Owner's Consultant:

- i. Contractor has provided substantial completion report to Consultant.
  - ii. All equipment shall be operating normally.
  - iii. All equipment software is installed and configured.
  - iv. All electronic devices are properly grounded.
  - v. All powered devices have AC power from the proper circuit.
  - vi. All patch cables and jumpers are in place.
  - vii. Insulation and shrink tubing are present on cable ends.
  - viii. Equipment labels are in place.
  - ix. The system documentation is complete with "as- built" drawings available.
  - x. Dust, debris, solder splatter, etc. is removed.
  - xi. All cables are dressed, routed, and labeled; all connections are consistent with regard to polarity.
  - xii. To the best of the Contractors knowledge, all contractual system specifications are fully met, in detail and intent.
- a. Contractor Testing prior to Consultant proof-of-performance inspection
- i. The installing Contractor shall test the systems prior to Consultant proof-of-performance inspection to include but not limited to the following:
    - 1. IP boxes have been configured and contractor has IP assignment tables
    - 2. Confirm audio from PA to each speaker zone by zone
    - 3. Both the touch panel microphone and PTT microphone works
    - 4. Audio from Bell is functional
    - 5. Audio from CD player and radio tuner with control of each
    - 6. Synchronize Clock control is communicating

7. Video Display Control is working
8. Video broadcast cart key switch works
9. Audio from video broadcast cart is in hallways and classrooms
10. All video displays responded and received broadcast event
11. Remote audio from local sound systems are receiving PA and Bell
12. IMS PA is receiving remote audio from local sound systems
13. Automated power up functions are working for remote sound systems
14. The telephone interface works and contractor has the number
15. CCTV IP address are entered into the touch panel
16. Classroom wall controllers are programmed and function
17. IP streaming channel line up is programmed and works
18. Confirm each classroom input is operational
19. Confirm digital signage (Common area LCD TV) are operational
20. Test each video source device in the IP video delivery system

B. System Documentation

- a. Prior to final acceptance by Owner, all system closeout documentation must be delivered and made available during final acceptance walkthrough.
  - i. As-Built drawings
  - ii. Equipment Manuals
  - iii. All documentation requirements stated in the Submittal requirements shall be updated and made a part of the As-built documents.
  - iv. Final Acceptance Testing Verification

1. Acceptance Testing shall be the responsibility of and performed by the Contractor in the presence of the Consultant and other Owner's representatives. Coordinate this testing so that free access, work lighting, and electricity are available on the site.
  - i. Fully balance all audio systems as directed by the consultant. This also means that all room amplifiers shall be set for equal audio level in the room with equal audio input
  - ii. The Contractor must complete all previous punch-list items prior to final acceptance test verification by the Owner and Consultant.

### **3.5 CLEANING**

#### **A. Prior to system turnover to Owner:**

1. Remove all dirt and debris from equipment racks and equipment rooms.
2. Clean all equipment filters, vents, and fans.
3. Clean all enclosures and back box interiors thoroughly before installing plates, panels, or covers.

### **3.6 DEMONSTRATION**

#### **A. The Contractor shall be responsible for the following:**

- a. The contractor shall demonstrate all systems to the owner and owner's representatives. This demonstration shall occur after all the submittal documents are supplied, including As-Built drawings, substantial completion report, and test results, and after notifying the Consultant in writing that the system meets the specification and is complete and ready for verification.
- b. Demonstrate operation of each major component and functional requirement as specified herein. If any portion of the system does not appear to be functioning properly, further test, along with corrective actions shall be performed by the Contractor. If the need for further adjustments becomes evident during the demonstration and testing, the demonstration shall be discontinued until the system operates properly.
- c. The Contractor shall remain responsible for all equipment, labor, hardware and documentation, in part and in total, until Owner accepts such work or material in writing.

- d. The Contractor shall be responsible for equipment adjustments to ensure normal and proper operation. Owner required system adjustments shall be made by the Contractor as directed by Owner or Project Consultant during final testing.
- e. Provide a minimum of two (2) installation technicians to assist the Owner or Project Consultant, as required during final test verification and final acceptance walkthrough. The technicians shall be equipped to perform necessary corrections to the system. They shall have test equipment capable of testing any and all parts of the equipment, cabling, or systems.
  - i. The technicians shall be prepared to make final adjustments as directed by the consultant. Equipment adjustments may be either electrical or physical
- f. The Contractor shall provide test equipment during final acceptance walkthrough. Minimum required test equipment shall include but not be limited to the following:
  - i. Multi test meter for reading AC / DC voltage and continuity
  - ii. Sound level db meter
  - iii. Audio signal tracer (powered speaker)
  - iv. Portable video monitor
  - v. Tone and pink noise generator
  - vi. Real Time Audio Analyzer (RTA)
  - vii. An acoustic polarity pulsing phase tester
  - viii. Three (3) two-way radios for communications between Contractor and Consultant

END OF SECTION