Meriden Public Library
AV & DIGITAL MEDIA EQUIPMENT

105 Miller Street
Meriden, Connecticut

Bid # B024-17R

Bids Due: April 10, 2024

PROJECT MANUAL
Dated 3/4/2024

TSKP STUDIO ARCHITECTURE | PLANNING | INTERIORS

LEGAL NOTICE

INVITATION TO BID

The City of Meriden is accepting sealed bids for:

B024-17R – Meriden Public Library AV & Digital Media Equipment

The City of Meriden, Library Department is seeking competitive bids for delivery and installation of AV equipment for the Meriden Public Library.

Bids shall be submitted on forms and in the manner specified. Forms and bid documents may be obtained from the Purchasing Department, on the City of Meriden website (www.meridenct.gov/business/bids-rfps/), and on the State of Connecticut Department of Administrative Services website (https://webprocure.proactiscloud.com). Bids will be accepted at the Purchasing Department, 142 East Main Street, Room 210, Meriden, Connecticut 06450 until **11:00 A.M. local, eastern standard time on April 10, 2024,** at which time they will be publicly opened and read. Any bid received after the time and date specified shall not be considered. See Bid Form for other deadlines.

The right is reserved to reject any or all bids, in whole or in part, to award any item, group of items, or total bid, and to waive informality or technical defects, if it is deemed to be in the best interest of the City of Meriden. No bidder may withdraw its bid within ninety (90) days of the date of the bid opening. Upon award of the bid, the winning bidder shall be bound by the bid proposal price throughout the contract period.

Each bid shall be accompanied by a Certified Check or Bid Bond in the amount of Five (5%) percent of the amount bid. Labor and Material Payment Bond and a Performance bond for One Hundred Percent (100%) of the contract price, with a corporate surety approved by the City of Meriden, will be required of the lowest responsible bidder.

The attention of bidders is called to the requirement for minimum State Prevailing Fair Wage Provisions (C.G.S. 31-53), to be paid under this contract.

This contract is subject to state set-aside and contract compliance requirements.

This Project is funded in part by State funds provided by the Connecticut State Library.

The City of Meriden is an Affirmative Action/Equal Opportunity Employer. Disadvantaged, minority, small, and women business enterprises are encouraged to respond.

Rawle Dummett
Purchasing Officer, City of Meriden, CT 06450-8022
Dated: March 6, 2024

SUPPLEMENTAL INSTRUCTIONS & INFORMATION TO BIDDERS

OWNER	City of Meriden 142 East Main St Meriden, CT 06450
PROJECT SITE LOCATION	Meriden Public Library 105 Miller Street Meriden, CT
ARCHITECT	TSKP Studio T.W. Iglehart, AIA 146 Wyllys Street, Suite 1-203 Hartford, CT 06106 twiglehart@tskp.com
AV CONSULTANT	Jaffe Holden Michael Markley 114-A Washington Street Norwalk, CT 06854 mmarkley@jaffeholden.com
PURCHASING AGENT	Rawle Dummett Purchasing Officer City of Meriden 142 East Main St, Room 210 Meriden, CT 06450 rdummett@meridenct.gov

SUPPLEMENTAL INSTRUCTIONS

1. **DRAWINGS**
   As listed in the Table of Contents at the front of this document prepared by TSKP Studio, Architects.

2. **SPECIFICATIONS**
   The Specific Section(s) being quoted by Vendor and all other Specifications for the Project as prepared by the Architect and included herein.

3. **BID FORM**
   Bids to be lump sums broken down on the Bid Sheets in the format enclosed herein, with no escalation clauses allowed.

   The Owner may elect to award a contract to other than the lowest bidder if it is considered to be in the best interest of the Owner. Under no circumstances will The Owner be responsible for the cost of preparing any bid or proposal.

4. **NO BID ITEMS**
   If a Contractor fails to bid on all items listed in the Signage Bid Sheets (Interior and Exterior Signage), their bid may be disqualified.

6. **DEFINITIONS**

   Plan and Specification reference to "Contractor" means the Vendor performing work under that specific Signage Specification Section.
   Specification reference to “provide” means to furnish and install unless otherwise noted.

7. **TERMS OF PAYMENT**
   Five Percent (5%) retainage will be withheld by Owner until the Contractor’s work is complete. Retainage will be withheld until acceptance of the Signage and satisfactory completion of Contractor’s work including all punch list items and submissions of all required record documents and guarantees.

8. **SCHEDULE**
   As Noted in the Bid Form.

   Time is of the essence of the Contract. Completion of Work included in the Invitation in accordance with the Project Schedule is absolutely essential to the use and occupancy of the Project for the Owner's operations. Contractor is to include in its quotations all costs, extra crews, equipment, warehousing, etc. as required to meet schedule.

   The selected Contractor(s) shall set forth a detailed schedule, including deliveries and field installation as proposed to meet schedule. Such schedule shall be compatible with Construction Project Schedule. Contractor shall notify Owner ten (10) days in advance of delivery.

   If Contractor is behind schedule through fault of no one but itself, it shall add manpower and/or work overtime as required **i**n order to regain schedule. No compensation for such overtime or added manpower will be made.
   If Contractor is required by the Owner or **C**onstruction **M**anager to work overtime for the convenience of the Project, such overtime premium costs will be compensated except that no overhead or profit will be allowed on the premium portion of these costs.

Note that Contractor will be required to purchase and submit for approval all critical materials and equipment immediately and that at some time during the schedule subcontractor may be required to perform work out of normal sequence.

Subcontractors whose work normally is coordinated with others should make themselves aware of others' work scope.

9. COORDINATION AND JURISDICTION

The Contractor shall coordinate its work with that of other trades at all times.

10. PARKING AND ACCESS

Parking of workers', supervisors', or management employees' cars will be allowed on the site only in designated areas.
Trucks will be allowed on the actual project site only to make deliveries of material, tools, or equipment and must then leave promptly unless being used as a tool of the trade.
Exceptions with the specific approval of Construction Manager and Owner must be made in advance.

11. HOISTING

A. Hoisting is the responsibility of the Contractor.
B. Location of and scheduling of Contractor's hoisting apparatus to be coordinated with Project Superintendent.

12. CLEAN UP

Daily clean up and removal of rubbish is the responsibility of the Contractor. Contractor shall be responsible for proper disposal of all packing and crating materials off-site. Cooperation among Subcontractors is required and expected regarding cleaning of general litter. Buildings are to be kept clean at all times and failure of Contractor in this regard will result in back charges from the General Contractor for cleaning.

13. CUTTING AND PATCHING

The Contractor shall perform all cutting and patching under jurisdiction of its trade(s). Also, if cutting and patching are required as a result of Contractor's failure in the performance of the Work, the Contractor shall be responsible for the corrective cutting and patching at no cost to the City of Meriden.

14. PROTECTION AGAINST LOSS AND DAMAGE

The Contractor shall protect and secure its materials and equipment against loss, including theft. The City of Meriden will not accept any claim for alleged theft. Contractor will protect its work from damage until its work is complete for the entire project.

15. ELEVATOR USE

Use of Elevator must be coordinated with the Project Supervisor.

16. SITE VISIT & PRE-INSTALLATION MEETING

The Contractor acknowledges that prior to furnishing a proposal for the Work, it has visited the site and is familiar with conditions at the site and in the locality where the Work is to be performed which could affect its work.

Selected contractors shall be required to attend a pre-installation meeting coordinated through the Owner's Representative. At such time delivery and installation logistics will be discussed including truck delivery locations, hauling routes, and other pertinent information.

17. SAFETY PROCEDURES

The Vendors are required to follow OSHA regulations as well as their Company safety manuals.

18. EXTRA WORK

Any work that is agreed upon as being in addition to the contract for which a lump sum amount has not been agreed upon will be performed on a time and material basis. Extra work tickets must be signed on a daily basis for this work.

For any work that a contractor disputes as being part of his contract and is directed to perform, the Owner will sign daily tickets for work verification only. No consideration will be given or change order issued for any claim of extra work that is not brought to the attention of the Owner/Architect at the time the alleged extra work is being performed. The allowed mark-up for OH&P on extra work is 15% for the Contractor's own forces, 10% on sub-contractors. TOTAL ALLOWANCE 20% MAXIMUM.

INFORMATION TO BIDDERS

1. BIDDING PROCEDURES

Sealed Bids shall be submitted on the forms designated by the attached proposal bid forms. Bids will be received by the City of Meriden's Purchasing Department, Room 210, City Hall, 142 East Main Street, Meriden, Connecticut, 06450-8022 until 11:00 a.m. on April 10, 2024 and thereafter immediately read in public (the "bid opening").

2. BIDS

Bids are to be submitted on the attached proposal forms. Please submit two copies of the complete bid package. One shall be an original and one can be a copy**. Please submit one complete copy of your bid on a flash drive.**

BID WILL BE AUTOMATICALLY REJECTED FOR ANYONE SUBMITTING A SURETY OTHER THAN THOSE SPECIFIED.

a. Bids must be made out and signed in the corporate, or other, name of Bidder, and must be fully and properly executed by an authorized person.
b. The sealed envelope must denote the Bidder's name and address in the upper left hand corner and the words "**BID DOCUMENT – B024-17R Meriden Public Library AV & Digital Media Equipment 11:00a.m.**" in the lower left hand corner.
c. Bids received later than the time and date specified will not be considered.
d. Amendments to or withdrawal of bids received later than the date and time set forth in the bid opening will not be considered.
e. All prices must be in ink or typewritten. In the event of a bidder's mathematical error in tabulating any bid prices, ***the written unit prices shall govern***.

3. BIDDER QUALIFICATIONS

Bidders will be required to fill out, and include as part of its bid, any attached Bidder's Qualification Statement.

In determining the qualifications of a bidder, the City of Meriden will consider the bidder's record of performance in any prior contracts for construction work. The City of Meriden expressly reserves the right to reject a bid if the bidder's historical performance, in the sole opinion of the City of Meriden, has been unsatisfactory in any manner or if the bidder has habitually and without just cause neglected the payment of bills or has otherwise disregarded its obligations to subcontractors, suppliers, or employees.

4. EXAMINATION OF BIDDING DOCUMENTS

Bidders are to examine all documents and visit the site in order to make a thorough examination of the conditions so that the bidder may familiarize itself with all of the existing requirements, conditions, and difficulties that will affect the execution of the work in order to determine the amount of work necessary to carry out the true intent of the specifications and work shown on the drawings.

The City of Meriden and its agents do not have any responsibility for the accuracy, completeness, or

sufficiency of any bid document obtained from any other source other than from the City of Meriden. Obtaining documents from any other source(s) may result in obtaining incomplete and inaccurate information. Obtaining documents from any other source may also result in failure to receive any addenda, corrections, or other revisions to the documents that may be issued.

No request shall be honored if such request is made less than seven (7) calendar days prior to the date fixed for the opening of bids. Any and all such interpretations, and any supplementary instructions, will be in the form of a written addenda to the specifications which, if issued, will be made available on the City of Meriden website (www.meridenct.gov) unless it is to change the date fixed for the opening of bids, not later than three (3) days prior to the date fixed for the opening of bids. Bidders are encouraged to check the website regularly for addenda. Failure of any bidder to receive any such addenda shall not relieve any bidder from any obligations under its bid as submitted.

Any questions about the bid document must be submitted in writing via email to meridenpurchasing@meridenct.gov. Any other format of question will not be answered.

5. BIDS TO REMAIN OPEN

No bidder may withdraw its bid within ninety (90) days of the date of the bid opening. Should there be reason why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the City of Meriden and the successful bidder.

6. AWARD OF CONTRACT

The Purchasing Officer reserves the right to make an award on the bid which, by the Purchasing Officer's judgment and recommendation from the Library Department following bid evaluations, best meets the specifications and is deemed to be in the best interest of the City of Meriden.

The contract will not be awarded to any corporation, firm, or individual which/who is in arrears to the City of Meriden by debt or contract, or who is in default as security or otherwise by any obligation to the City of Meriden.

The right is reserved to reject any or all bids, in whole or in part, to award any item, group of items, or total bid, and to waive informality or technical defects, if it is deemed to be in the best interest of the City of Meriden.

7. BID PROTEST PROCEDURE

In the event that any bidder wishes to protest the potential award of a bid, or any procedure of act in the advertising or soliciting of the bids, said bidder must make said protest in writing, which shall state the reason therefore and request a conference with respect thereto. Said protest must be received in the City Purchasing Office within **FIVE (5)** business days after the delivery of bid results or decisions. A conference with respect to said protest shall be scheduled by the Purchasing Officer forthwith and shall be attended by him or his designee and such other persons as the Purchasing Officer and the City Manager shall require to attend. The subject matter of said conference shall be limited to the reasons for the protest specified in the written request for said conference. Said conference shall also include a discussion of all possibilities for a resolution of dispute. The City shall make a decision in writing within three (3) business days after said conference and forward the same to the protesting bidder forthwith. In the event that any protesting bidder wishes to take legal action against the City, they must fully comply with all of these

instructions to bidders.

8. CITY OF MERIDEN, LOCAL PREFERENCE

N/A

9. EXTENSION OF AGREEMENT

N/A

10. TIME

See above

11. SCHEDULE OF WORK

The Contractor shall schedule all work in a manner that will not disrupt City of Meriden operations. Once the work has begun, the Contractor shall work full-time until completion of the Contract.

12. TAXES

The City of Meriden is exempt under Connecticut General Statutes from the payment of the excise taxes imposed by the federal government and the Sales and Use Tax of the State of Connecticut; such taxes should not be included in the bid price. Upon request, exemption certificates will be furnished to the successful bidder.

13. FAIR EMPLOYMENT PRACTICES

The Contractor shall agree that neither it or its subcontractors, except in the case of a bona fide occupational qualification or need, to refuse to hire or employ or to bar or to discharge from employment any individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment because of the individual's race, color, religious creed, age, sex, gender identity or expression, marital status, national origin, ancestry, present or past history of mental disability, intellectual disability, learning disability, physical disability, including, but not limited to, blindness or status as a veteran. The aforementioned terms are obtained from Connecticut General Statutes Section 46a-60, *et seq.,* entitled "Discriminatory employment practices prohibited," as amended.

14. FORM OF AGREEMENT BETWEEN CITY OF MERIDEN AND CONTRACTOR

The Agreement for the work will be written on the Agreement between City of Meriden and Contractor, AIA A105-2017.

15. LOCAL SUBCONTRACTORS, SUPPLIERS, etc.

Local subcontractors, material suppliers, and labor in the City of Meriden should be considered and sought out insofar as it is practical in the performance of this project.

16. CITY OF MERIDEN CODE OF ETHICS

The City of Meriden has adopted a Code of Ethics located in Chapter 21 of the Code of the City of Meriden,

sections 21-1 through 21-15, inclusive, which are expressly incorporated herein by reference. The terms of the Code of Ethics shall constitute a part of any contract or agreement entered into by the City of Meriden as a result of this bid as if those terms were fully set forth in such contract or agreement.

Bidders are specifically advised that the Code of Ethics prohibits public officers and employees, as well as their immediate families and businesses, with which they are associated from participating in any transaction which is incompatible with the proper discharge of official duties or responsibilities. Bidders are also advised that the Code of Ethics contain provisions with respect to paid contractors and former employees and officials.

BIDDERS SHOULD NOTE THAT BIDS, CONTRACTS, AND AGREEMENTS ENTERED INTO OR AWARDED IN VIOLATION OF THE CODE OF ETHICS ARE VOIDABLE BY RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MERIDEN.

Copies of the Code of Ethics may be obtained from the office of the City Clerk or may be found online on the City of Meriden's website.

17. NON-COLLUSION BID STATEMENT

Each bidder submitting a bid to the City of Meriden for any portion of the work contemplated by the documents on which bidding is based shall execute and attach thereto the sworn Non-Collusive Bid Statement, to the effect that the bidder has not colluded with any other person, firm, or corporation in the submission of the bid.

18. SOIL CONDITIONS

The City of Meriden does not guarantee the accuracy of any information which it may have obtained as to the kind or condition of the soil that may be encountered in the performance of the proposed work; neither does the City of Meriden represent that the plans and specifications drawn are based upon any soil data so obtained. The City of Meriden does not make any representations as to the soil data so obtained. The City of Meriden does not make any representations as to the soil conditions to be encountered or as to foundation materials.

19. AWARD IN CASE OF A TIE

In the event there are two or more responsive bidders, the decision to award will be based by the following criteria and in the following order:

a. The incumbent will be awarded the bid over that of another bidder.
b. In the case of a multi-item bid, if one bidder has been awarded other items from the same bid and the other bidder has not, the bidder with the multiple awards will be awarded the bid over that of another bidder.
c. The bidder located in the State of Connecticut will be awarded the bid over that of another bidder.
d. The winner of a coin toss will be awarded the bid over that of another bidder.

20. ASSIGNMENT OF CONTRACT

No contract may be assigned without the written consent of the Purchasing Officer or designee.

21. PERMITS

The Contractor shall be responsible for obtaining any and all necessary permits required by the City of Meriden prior to the commencement of work. The Contractor may contact the City of Meriden Building Department for permit information at (203) 630-4091. For all other required permits, contact the City of Meriden Engineering Department at (203) 630-4018.

22. BID PRICE AND PAYMENT

The City of Meriden is exempt from the payment of the excise taxes imposed by the Federal government and the Sales and Use Tax of the State of Connecticut under Connecticut General Statutes; accordingly, such taxes shall not be included in the bid price.

The City of Meriden, unless stated otherwise in the bidding documents or Contract, will make payment to the Contractor not less than thirty (30) days following completion of services.

23. QUALITY

All materials, equipment, supplies, and services shall be subject to rigid inspection. If defective material, equipment, supplies, or services are discovered, the Contractor shall remove or make good such material, equipment, or supplies without extra compensation. It is expressly understood and agreed that any inspection by the City of Meriden will in no way lessen the responsibility of the Contractor or release Contractor from the obligation to perform and deliver to the City sound and satisfactory materials, equipment, supplies, or allow the cost to be deducted from any monies due it from the City of Meriden. All services will be performed in a workmanlike manner.

24. INSURANCE

The successful bidder shall be required to provide a Certificate of Insurance denoting general liability, automobile liability, workers compensation liability, and other coverage required by the City's Risk Manager.

25. CITY HALL CLOSING

If Meriden City Hall is closed due to inclement weather, or any other unforeseen event, bids will be due at the same time on the next business day that City Hall is open.

26. PAYMENT REQUISITIONS & CERTIFIED PAYROLL

Progress payment requisitions are due monthly on last day of the month for work completed during the contract period. Requisitions are to be sent to the Architect/Engineer and/or City of Meriden Department responsible for management/administration of the contracted work.

Certified Payroll for construction contracts that require State of Connecticut Prevailing Wage Determinations are required for each week of work by the Contractor and any or all the Contractor's Subcontractors and are due monthly with each requisition. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden Purchasing Department. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

For federally funded construction contracts with Davis Bacon Wage Determinations, Certified Payroll for all employees of the Contractor and any or all of the Contractor's Subcontractors are required to be submitted weekly to the Architect/Engineer and to the City of Meriden Purchasing Department. One hard copy and one electronic copy shall be sent to the Architect/Engineer and the City of Meriden Purchasing Department. Employees on the construction site will be interviewed by City of Meriden Staff and/or City of Meriden subcontracted Project Management/Clerk-of-the-Works/Owner's Representatives for Davis Bacon compliance. No progress payments will be issued to the Contractor without accompanying Certified Payroll.

27. CHRO

The contractor who is selected to perform this State project must comply with CONN. GEN. STAT. §§ 4a-60, 4a-60a, 4a-60g, and 46a-68b through 46a-68f, inclusive, as amended by June 2015 Special Session Public Act 15-5. An Affirmative Action Plan must be filed with and approved by the Commission on Human Rights and Opportunities prior to the commencement of construction. State law requires a minimum of twenty-five (25%) percent of the state-funded portion of the contract for award to subcontractors holding current certification from the Connecticut Department of Administrative Services ("DAS") under the provisions of CONN. GEN. STAT. § 4a-60g, as amended. (25% of the work with DAS certified Small and Minority owned businesses and 25% of that work with DAS certified Minority, Women and/or Disabled owned businesses.) The contractor must demonstrate good faith effort to meet the 25% set-aside goals. For municipal public works contracts and quasi-public agency projects, the contractor must file a written or electronic non-discrimination certification with the Commission on Human Rights and Opportunities. Forms can be found at http://www.ct.gov/opm/cwp/view.asp?a=2982&q=390928&opmNav_GID=1806.

CITY OF MERIDEN, CONNECTICUT

INSURANCE REQUIREMENTS

Contractor shall agree to maintain in force at all times during the contract the following minimum coverages and shall name the City of Meriden as an **Additional Insured on a primary and non-contributory basis** to all policies except Workers Compensation and Professional Liability. All policies should also include a Waiver of Subrogation. Umbrella/Excess shall state that it follows form over General Liability, Auto Liability and Workers Compensation. Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum AM Best's rating of "A-"VIII. In addition, all Carriers are subject to approval by the City of Meriden.

		(Minimum Limits)
General Liability	Each Occurrence	$1,000,000
	General Aggregate	$2,000,000
	Products/Completed Operations Aggregate	$2,000,000
Auto Liability	Combined Single Limit Each Accident	$1,000,000
Umbrella (Excess Liability)	Each Occurrence Aggregate	$1,000,000 $1,000,000
Workers' Compensation and Employers' Liability	WC Statutory Limits EL Each Accident EL Disease Each Employee EL Disease Policy Limit	 $1,000,000 $1,000,000 $1,000,000
Errors & Omissions	Each Occurrence	$1,000,000

Original, completed Certificates of Insurance must be presented to the City of Meriden prior to contract issuance. Contractor agrees to provide replacement/renewal certificates at least 60 days prior to the expiration date of the policies.

MERIDEN PUBLIC LIBRARY RENOVATIONS –

BID FORM
Audio Video Systems – Phase II
City of Meriden Bid No. B24-17R

To: Rawle Dummett
Purchasing Officer
142 East Main St, Room 210
City of Meriden, CT 06450-8022

Bid of: _____ (Name of Company)

Bid Opening Date:_____

In compliance with the Bid Documents as defined in the **Project Manual Dated 3-4-2024**, the undersigned Contractor (the "Bidder") hereby proposes and agrees to fully perform the work described in the Bid Documents within the time stated and in strict accordance with the Bid Documents for the above referenced Project, for the sum(s) of money identified in this Bid Form.

All sealed Bids shall be submitted no later than **11:00 AM April 10, 2024** as described in the Invitation to Bid

Other Deadlines
Bidder questions: April 4, 2024
Final Addenda postings: April 8, 2024

This Bid is submitted on the basis that it may not be withdrawn or modified for **Ninety (90) Days after the Bids for the Project are opened.**

Furthermore, the undersigned Bidder declares the Project Site, the Invitation to Bidders, the Drawings, Specifications, Addenda, and the availability of material and labor has been carefully examined and agrees to furnish and install furniture as specified and scheduled, including all supervision, material, labor, tools, apparatus and implements, freight, permits, removal of debris, and cartage. The undersigned Bidder also agrees to complete the Work in accordance with the Contract Documents within the time limit stated below.

See Supplemental Instructions and Information to Bidders regarding substitutions and required submittals.

After review of all factors, terms and conditions, including price, the purchasing authority of the City of Meriden reserves the right to reject any and all bids, or any part thereof, or waive defects in same, or accept any proposal deemed to be in the best interest of the **City of Meriden**.

BID

BASE BID: $_____ (_____ Dollars)

ALTERNATE #1: $_____ (_____ Dollars)

ALTERNATE #2: $_____ (_____ Dollars)

ALTERNATE #3: $_____ (_____ Dollars)

ALTERNATE #4: $_____ (_____ Dollars)

ALTERNATE #5: $_____ (_____ Dollars)

ADDENDUM RECEIPT

It is the bidder's responsibility to monitor the City of Meriden's website for all addenda The City or its agents or contractors have no obligation to deliver copies to potential bidders.

The undersigned Bidder acknowledges receipt of the following addenda:

Addendum No. 1 dated _____, 2024 Signature_____

Addendum No. 2 dated _____, 2024 Signature_____

Addendum No. 3 dated _____, 2024 Signature_____

Addendum No. 4 dated _____, 2024 Signature_____

BID BOND

The Bidder shall submit a Bid Bond, Certified Check or Bank Check in the amount of **5%** of the Bid.

PERFORMANCE AND PAYMENT BOND

The Owner will require that a 100% Performance and Payment Bond be submitted by the Contractor prior to the commencement of work.

FORMS

- **Bid Form**

The successful bidder shall provide the following within five (5) business days after receipt of a notice of award from the Purchasing Department:

(i) the requested Certificate of Insurance from the following company:

_____;
And

(ii) Payment and Performance Bonds from the following company:_____.

Within five (5) business days after receipt of final contract from City, we will forward to the Purchasing Department four original contracts, in the a form provided by the City, executed by an authorized officer.

PENALTIES/DELIVERY DELAYS

In the event that deliveries are not completed during the completion installation date stated herein, Owner reserves the right to deduct up to 5% of the contract cost off the invoice balance of the delayed items for each day delayed.

In addition, for any items not received during the required time, which the Owner deems necessary for the library opening, the vendor will loan, at no additional cost, substitutes, which are acceptable to the Owner.

DATE OF BID: SIGNATURE OF BIDDER

Name of Bidder _____
Signed _____
Title _____
E-mail _____

Telephone No._____

Mailing Address:

State of ( )
County of ( )

On this _____ day of _____, 2024,

Personally appeared before me

(*_____)
(Name of Person Signing)

(**_____ of _____)
(Title) (Name of Bidder)

signed of the foregoing bid and acknowledged the same to be his free act and deed ** (as such officer and the free act and deed of said corporation) before me.

Notary Public

* The Bid must be signed by the Bidder if the Bidder is an individual, by one of the partners, if a partnership, by an authorized officer if a corporation. The person signing must state the capacity in which he signs at the place indicated.

** If the Bidder is a corporation, the blanks enclosed in parentheses in the acknowledgement should be filled in with the name of the corporation, corporate seal, and the title of the person signing. If the Bidder is an individual or partnership, the parentheses should be disregarded.

AIA® Document A105™ – 2017

Standard Short Form of Agreement Between Owner and Contractor

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

The Architect:
(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contractor shall complete the Work described in the Contract Documents for the Project. The Contract Documents consist of

.1 this Agreement signed by the Owner and Contractor;

.2 the drawings and specifications prepared by the Architect, dated , and enumerated as follows:

Drawings:

Number	Title	Date

Specifications:

Section	Title	Pages

.3 addenda prepared by the Architect as follows:

Number	Date	Pages

.4 written orders for changes in the Work, pursuant to Article 10, issued after execution of this Agreement; and

.5 other documents, if any, identified as follows:

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The Contract Time is the number of calendar days available to the Contractor to substantially complete the Work.

§ 2.2 Date of Commencement:
Unless otherwise set forth below, the date of commencement shall be the date of this Agreement.
(Insert the date of commencement if other than the date of this Agreement.)

§ 2.3 Substantial Completion:
Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion, as defined in Section 12.5, of the entire Work:
(Check the appropriate box and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement.

[ ] By the following date:

ARTICLE 3 CONTRACT SUM

§ 3.1 The Contract Sum shall include all items and services necessary for the proper execution and completion of the Work. Subject to additions and deductions in accordance with Article 10, the Contract Sum is:

($)

§ 3.2 For purposes of payment, the Contract Sum includes the following values related to portions of the Work:
(Itemize the Contract Sum among the major portions of the Work.)

Portion of the Work	Value

§ 3.3 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and hereby accepted by the Owner:
(Identify the accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 3.4 Allowances, if any, included in the Contract Sum are as follows:
(Identify each allowance.)

Item	Price

§ 3.5 Unit prices, if any, are as follows:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

ARTICLE 4 PAYMENTS

§ 4.1 Based on Contractor's Applications for Payment certified by the Architect, the Owner shall pay the Contractor, in accordance with Article 12, as follows:

(Insert below timing for payments and provisions for withholding retainage, if any.)

§ 4.2 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate below, or in the absence thereof, at the legal rate prevailing at the place of the Project.
(Insert rate of interest agreed upon, if any.)

 %

ARTICLE 5 INSURANCE

§ 5.1 The Contractor shall maintain the following types and limits of insurance until the expiration of the period for correction of Work as set forth in Section 14.2, subject to the terms and conditions set forth in this Section 5.1:

§ 5.1.1 Commercial General Liability insurance for the Project, written on an occurrence form, with policy limits of not less than ($) each occurrence, ($) general aggregate, and ($) aggregate for products-completed operations hazard.

§ 5.1.2 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than ($) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance, and use of those motor vehicles along with any other statutorily required automobile coverage.

§ 5.1.3 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided that such primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 5.1.1 and 5.1.2, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 5.1.4 Workers' Compensation at statutory limits.

§ 5.1.5 Employers' Liability with policy limits not less than ($) each accident, ($) each employee, and ($) policy limit.

§ 5.1.6 The Contractor shall provide builder's risk insurance to cover the total value of the entire Project on a replacement cost basis.

§ 5.1.7 Other Insurance Provided by the Contractor
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ 5.2 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance and shall provide property insurance to cover the value of the Owner's property. The Contractor is entitled to receive an increase in the Contract Sum equal to the insurance proceeds related to a loss for damage to the Work covered by the Owner's property insurance.

§ 5.3 The Contractor shall obtain an endorsement to its Commercial General Liability insurance policy to provide coverage for the Contractor's obligations under Section 8.12.

§ 5.4 Prior to commencement of the Work, each party shall provide certificates of insurance showing their respective coverages.

§ 5.5 Unless specifically precluded by the Owner's property insurance policy, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, suppliers, agents, and employees, each of the other; and (2) the Architect, Architect's consultants, and any of their agents and employees, for damages caused by fire or other

causes of loss to the extent those losses are covered by property insurance or other insurance applicable to the Project, except such rights as they have to the proceeds of such insurance.

ARTICLE 6 GENERAL PROVISIONS

§ 6.1 The Contract

The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written modification in accordance with Article 10.

§ 6.2 The Work

The term "Work" means the construction and services required by the Contract Documents, and includes all other labor, materials, equipment, and services provided, or to be provided, by the Contractor to fulfill the Contractor's obligations.

§ 6.3 Intent

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

§ 6.4 Ownership and Use of Architect's Drawings, Specifications and Other Documents

Documents prepared by the Architect are instruments of the Architect's service for use solely with respect to this Project. The Architect shall retain all common law, statutory, and other reserved rights, including the copyright. The Contractor, subcontractors, sub-subcontractors, and suppliers are authorized to use and reproduce the instruments of service solely and exclusively for execution of the Work. The instruments of service may not be used for other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Architect.

§ 6.5 Electronic Notice

Written notice under this Agreement may be given by one party to the other by email as set forth below.
(Insert requirements for delivering written notice by email such as name, title, and email address of the recipient, and whether and how the system will be required to generate a read receipt for the transmission.)

ARTICLE 7 OWNER

§ 7.1 Information and Services Required of the Owner

§ 7.1.1 If requested by the Contractor, the Owner shall furnish all necessary surveys and a legal description of the site.

§ 7.1.2 Except for permits and fees under Section 8.7.1 that are the responsibility of the Contractor, the Owner shall obtain and pay for other necessary approvals, easements, assessments, and charges.

§ 7.1.3 Prior to commencement of the Work, at the written request of the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence.

§ 7.2 Owner's Right to Stop the Work

If the Contractor fails to correct Work which is not in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work until the correction is made.

§ 7.3 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case, the Architect may withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the cost of correction, provided the actions of the Owner and amounts charged to the Contractor were approved by the Architect.

§ 7.4 Owner's Right to Perform Construction and to Award Separate Contracts

§ 7.4.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project.

§ 7.4.2 The Contractor shall coordinate and cooperate with the Owner's own forces and separate contractors employed by the Owner.

ARTICLE 8 CONTRACTOR

§ 8.1 Review of Contract Documents and Field Conditions by Contractor

§ 8.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 8.1.2 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner. Before commencing activities, the Contractor shall (1) take field measurements and verify field conditions; (2) carefully compare this and other information known to the Contractor with the Contract Documents; and (3) promptly report errors, inconsistencies, or omissions discovered to the Architect.

§ 8.2 Contractor's Construction Schedule

The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work.

§ 8.3 Supervision and Construction Procedures

§ 8.3.1 The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work.

§ 8.3.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner, through the Architect, the names of subcontractors or suppliers for each portion of the Work. The Contractor shall not contract with any subcontractor or supplier to whom the Owner or Architect have made a timely and reasonable objection.

§ 8.4 Labor and Materials

§ 8.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work.

§ 8.4.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract Work. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

§ 8.5 Warranty

The Contractor warrants to the Owner and Architect that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents. Any material or equipment warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 12.5.

§ 8.6 Taxes

The Contractor shall pay sales, consumer, use, and similar taxes that are legally required when the Contract is executed.

§ 8.7 Permits, Fees and Notices

§ 8.7.1 The Contractor shall obtain and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work.

§ 8.7.2 The Contractor shall comply with and give notices required by agencies having jurisdiction over the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs. The Contractor shall promptly notify the Architect in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules, and regulations.

§ 8.8 Submittals

The Contractor shall promptly review, approve in writing, and submit to the Architect shop drawings, product data, samples, and similar submittals required by the Contract Documents. Shop drawings, product data, samples, and similar submittals are not Contract Documents.

§ 8.9 Use of Site

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents, and the Owner.

§ 8.10 Cutting and Patching

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

§ 8.11 Cleaning Up

The Contractor shall keep the premises and surrounding area free from accumulation of debris and trash related to the Work. At the completion of the Work, the Contractor shall remove its tools, construction equipment, machinery, and surplus material; and shall properly dispose of waste materials.

§ 8.12 Indemnification

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them, from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

ARTICLE 9 ARCHITECT

§ 9.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 9.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the Work.

§ 9.3 The Architect will not have control over or charge of, and will not be responsible for, construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

§ 9.4 Based on the Architect's observations and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor.

§ 9.5 The Architect has authority to reject Work that does not conform to the Contract Documents.

§ 9.6 The Architect will promptly review and approve or take appropriate action upon Contractor's submittals, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 9.7 On written request from either the Owner or Contractor, the Architect will promptly interpret and decide matters concerning performance under, and requirements of, the Contract Documents.

§ 9.8 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from the Contract Documents, and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 9.9 The Architect's duties, responsibilities, and limits of authority as described in the Contract Documents shall not be changed without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

ARTICLE 10 CHANGES IN THE WORK

§ 10.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract, consisting of additions, deletions or other revisions, and the Contract Sum and Contract Time shall be adjusted accordingly, in writing. If the Owner and Contractor cannot agree to a change in the Contract Sum, the Owner shall pay the Contractor its actual cost plus reasonable overhead and profit.

§ 10.2 The Architect may authorize or order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. Such authorization or order shall be in writing and shall be binding on the Owner and Contractor. The Contractor shall proceed with such minor changes promptly.

§ 10.3 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be subject to equitable adjustment.

ARTICLE 11 TIME

§ 11.1 Time limits stated in the Contract Documents are of the essence of the Contract.

§ 11.2 If the Contractor is delayed at any time in progress of the Work by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, the Contract Time shall be subject to equitable adjustment.

§ 11.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the responsible party.

ARTICLE 12 PAYMENTS AND COMPLETION

§ 12.1 Contract Sum

The Contract Sum stated in this Agreement, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 12.2 Applications for Payment

§ 12.2.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for Work completed in accordance with the values stated in this Agreement. The Application shall be supported by data substantiating the Contractor's right to payment as the Owner or Architect may reasonably require, such as evidence of payments made to, and waivers of liens from, subcontractors and suppliers. Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

§ 12.2.2 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment, all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or other encumbrances adverse to the Owner's interests.

§ 12.3 Certificates for Payment

The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the

Contractor; (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in part; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole. If certification or notification is not made within such seven day period, the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time and the Contract Sum shall be equitably adjusted due to the delay.

§ 12.4 Progress Payments

§ 12.4.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract Documents.

§ 12.4.2 The Contractor shall promptly pay each subcontractor and supplier, upon receipt of payment from the Owner, an amount determined in accordance with the terms of the applicable subcontracts and purchase orders.

§ 12.4.3 Neither the Owner nor the Architect shall have responsibility for payments to a subcontractor or supplier.

§ 12.4.4 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the requirements of the Contract Documents.

§ 12.5 Substantial Completion

§ 12.5.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

§ 12.5.2 When the Contractor believes that the Work or designated portion thereof is substantially complete, it will notify the Architect and the Architect will make an inspection to determine whether the Work is substantially complete. When the Architect determines that the Work is substantially complete, the Architect shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, establish the responsibilities of the Owner and Contractor, and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 12.6 Final Completion and Final Payment

§ 12.6.1 Upon receipt of a final Application for Payment, the Architect will inspect the Work. When the Architect finds the Work acceptable and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment.

§ 12.6.2 Final payment shall not become due until the Contractor submits to the Architect releases and waivers of liens, and data establishing payment or satisfaction of obligations, such as receipts, claims, security interests, or encumbrances arising out of the Contract.

§ 12.6.3 Acceptance of final payment by the Contractor, a subcontractor or supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 13 PROTECTION OF PERSONS AND PROPERTY

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall take reasonable precautions to prevent damage, injury, or loss to employees on the Work and other persons who may be affected thereby, the Work and materials and equipment to be incorporated therein, and other property at the site or adjacent thereto. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, or by anyone for whose acts the Contractor may be liable.

ARTICLE 14 CORRECTION OF WORK

§ 14.1 The Contractor shall promptly correct Work rejected by the Architect as failing to conform to the requirements of the Contract Documents. The Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement, and additional testing.

§ 14.2 In addition to the Contractor's other obligations including warranties under the Contract, the Contractor shall, for a period of one year after Substantial Completion, correct work not conforming to the requirements of the Contract Documents.

§ 14.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 7.3.

ARTICLE 15 MISCELLANEOUS PROVISIONS

§ 15.1 Assignment of Contract

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

§ 15.2 Tests and Inspections

§ 15.2.1 At the appropriate times, the Contractor shall arrange and bear cost of tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities.

§ 15.2.2 If the Architect requires additional testing, the Contractor shall perform those tests.

§ 15.2.3 The Owner shall bear cost of tests, inspections, or approvals that do not become requirements until after the Contract is executed. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 15.3 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules.

ARTICLE 16 TERMINATION OF THE CONTRACT

§ 16.1 Termination by the Contractor

If the Work is stopped under Section 12.3 for a period of 14 days through no fault of the Contractor, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, and costs incurred by reason of such termination.

§ 16.2 Termination by the Owner for Cause

§ 16.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the subcontractors;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** is otherwise guilty of substantial breach of a provision of the Contract Documents.

§ 16.2.2 When any of the above reasons exist, the Owner, after consultation with the Architect, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may

- **.1** take possession of the site and of all materials thereon owned by the Contractor, and
- **.2** finish the Work by whatever reasonable method the Owner may deem expedient.

§ 16.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 16.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 16.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

§ 16.3 Termination by the Owner for Convenience

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 17 OTHER TERMS AND CONDITIONS

(Insert any other terms or conditions below.)

This Agreement entered into as of the day and year first written above.
(If required by law, insert cancellation period, disclosures or other warning statements above the signatures.)

OWNER *(Signature)*	***CONTRACTOR*** *(Signature)*
(Printed name and title)	*(Printed name and title)* LICENSE NO.: JURISDICTION:

SECTION 274100 - AUDIO/VIDEO SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work specified in this Section.

B. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.2 SCOPE OF SPECIFICATION

A. The following terms are defined for this specification section:
1. "Owner" or "End User" is Meriden Public Library.
2. "Architect" is the Architect for the project: TSKP STUDIO.
3. "Systems" are the audio and video systems.
4. "Designer" or "Systems Designer" is the designer of the audio and video systems: Jaffe Holden Acoustics, Inc.
5. "Electrical Engineer" is the designer of the Electrical Pathway & Wiring Systems.
6. "General Contractor" is the General Contractor or Construction Manager responsible for the construction of the project.
7. "Contractor" or "Systems Contractor" is the specialty contractor working under the General Contractor, responsible for the installation of the audio and video systems.

B. This specification covers all Systems as described below for the project. The objective is to provide professional systems, installed, acceptance tested, and ready for use.

C. The written specification and the large format AV drawings shall be collectively referred to herein as the Contract documents. System features which are mentioned in one part may not be shown in the others. In case of conflict between the written specification and the drawings, Contractor must seek clarification from the Systems Designer. In the event that the Contractor fails to obtain such clarification, the interpretation of the Systems Designer will prevail.

1.3 CONTRACTOR RESPONSIBILITY

A. Specification drawings are detailed only to the extent necessary to show design intent and signal flow. It is understood and agreed by the Contractor that the work herein described shall be complete in every detail to supply a complete working system.

B. Equipment not mentioned herein nor shown on drawings but necessary to meet this requirement shall be provided without claim for additional payment.

1.4 SUMMARY DESCRIPTIONH

A. Appendix A contains the Summary Systems Description.

B. Specific products to meet the system requirements described in Appendix A will be called out in the contract documents.

1.5 SCOPE OF WORK

A. Furnish all materials, labor and any engineering services to provide complete and professionally installed Systems in working order as described herein. Labor furnished shall be specialized and experienced in Systems installation.

B. Furnish and install all wire and cable.

C. Contractor to provide initial DSP and control system programming prior to acceptance testing, one full set of programming changes and adjustments, prior to handover to the Owner, and one additional set of changes and adjustments during the initial warranty period, as part of the base scope of work.

D. 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, signal format converters, line/distribution amplifiers and other devices for proper installation, interface, isolation or gain structure.

E. Furnish shop drawings and receive approval, prior to fabrication and installation.

F. Provide frequency scanning and coordination for all audio/video systems wireless transmitters and receivers. Coordinate with other Contractors and Owner as necessary to account for local frequencies used by others within the building, and to account for available spectrum in the surrounding area.

G. Perform initial adjustments and verification tests. Submit verification test report.

H. Participate in acceptance tests and perform final adjustments.

I. Provide training sessions, as specified in section 3.15, to the Owner.

J. Provide any manufacturer required commissioning and/or training and properly schedule with the manufacturer for their staff to attend. Coordinate schedule and training syllabus with owner and consultant.

K. Provide system documentation including copies of all relevant drawings and equipment manuals.

L. Provide maintenance services for the specified period from the date of acceptance.

M. Guarantee all equipment and components for the specified period from the date of acceptance.

N. Requirements and materials that apply to the work of others related to the Systems are listed to define and establish Systems requirements.

O. Work scope does not include the AC power system except as specifically called out in these specifications or in the drawings.

P. See Work Scope Summary Table at the end of Part One (Paragraph 1.12).

1.6 SUBMITTALS

A. Pre-Bid Submittals
   1. All Contractors submitting bids for the Systems specified herein must be qualified by the Systems Designer.
   2. Not later than ten (10) days prior to the bid date, Contractor shall submit to the Systems Designer for approval, brochures containing a statement of the Contractor's qualifications. At minimum, this submittal shall include the following:
      a. A list of Systems of comparable size and scope to that described herein, completed by the Contractor in the last five (5) years. Indicate the project name and address, year of completion, and the name and phone number of a person to contact who is a representative of the Owner or User.
      b. A personal resume of formal education and experience, and a copy of the current CTS-I certificate of the staff member who would act as Leader for the Project. A personal resume of formal education and experience, and a copy of the current CTS-D certificate of the staff member who would act as Project Engineer.
      c. A description of the Contractor's capabilities and facilities for rack assembly, shop fabrication, repair, and servicing of Systems
      d. A description of the Contractor's capabilities and facilities for generating CAD (or other high-quality graphics) documentation for the Shop Drawings and As-Built Drawings

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 these documents. Discrepancies between drawings and specifications or obvious omissions shall be referred to the Systems Designer for clarification before the bid date. Where discrepancies occur and pre-bid instructions have not been obtained, the contractor agrees to abide by the Systems Designer's decision.
   2. Bid proposals shall include all work and all equipment as specified, as well as any other equipment and materials to be used in assembling the system.
   3. Requests for clarification of specification intent shall be made, in writing, not later than ten (10) days prior to bid date.
   4. No portion of the work herein may be assigned or sub-contracted to others unless the following requirements have been satisfied:
      a. The names of any proposed sub-contractors shall have been disclosed in the bid proposal.
      b. A statement of qualifications for each sub-contractor shall have been included with the bid proposal.
      c. All terms of this contract, including bidding and qualification requirements, shall apply to the sub-contractor.
   5. The bid submittals shall include the following:
      a. The total Contract price.
      b. The total price for any Add-Alternates (See Paragraph 2.02.D)

c. An itemized list of all equipment and materials to be used in assembling the system
d. Unit pricing for all items on the specified equipment list
e. Lot pricing for miscellaneous items not on the specified equipment list
f. A breakdown of the number of staff hours allotted for:
    1) Preparation of submittals, shop drawings, and system documentation
    2) On site coordination meetings and supervision
    3) In shop engineering, fabrication, and assembly
    4) On site fabrication, assembly, and installation
    5) On site verification and acceptance testing

C. Shop Drawing Submittals:
1. Within thirty (15) days after contract award, submit a Work Scope plan that lists all actions required to complete the work in this section. The Work Scope plan must include a complete schedule of all activities, particularly activities that require coordination with other trades, Architect, Owner, and Systems Designer, and must reference all relevant documents related to each activity. Critical path must be identified, and all key moments relating to procurement and installation must be identified. All points of coordination must be vetted with the other affected parties prior to submittal to the Owner for review.
2. Within sixty (30) days after contract award, submit digital PDF files of detailed shop drawings to the Architect for approval. All shop drawings shall be marked with the related drawing number when submitted. Do not begin installation or fabrication without the approval of the Architect and Systems 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 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. Systems Designer will review submittals twice only without additional cost being charged to the project. If a submittal or portion of a submittal is rejected after two attempts, the Contractor is liable for additional cost for further reviews.
6. At minimum, the Shop Drawings shall include electronically bound copies of the following:
    a. Table of Contents
    b. Itemized list of all equipment and materials to be used in assembling the system
    c. Catalog cut sheets or data sheets for each listed item.
        1) Product data sheets must not be web page captures of specifications, unless there is no other recourse.
        2) Product data sheets with multiple options or part numbers must clearly be marked with the selection to be used for this project. All options must be called out. Anything the Contractor is not supplying that is shown on the sheet must be called out as an exclusion.
    d. One-line signal flow diagrams for all systems showing point to point wiring interconnection 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. A complete list of all wire run numbers along with the termination location of each end of each wire run
    f. Detailed 3-wire schematic diagrams for any custom circuitry

g. Detailed 3-wire schematic diagrams for typical connections between audio lines, patch bays, and rack mounted equipment
h. Drawings of all items which are to be custom fabricated or modified. Drawings shall be of scale suitable for use in fabrication. They shall show materials, finishes and panel/control markings. Submit samples of lettering/label size and typeface to be employed on custom plates, panels and other equipment.
i. Full size drawings illustrating the physical layout and labeling of patch bays
j. Mechanical drawings of all assemblies, major sub-assemblies, racks, and enclosures
k. Mechanical drawings showing proposed mounting details of all loudspeakers and associated rigging, and interface with adjacent architecture
l. All mounting systems not provided as a complete package from a single manufacturer must be engineered, approved, and have drawings stamped by a professional rigging engineer or licensed structural engineer, as approved by the General Contractor. The engineer shall verify that the design meets or exceeds design criteria for this particular use case. Each mounting system solution must be separately engineered, verified, and stamped.
m. Provide a detailed written plan for EDID and HDCP management for all video signals and interconnections between video devices.
n. Provide an IP Address table and addressing protocol in coordination with Owner's IT department.
o. Provide a mockup of all system graphical user interface screens and all source code/configuration files required for proper system operation.

7. For the ease of drawing review, the following guidelines must be adhered to:
   a. Plot styles should be utilized so that color is only used for emphasis of specific line types.
   b. The paper size for all shop drawings must match that of all other construction drawings. All drawings must be legible at ½ size.
   c. Drawings should be in black and white but if color is used the drawings must still be legible with all design information easily seen, when printed black and white.
   d. CAD drawings should be delivered as PDF prints. Provide DWG files upon request.
   e. All revisions of drawings in drawing packages must include a revision number and date, with all changed drawings clearly indicated, with changes clouded and tagged with the revision number. Drawings that have not changed from previous releases should not be marked as revised. Already revised drawings should have revision clouds and tags removed from the previous revision so that current revisions are clear to see.
8. Document release must be simultaneous unless a tiered release is authorized by the Systems Designer. If utilizing a tiered document release system, each release must be a full release of documents within each tier, within the context of the entirety of this scope of work. The required order for tiered review is:
   a. Equipment and Panel Locations(provided as indicated in the Work Scope Table in this section)
   b. Complete project equipment list and Product data sheets
   c. Single-line drawings, Panel details, Rack elevations, and Patchbay layouts
      1) Patchbay layouts must conform to the guidelines for Patchbay layouts included in this specification and on large format drawings.
      2) Panel drawings must indicate each panel and its engraving individually (if two 'AA' panels exist, for instance, they must have individual panel drawings showing the connector numbering and other engraving specific to that panel at that location)
      3) All custom rack panels must have a panel drawing as part of this submittal.

d. Rigging and Mounting Details
e. Control system and DSP system GUI mockup, functional control narrative, initial DSP programming, other software configuration files, HDCP/EDID plan and IP addressing plan.

9. All drawings shall be produced in AutoCAD, Revit, or in a similar and compatible computer drafting/graphics program. All submittal drawings must be engineered and drafted to represent actual fabrication and installation drawings and details. All details that are graphically unclear must be properly noted to clarify intent. Copies of the Contract Drawings are not acceptable as submittal drawings and will be rejected.
10. The use of electronic files generated by anyone other than the Systems Contractor (e.g., architectural backgrounds, Systems Designer's drawings, etc.) will not release the Contractor of the responsibility to supply Shop Drawings that represent a completely engineered, coordinated, and functional solution. The Contractor has the final responsibility to provide systems that meet or exceed all requirements of the contract documents.

D. Substitutions:
1. Substitutions may be permitted subsequent to Contract award, but only with the express written permission of the Systems Designer. The proposed substitutes must be equivalent to the specified products in quality, performance, construction, function and conformance to system objectives.
2. It is the responsibility of the Contractor to prove, to the satisfaction of the Systems Designer, that the proposed substitution is equal to the specified product, as demonstrated by submission of the following:
   a. List of advantages to the Owner
   b. Cost savings
   c. Printed specifications or laboratory test data
   d. Previous field experience
3. The Contractor shall list the unit price of each item proposed for substitution and indicate which specified items are to be deleted.
4. If the Systems Designer determines that the proposed product is not equal to the specified project, the Contractor shall supply the product specified in the Contract documents.
5. Where substitute materials or methods are approved, the Contractor shall make all adjustments to contingent work necessary to accommodate the substituted equipment, without claim for additional payment.
6. In the event that one or more of the products specified herein is unavailable, the Contractor shall make recommendations to the Systems Designer as to what substitutions are available to meet the intent of the specification.
7. The Systems 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 costs.
8. Selected items of the systems are subject to rapid technology changes. Items that have a high likelihood of needing re-evaluation prior to installation are highlighted in the equipment list. The Contractor shall not purchase these items without 30 days prior notice to the Systems Designer.

E. Samples:
1. Submit samples of substitute equipment to the Systems Designer as required to prove equivalency to items specified.

2. Submit samples of custom work, finishes or other materials as required by the Architect or Systems Designer to verify appearance and quality. All panels within direct view of the public may require a custom finish. Provide the Architect with a list of any panels that meet this criteria so that they may specify custom finishes. A sample of every type of finish specified other than standard finish as detailed in this specification must be provided to the Architect for approval.
3. Costs for shipping samples shall be the responsibility of the Contractor.
4. Submitted samples will not be returned.

F. Progress Reports must be submitted to the Owner every two weeks. The progress report will include:
1. Work Scope Plan updates and any schedule changes
2. Overall Project Status
3. Work Completed by percentage complete
4. Work planned for the next two week period
   a. Call out any coordination requirements for each item.
5. Procurement report
   a. Percentage by dollar value of equipment that has been procured to date
   b. Procurement problems or concerns to be addressed by others

6. RFI/Submittal List
   a. List outstanding RFI's and Submittals, showing the assigned document number and the date it was submitted.
   b. Highlight in Yellow any items that are overdue but are not affecting schedule or project quality.
   c. Highlight in red any items that are overdue AND are affecting schedule and/or project quality.

G. Written Guarantee (See Paragraph 1.9)

H. Verification Test Report (See Paragraph 3.13)

I. System Documentation and Operation Manuals (See Paragraph 3.15)

1.7 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 in charge throughout.

B. Cooperate with all appropriate parties in order to achieve well-coordinated progress with the overall construction completion schedule and satisfactory final results.

C. Watch for conflicts with work of other contractors on the job and execute, without claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or to preserve acoustic performance, symmetry, and pleasing appearance.

D. Immediately report to the Architect and Systems Designer any design or installation irregularities, particularly architectural elements that interfere with the intended coverage angles of

loudspeakers, or proper open sightlines to projection surfaces or displays so that appropriate action may be taken.

E. Do all cutting, patching and painting for proper and finished installation of the system and repair any damage done as a result of such installation. Clean up and dispose of trash from all Systems work areas.

1.8 QUALITY ASSURANCE

A. Parts listed shall be complete, type numbers accurate and equipment furnished shall conform to manufacturer's specifications.

B. All materials shall be new and shall conform to applicable provisions of Underwriters Laboratories and the American Standards Association.

C. Procure and pay for all permits, licenses and inspections and observe any requirements stipulated therein.

D. Comply with federal, state and local labor regulations and applicable union regulations.

E. Installation shall conform to latest federal, state and local electrical and safety codes or those of other authorities having jurisdiction. Where conflicts exist, the most stringent code or regulation shall apply.

F. If additional work by the Systems Designer is required as a direct result of deviations from approved drawings and specifications during construction, the General Contractor and/or Systems Contractor will be liable for those additional costs that the Owner may incur.

G. Government Standards: The Systems Contractor is to comply with all government regulations, standards, and laws that apply to the installation and use of the AV equipment and/or other scope of work specified in this section. The following agencies have laws and rules that apply.
   1. Federal Communications Commission (FCC): FCC rules are located in Title 47 of the Code of Federal Regulations. The following is a partial list of the FCC regulations that apply to equipment specified in this section of work:
      a. Part 15: Radio frequency devices
      b. Part 22: Public mobile services.
      c. Part 24: Personal communications services.
      d. Part 25: Satellite communications.
      e. Part 27: Wireless communications service.
      f. Part 51: Interconnection.
      g. Part 74: Experimental radio, special broadcast, and other program distribution services.
      h. Part 95: Personal radio services.
   2. Occupational Safety and Health Administration (OSHA) – Follow all applicable standards for health and safety particularly sound pressure level exposure.
   3. ANSI Standards: American National Standards Institute (ANSI) standards cover safety, fabrication, assembly, installation, rigging, equipment handling, and testing.
   4. Contributing Organizations – The Organizations listed below have published standards used to establish the technical references to be followed under this scope of work.
      a. Acoustical Society of America (ASA) (ASC S1)

b. Alliance for Telecommunications Industry (ATIS) (ASC T1)
c. American Society of Safety Engineers (ASSE) (ASC A1264)
d. Audio Engineering Society (AES) (ASC S4)
e. Electronics Industry Alliance (EIA) (CEMA)
f. Entertainment Services and Technology Association (ESTA) (ASC E1)
g. Institute of Electrical and Electronics Engineers (IEEE) (ASC C136) (802.1)
    1) IEEE 802.1AS: This standard specifies the protocol and procedures used to ensure that the synchronization requirements are met for time sensitive applications, such as audio and video, across Bridged and Virtual Bridged Local Area Networks consisting of LAN media where the transmission delays are fixed and symmetrical.
    2) IEEE 802.1QAT: This standard specifies protocols, procedures and managed objects, usable by existing higher layer mechanisms, that allow network resources to be reserved for specific traffic streams traversing a bridged local area network. It identifies traffic streams to a level sufficient for bridges to determine the required resources and provides a mechanism for dynamic maintenance of those resources.
    3) IEEE 802.1QAV: This standard allows bridges to provide guarantees for time-sensitive (i.e. bounded latency and delivery variation), loss-sensitive real-time audio video (AV) data transmission (AV traffic). It specifies per priority ingress metering, priority regeneration, and timing-aware queue draining algorithms. This standard uses the timing derived from IEEE 802.1AS. Virtual Local Area Network (VLAN) tag encoded priority values are allocated, in aggregate, to segregate frames among controlled and non-controlled queues, allowing simultaneous support of both AV traffic and other bridged traffic over and between wired and wireless Local Area Networks (LANs). Bridges are increasingly used to interconnect devices that support audio and video streaming application. This standard will specify enhancements to bridge relay function to provide performance guarantees to allow for time-sensitive traffic in a local area network and harmonize delay jitter and packet loss for wired (e.g., IEEE 802.3 - "Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications"), wireless (e.g., IEEE Std 802.11 - "Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications"), and mixed wired/wireless L2 networks. Most if not all entertainment media going forward is in digital form. Audio and video streaming and interactive applications over bridged LANs need to be enhanced to have comparable real-time performance of legacy out-of-band analog media distribution. There is significant vendor and end-user interest and market opportunity to consolidate layer 2 solution for both computer networking (e.g. internet access) and audio video services (e.g. home consumer electronics, professional A/V applications, etc) in mixed wired and wireless environments. The use of such consolidated network will realize operational and equipment cost benefits. This standard defines a set of enhancements to the Virtual Bridged LAN (802.1Q - "Standards for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks").This will enable end-to-end quality of service guarantee

agreement for audio and video streaming negotiated over SRP protocol to be realized in a bridged LAN, while interoperating with existing 802.1D - "Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges" and Q bridges. There is currently no interoperability among bridges that support Audio and Video streaming, nor generally accepted means of achieving such service guarantees in a bridged LAN.

4) IEEE 802.3 – 2008: A revision of base standard incorporating the 802.3an/ap/aq/as amendments, two corrigenda and errata. Link aggregation was moved to 802.1AX.
5) IEEE 802.3AZ: Energy Efficient Ethernet is scheduled for release in September 2010.
6) IEEE 802.3bd: Defines a MAC Control Frame to support 802.1Qbb Priority-based Flow Control.

h. International Cable Engineers Association (ICEA) Formerly IPCEA
i. International Standards Organization (ISO)
j. National Electrical Manufacturer's Association (NEMA) (ASC C119)
k. National Fire Protection Associations (NFPA)
l. National Safety Council (NSC) (ASC A10)
m. Photographic and Imaging Manufacturer's Association (PIMA)
n. Society of Motion Picture and Television Engineers (SMPTE)
o. Telecommunications Industry Association (TIA)
p. Underwriters Laboratories (UL) (ASC C101) (CE)
q. NTSC
r. National Association of Broadcasters (NAB) – System technical standards for video and RF compliance are listed in the most recent edition of the NAB Handbook

5. Safety Standards – Contractor will adhere to the following Safety Standards for all work identified in Division 27 41 00 and as part of the General and Supplementary sections of the Division-1 Specifications.
   a. ANSI A14.2-2000: Safety Requirements for Portable Metal Ladders
   b. ANSI A14.7-2000: Safety Requirements for Mobile Ladder Stands and Mobile Work Platforms.
   c. ANSI C2-2002: National Electrical Safety Code
   d. ANSI Z136.1-2000: Safe Use of Lasers and laser systems
   e. ANSI Z136.2-1997: Safe Use of Optical Fiber
   f. ANSI Z359.1-1992 (R1999): Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
   g. ANSI/PIMA IT7.101-1999: Recommended Practice for the Safe Handling and Operating of Audiovisual Equipment.
   h. IEEE 142-1991: Grounding of Industrial and Commercial Power Systems
   i. UL 514A: Scrub Water exclusion from AV Floor Boxes
   j. UL 1419-1995: Standard for Safety for Professional Video and Audio Equipment in accordance with the National Electrical Code, ANSI/NFPA 70
   k. UL 1492-1994: Standard for Safety for Audio-Video Products and Accessories
   l. UL 1651-1997: Standard for Safety for single and multiple Optical Fiber Cable
   m. UL 1667-1996: Audiovisual Systems Safety Standard for Tall AV Institutional Carts for use with Audio, Video, etc.
   n. ANSI E1.1-1999: Construction and Use of Wire Rope Ladders to prevent most injuries
   o. ANSI A10.8-2001: Safety Requirements for Scaffolding
   p. ANSI A10.42-2000: Rigging Qualifications and Responsibilities

6. Applicable Performance Standards – Execute all Division work in accordance with the following standards:
   a. ANSI S4.48-1992 (R1998): Recommended Practice for the Application of Connectors, Part 1, XLR-Type polarity, and gender
   b. ANSI S4.55-1997: Recommended Practice for conservation of the Polarity of Audio Signals
   c. ANSI S4.56-1997: Recommended Practice for the subjective evaluation of Loudspeakers
   d. ANSI S12.2-1995 (R1999): Criteria for Evaluating Room Noise
   e. ANSI T1.217-1991 (R1998): Integrated Services Digital Network (ISDN) Management –Primary Rate Physical Layer
   f. ANSI T1.522-2000: Quality of Service (QOS) for Business Multimedia Conferencing. Specifies classes of Service for conferencing on IP Networks
   g. AES15: ANSI S4.49: AES Recommended practice for Sound Reinforcement Systems –Communications Interface PA-422.
   h. AES-R1-1997 AES project report for professional audio: Specifications for audio on high capacity media
   i. AES14-1992 (r1998) AES standard for professional audio equipment -- Application of connectors, part 1, XLR-type polarity and gender
   j. AES24-1-1999, (Revision of AES24-1-1995) AES standard for sound system control - Application protocol for controlling and monitoring audio devices via digital data networks
   k. AES26-2001 (Revision of AES26-1995) AES recommended practice for professional audio -- Conservation of the polarity of audio signals
   l. ANSI/TIA/EIA 606-1993: Standard for the Telecommunications Infrastructure of Commercial Buildings
   m. ANSI/TIA/EIA 607-1994: Commercial Building Grounding and Bonding Requirements for Telecommunications
   n. IEEE 149-1979 (R1990): Test Procedure for Antennas
   o. IEEE 1100-1999: Powering and Grounding Sensitive Electronic Equipment
   p. NEMA 250-2001: Enclosures for Electrical Equipment
   q. SMPTE 292M: SMPTE 292M defines the base 1.485Gbps HD-SDI. Note: This standard can handle all HD formats except 1920*1080 @ 50P and 60P.
   r. SMPTE 372M: Uncompressed Dual-Link HD-SDI for 50P & 60P
   s. SMPTE 424M: 2.97 Gbps HD-SDI for 50P & 60P
   t. TIA/EIA-568-B: Digital audio over Cat5 audio cable
   u. UL 1047-1999: Isolated Power Systems Equipment
   v. UL 1581-1998: Reference Standard for Electrical Wires, Cables, and Flexible Cords
   w. UL 1682-1998: Standard for Safety for Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type up to 800 Amperes and up to 600 volts ac or dc.
   x. UL 467-1998: Grounding and Bonding Equipment
   y. UL 813-1999: Commercial Audio Equipment and accessories for use in commercial enterprises… this standard was originally listed for public review in the October 13, 1995 issue of Standards Action. It is being resubmitted owing to substantive changes in the text.
   z. ANSI/TIA/EIA-568-A: Commercial Building Telecommunications Cabling
   aa. ANSI/TIA/EIA-569-A: Commercial Building Standard for Telecommunications Pathways and Spaces
   bb. ANSI/TIA/EIA-607: Commercial Building Grounding and Bonding Requirements for Telecommunications
   cc. ANSI/TIA/EIA TSB-72: Centralized Optical Fiber Cabling Guidelines

dd. ANSI/TIA/EIA-526-14A: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
ee. ANSI/TIA/EIA-526-7 Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant
ff. ANSI/IEEE C-2 National Electrical Safety Code how to install cabling in accordance with the most recent edition of BICSI® publications:
gg. BICSI Telecommunications Distribution Methods Manual
hh. BICSI Cabling Installation Manual

1.9 GUARANTEE AND SERVICE

A. All systems and components shall be guaranteed free of defects in materials and workmanship for a period of one (1) year (or to the length of the Manufacturer's warranty if longer) from the date of acceptance and shall be repaired or replaced within forty-eight (48) hours following report of such defects by the owner.

B. 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. If corrective measures on-site are required they will be performed within 12 hours of the determination of a need for a site visit.

C. If, during the Guarantee period, any component is out of service for more than seven (7) days due to unavailability of parts or service, Contractor shall supply and install an identical new component. If an identical component is not available, Contractor will substitute equivalent equipment, with the approval of the Owner.

D. During the course of the Guarantee period, the Systems Contractor will provide the Owner with a 24 hour service phone number for emergency calls. A service engineer will respond to all emergency calls within one (1) hour. The personnel answering this call must be fully qualified to troubleshoot problems and propose solutions. A qualifying emergency event is defined as an event that may cause severe hardship or cause the systems to be inoperable or unusable for a scheduled class or event.

E. 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. Contractor shall submit proposed schedule for these visits and shall notify Owner and Systems Designer in writing at least one month in advance of each visit.

F. During the course of the guarantee period, the Systems Contractor will supply the Owner with any published updates of manufacturer provided operating programs for any and all software-controlled equipment that are issued to correct "bugs". During the Guarantee period, the Owner will rely on the Systems Contractor to determine when to update the software, unless it is needed to correct a situation that renders the systems unstable, non-functional, or otherwise affects operations.

G. Repeated device failures, defined as the failure of a device or a single type of device three or more times over three contiguous months, will be considered as a failure of a manufactured system and all items of this type shall be replaced at no charge to the Owner.

H. At least one representative of the Systems Contractor, well versed in the installation and the operation of the systems, shall be on site in support of the Owner for the first significant public event in each space (as determined by the Owner) where the system will be used. The Contractor representative(s) for this event shall also be competent in show operations.

I. Contractor is to coordinate ongoing remote access to AV Systems Networks for support and troubleshooting. Owner to provide the access at their discretion.

1.10 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 Owner relieves the Contractor in writing of this responsibility, whichever is earlier, regardless of the location of the equipment. All equipment is deemed to be under the control of the Systems Contractor until acceptance of the system by the Owner or until Owner relieves the Contractor in writing of this responsibility, whichever is earlier.

1.11 EXISTING CONDITIONS

A. Visit the site prior to making a bid. No subsequent allowance will be made due to failure to thus observe and verify conditions which may affect the work. Report to the Architect and Systems Designer any discrepancies among this specification and existing conditions and similarly report obvious omissions.

1.12 WORK SCOPE SUMMARY TABLE

ITEMS TO BE PROVIDED AND INSTALLED	General Contractor		Electrical Contractor		Systems Contractor	
	Pro-vide	Install	Pro-vide	Install	Pro-vide	Install
AVTP Outlet Devices for Branch Circuits delivered to Systems Equipment Racks and Devices					x	x
• Equipment Rack Back Boxes and Wall Plates					x	x
Systems Equipment Racks and Devices					x	x
• Systems Equipment Rack Cabling					x	x
• Systems Equipment Rack Termi-nations						x
Systems Device Back Boxes and Floor Boxes					x	x
• Systems Device Cabling					x	x
• Systems Device Termination						x

◊ Installation criteria to be provided by Systems Contractor

PART 2 - EQUIPMENT

2.1 GENERAL EQUIPMENT

A. Whenever any equipment is specified by manufacturer and model number, it is for 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 provided shall operate at the required AC line voltage and frequency.

D. Contractor shall provide quantities as indicated in the equipment list, detail drawings, location drawings, schedule of terminations, and as required for a complete installation.

E. Audio & Video Wire and Cable
1. All wire numbers listed in the drawings are Belden unless otherwise noted.
2. THHN wire is not an allowable substitute for twisted pair stranded loudspeaker wiring.
3. Approved manufacturers: Belden, Canare, Clark Wire, Gepco, West Penn, Whirlwind
4. Where conflict exists with any codes or ordinances, such codes and ordinances shall take precedence.
5. Where conflict exists with electrical specifications, the higher standard or more stringent requirement shall apply.

F. AV System Plates and Panels:
1. Specifications – Rack Mount Panels
   Material: 11 gauge steel or 1/8" Aluminum, minimum thickness
   Finish: Black or to match adjacent equipment
   Size: 19" wide, standard EIA mounting hole spacing, height as specified
2. Specifications – Back Box Enclosures
   Material: Code grade steel
   Finish: Black or galvanized
   Size: As specified
3. Specifications – Plug Box and Termination Panels
   Material: 11 gauge steel or 1/8" Aluminum, minimum thickness
   Finish: Black (unless instructed otherwise by Architect)
   Size: As specified
4. Approved Manufacturers: Steel City, Raco, Hoffman, Whirlwind, Pro Co, Wireworks

2.2 MAJOR EQUIPMENT

A. Equipment provided shall be that specified herein or approved substitute (see Paragraph 1.6.B).

B. Detailed performance specifications shall be those published by the manufacturer effective on the date of this document for all equipment listed.

C. See spreadsheet of major equipment in Appendix B.

2.3 DETAIL DRAWINGS

A. The drawings herein may detail custom built equipment and system details.

B. Furnish all materials and labor to provide complete and finished work even though not specifically shown on the drawings.

C. Detail drawings are located in large format AV drawings.

PART 3 - EXECUTION

3.1 AUDIO SYSTEM REQUIREMENTS

A. Requirements herein refer to materials and work which are related to or part of the Systems. Where conflict exists with other specifications concerning such work or materials, this specification takes precedence unless otherwise approved in writing by the Owner.

3.2 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. All mounting hardware shall be included.

C. All bolts and fasteners must be Grade 5 or better.

D. All bolted attachments to have lock washers or other self-locking fasteners.

E. Provide all required mounting brackets and framing, hardware and components, safety systems and rigging systems using the following minimum design factors (given as ratio of working load limit (WWL) : rated breaking load):
1. 5:1 – Minimum design factor for all mounting components regardless of mounting condition.
2. 5:1-8:1 – Minimum design factor for manufacturer provided mounts & assemblies where engineered stamped documentation and destructive testing data is provided by manufacturer.
3. 10:1 – For all hardware and connecting assemblies between manufacturer rated assemblies when equipment is hung above the general public. This includes but is not limited to wire rope, bolts, shackles, turnbuckles, beam clamps, supplemental steel provided by Systems contractor and other connecting hardware.
4. Design factor calculations to be provided with all equipment mounting details.
5. Systems Contractor shall coordinate required additional blocking, supplemental steel or channel strut supports with Main Contractor & specific trade contractors.
6. All mounting systems not provided as a complete package from a single manufacturer must be engineered, approved, and have drawings stamped by a professional rigging engineer or licensed structural engineer, as approved by the Main Contractor. The engineer shall verify that the design meets or exceeds design criteria for this particular use case. Each mounting system solution must be separately engineered, verified, and stamped.

F. All supporting structures and enclosures supplied by the Contractor not having a standard factory paint finish shall be painted. Paint specifications will be supplied by the Architect or indicated herein.

G. 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 Architect. This does not exclude equipment or materials where standard colors and finishes may be specified herein.

H. Finish of blank panels and custom assembly panels shall match adjacent equipment panels. Verify all panel colors with Architect. All color choices should be clearly indicated on panel drawing submittals, and on the panel schedule.

I. 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 drawings to ensure consistency and clarity. Verify any changes in working type size and/or placement with the Systems Designer prior to marking.

J. Protect equipment and related wiring where construction conditions may cause damage or environmental conditions exceed manufacturer's specifications.

K. The standard reference for the layout and construction of the system shall be:
1. Giddings, Philip. Audio Systems Design and Installation.

3.3 CONDUIT

A. Review and coordinate with existing conduit for integration.

B. All wiring shall be in conduit unless authorized by the Architect, approved by the Systems Designer, and permitted by code. Exceptions are short runs at rack 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 ceilings and shall be supported from walls or ceilings by means of approved galvanized iron clamps or hangers. Conduit connections to equipment racks shall be insulated.

D. All conduit shall be sized for maximum 40% fill or less if required by code.

E. Conduit containing STP, UTP, and COAX wire types must be installed so that the final length of the cable runs does not exceed maximum cable lengths as stated in 3.8.N and 3.8.O.

F. All conduits, within 6" of termination box, junction box, gutter or rack/ ladder tray, must be labeled with conduit group and destination of the opposite end of that conduit, as follows: "AV -<Group> - <opposite end>". For example "AV – B – AA stage right". Permanent marker on the conduit where it can be seen from the ground or nearest access point is acceptable.

G. Each termination does not require individual home run conduits. Conduits of like groups (see 3.4 below) may be combined at junction boxes so that a smaller number of larger conduit sizes may be used instead of a larger quantity of smaller individual conduits.

3.4 CONDUIT SEPARATION

A. Systems wiring is divided into wiring groups according to their nominal voltage levels. Cabling may be combined in a single conduit, and/or junction box(es) as long as all cables are of the same wiring group (refer to Schedule of Terminations for cabling, grouping, and destination details, by termination):

	Wiring Type
Group A	Microphones and other sensitive wiring (0 mV to 100 mV)
Group B	Line level wiring (100 mV to 10 V)
Group C	Loudspeaker and control wiring (10 V to 70 V)
Group D	Telephone, video, control and digital circuits
Group E	Category Cable, and Fiber optic cable
Group F	Spare Conduit

Note: These wiring groups must never be intermixed within a given conduit run or junction box.

B. Minimum conduit separation between conduits carrying wiring of different groups is:

	Group A	Group B	Group C	Group D	Group E
Group A	adjacent	6"	12"	12"	12"
Group B	-	adjacent	12"	6"	6"
Group C	-	-	adjacent	6"	6"
Group D	-	-	-	adjacent	adjacent
Group E	-	-	-	-	adjacent
Group F	12”	12”	12”	12”	12”

Note: Ninety degree crossings in close proximity are acceptable. Separations must be maintained until within six feet of box or gutter entry.

C. Minimum conduit separation between conduits carrying Systems wiring and other electrical service conduit is:

	Group A	Group B	Group C	Group D	Group E	Group F
Dimmer controlled lighting	24"	12"	6"	12"	12”	24”
SCR controlled services	24"	12"	6"	12"	12”	24”
220/440V circuits	6"	6"	adjacent	adjacent	adjacent	24”
All other services	6"	6"	adjacent	adjacent	adjacent	24”

Note: Heavy current demands in or long parallel runs with the above services may dictate greater separations to avoid interference in the Systems. Separations must be maintained until within six feet of box or gutter entry.

D. Contractor must have written authorization from the Systems Designer for any conduit installation which does not conform to these requirements. The conduit separations above are based on the use of EMT conduit for all AV and other signals. Separations where Rigid conduit is utilized for AV systems and/or other adjacent systems may be halved. Separations where PVC conduit is utilized for AV systems and/or other adjacent systems must be doubled. Flex conduit is not allowed without written authorization for each separate instance. The Contractor must request information on separation adjustments for each instance where a different type of conduit than what is listed above is used.

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, will be permitted except as authorized, in writing, by the Architect.

3.6 BOXES

A. With the exception of portable equipment, all boxes, conduits, cabinets, equipment and related 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 Systems Designer.

D. Clean all box interiors before installing plates, panels or covers.

E. Using permanent marker on the box or on wire tags, indicate the lengths of installed cable for all COAX and Category wiring inside the box.

F. Using permanent marker, inside the box, indicate the box name, for example “AA”.

3.7 WIRING METHODS AND PRACTICES

A. Provide installation of all Systems wire and cable, ensuring proper:
   1. Pulling Tensions
   1. Quantities
   2. Types
   3. Lengths
   4. Routing
   5. Wire Group Separation
   6. Identification

B. The interconnection of equipment in a rack shall use the same wire by type as specified for runs external to racks unless otherwise indicated on AV single line drawings. All wiring within racks shall be direct between devices without splices.

C. Interconnection wire between amplifiers and loudspeaker transition panels will be type LSXFR (refer to wire types on AV0.01).

D. Connector polarity shall be maintained except for terminations at equipment manufactured to other standards. In the event that manufactured equipment can be ordered with, or internally set to, various standards, the equipment shall be configured as follows:
1. Polarity for XLR style connector shall be: pin 2-high, pin 3-low, and pin 1-shield.
2. Polarity for TRS style connector shall be: tip-high, ring-low, and sleeve-shield.

E. Spare wire runs of each group and type shall be pulled to each termination location. The number of spares shall be ten percent of those in actual use or one, whichever is greater.

F. Splicing of cables is not permitted between terminations of specified equipment.

G. Do not pull wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs without written approval from the Systems Designer; 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.

H. Provide wire pulling lubricants and pulling tensions in accordance with the wire and cable manufacturer's recommendations.

I. All wires shall be permanently identified at each wire end by marking with self-laminating adhesive labels fully covered with clear heat shrink tubing, and a chart kept of each wire's function. This applies to wire within a rack assembly as well as wire running in conduit.

J. Wire ends should be wrapped with heat shrink tubing. Each shield or drain wire should be covered with heat shrink to avoid unintentional connections.

K. Use Wago or Entrelec DIN rail mounted terminal blocks for all terminal block wiring connections. Do not exceed one wire per terminal connection point. Do not cut strands from conductors to fit lugs or terminals. Spare terminal blocks, equivalent to 10% of those in actual use, shall be provided.

L. Form, in an orderly manner, all conductors in enclosures and boxes, wire ways and wiring troughs, providing circuit and conductor identification. Tie using wraps of appropriate size and type. Limit spacing between ties to six (6) inches and provide circuit and conductor identification at least once in each enclosure.

M. Provide service loops, minimum 6’, at each termination so that plates, panels, patch bays, and equipment can be dismounted and placed on an adjacent horizontal work surface allowing for safe service and inspection without disconnection.

N. Maximum installed length of Category cables is 200’

O. Maximum installed length of Coaxial cable for HD-SDI, 3G-SDI, 6G-SDI, and 12G-SDI is 200’

P. Provide lengths of installed cables marked inside each termination back box using legible and permanent markings.

3.8 GROUNDING

A. Audio system wiring shall conform to the following procedures:
1. Audio equipment AC ground pins shall connect to AC isolated ground.
2. Audio equipment chassis shall connect to AC isolated ground or rack frames.
3. Audio rack frames shall connect to AC isolated ground bus in panelboard by means of #2 gauge (minimum) conductor.
4. Audio shields between AC powered pieces of equipment, where signal shield is tied to chassis ground, shall be directly connected to ground at the initiating end only. Capacitively terminate the receiving end with a 0.1µF capacitor.
5. Audio signal paths between AC powered pieces of equipment shall be connected using balanced lines and/or transformer isolation as required. No unbalanced signal paths may be connected to the patch bay.
6. Isolate all Systems wiring from racks, back boxes and conduit.
7. Isolate all Systems racks from conduit and other conductive surfaces. Use insulated bushings for conduit connections and a dielectric plinth between racks and conductive flooring materials.
8. AC isolated ground system shall be isolated from all other facility grounds except at the single point of connection at the AV isolation Transformer.
9. All metallic conduit, boxes and enclosures shall be grounded in accordance with the current National Electrical Code.

B. Metallic enclosures containing active equipment shall be grounded with due regard for the minimization of electrical noise. This may include the provision of grounding conductors separate from the AC ground.

3.9 EQUIPMENT RACKS

A. The equipment racks shall be considered as custom assemblies and shall be assembled, wired and tested in the Contractor's shop. Assembly of racks on-site will not be permitted, without written approval from the Systems Designer (except for system wiring which must terminate directly to the patch bays via soldering, punch-down or other non-connectorized termination process).

B. Placement of equipment in equipment racks, as shown in the drawings, is for maximum operator convenience. Verify any changes in placement of the equipment with the Systems Designer before assembly.

C. Racks shall be installed plumb and square without twists in the frames 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 wires and cables used in assembling custom panels and equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted engineering practice.

G. Harnessed cables shall be combed straight, wrapped every six (6) to ten (10) inches, and attached to the structure as necessary. Each cable that breaks out from a harness for termination shall be provided with an ample service loop so that panels, patch bays, and equipment can be dismounted and placed on an adjacent horizontal work surface allowing for safe service and inspection without disconnecting.

H. Harnessed cables shall be formed in either a vertical or a horizontal relationship to equipment, controls, components or terminations.

I. Cable shields shall be connected to the isolated ground system with due regard for ground loops. (See Giddings reference book, Chapter 10)

J. All system components and related wiring shall be located with due regard for the minimization of induced electro-magnetic and electrostatic noise, for the minimization of wiring length, for proper ventilation, and to provide reasonable safety and convenience for the operator.

K. All rack mounted equipment, with front panel controls, shall be provided with security covers to avoid tampering with preset levels. If specific security covers are not included in the equipment list, the Contractor will provide the manufacturer's security cover for each specified device or a suitable alternate.

L. Every device shall be installed with regard for proper polarity. Absolute polarity shall be maintained through the entire Systems signal chain.

M. Any permanently mounted electronic device must be balanced. Contractor will provide balancing transformers for unbalanced equipment connections where necessary.

3.10 VERIFICATION TESTS

A. Test each point to point wire segment individually, and test any linkage of multiple point to point cables that form an end to end link.

B. Contractor must document all verification test requirements and results for submission (see 3.13.A below).

C. Confirm that each individual wire and cable run (whether in a rack or in conduit) is identified with a unique number. These numbers are affixed to both ends of each cable and are clearly visible. Provide a complete list of these numbers along with the termination location of each end of the wire run.

D. Verify all circuits and extensions for correct connection, continuity and polarity. Absolute polarity must be maintained between all points in the system.

E. Identify installed length of all copper and fiber cabling.

F. Confirm that all system outputs are free of spurious signals including oscillations and radio frequency signals. A wide band oscilloscope shall be used to verify this condition.

G. Confirm that the system is free of audible clicks, pops, and other noises when any operating control is activated, with or without input signal.

H. For all microphone lines, tie lines, return lines and effect loudspeaker lines, confirm:
1. Proper circuits appearing at each termination location
2. Proper circuits appearing at each jack bay position
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
7. Perform a sweep test to 0.5MHz

I. For RF Coaxial cabling confirm:
1. Receptacles output does not exceed +15dBmv (50-400MHz - +6 dBmv minimum, above 400MHz - +3dBmv minimum)
2. For each modulated video output, tap to meet +9dBmv (+/- 3dBmv)
3. Verify that all TV channels are visible and free of any interference or signal distortion
4. Frequency sweep test from 5MHz to 1000MHz.

J. For all other Coaxial cabling confirm:
1. Verify that the installed cable meets, at a minimum, the requirements set forth in SMPTE ST 2081 for 6G-SDI single-link and 12G-SDI dual-link.
2. Verify that TDR impedance is 75 +/-3 ohms
3. Frequency sweep test from 5MHz to 6GHz.

K. For Category Cabling:
1. Use Category 6A cable pair tester to verify compliance with TIA/EIA standards referenced above (including all current addendums)
2. Test each cable using the permanent link procedure for opens, shorts, reversals, cross twists and mis-wiring. Check NEXT, ELFEXT, Delay Skew, Return Loss, and Alien Crosstalk.
3. Report all mis-wiring or failures found and report retests as needed.
4. If any conductors report open or short, replace the entire wire and re-test.

L. For Fiber cabling:
1. Using appropriate test devices and proper factory terminated jumpers, measure all fiber optic line attenuations, end to end, as required by TIA/EIA-526-14A.
2. Optical budget may not exceed the cable performance by length plus splice and connector losses (0.03 dB for each fusion splice, 0.3dB for each mechanical splice, and/or 0.4 dB for each connector).
3. Overall attenuation must meet TIA/EIA-568B standards. Perform attenuation tests at 850nm and 1300nm.

M. Confirm that loudspeakers and mountings are free of buzzes and rattles when the loudspeaker is swept with sine wave tones over its rated bandwidth at one-half (1/2) its maximum rated power.

N. For all permanently mounted loudspeaker terminations, provide impedance measurement of each pair of loudspeaker lines with all loudspeakers connected and all amplifiers disconnected. These

measurements shall be documented as editable tabular data listing impedance for each 1/3 octave band from 20 Hz to 20 kHz and shall be accurate to the nearest tenth of an Ohm.

O. For all intercom terminations, confirm proper operation by initiating and receiving audio communication and call light. For single lines connected to a matrix, test each line with each channel in the matrix. Verify that all channels are quiet and without spurious noise.

P. For all electronic devices mounted in racks and connected to patch bays, confirm:
1. Every input and output is balanced.
2. Proper polarity is maintained throughout the entire audio path.
3. Tip connection of each TRS jack is connected to the positive terminal of each corresponding input or output.

Q. For all devices requiring IP addressing:
1. IP addressing scheme must make use of subnets such that all devices, regardless on which network (Audio, Video, Control, or House) they reside, have a unique IP address to eliminate the possibility of duplicate IP addresses if networks are inadvertently cross-patched.
2. All devices must have static IP addresses.
3. Create a spreadsheet of all devices and their IP addresses, Subnet Masks, MAC Addresses, and other pertinent IP configuration information.
4. Coordinate all IP addressing schemes with the Owner.

R. If the Audio, Video, and Control network switches are dedicated to these systems and the systems do not rely on Owner furnished and configured network switches:
1. Configure network switches to operate properly and provide the proper network configurations to support the network devices and protocols used by those devices.
2. Configure, as needed, VLANS, IGMP, QOS, and other protocols requiring configuration to provide a fully functioning and robust network system.
3. With all networks configured and operating, and all network devices configured and operating, confirm that the networks are behaving as expected and as required.

S. The Contractor is responsible for the programming and configuration of all DSP systems and control systems necessary as specified in this project specification and AV large format drawings.
1. Programming and configuration must be complete and ready prior to System Designer's arrival for verification of functionality and acceptance testing.
2. Programming for the DSP systems must contain control pages to support normal operations, and to support Acceptance Testing and System Tuning operations, as described in this specification and the large format AV drawings.
3. Programming for the Control Systems must include all master controller code and touch panel code and graphics, working together to provide the function as described in this specification and the large format AV drawings.

T. Test all Audio, Video, and Control system controls, including but not limited to mixing consoles, switchers, routers, touch panels, paging stations, volume controls, and source selectors for proper operation.

U. Test proper operation of any portable controls at each designated control location (Stage Manager's rack, for example).

3.11 INITIAL ADJUSTMENT

A. All initial adjustments must be documented and submitted as part of the Verification Test Reports (see 3.13).

B. Make all adjustments and modifications so that the system is operational and fully functional including but not limited to:
   1. Update all device software and firmware to the latest manufacturer's recommended release that allows for proper operation with ALL OTHER DEVICES in the systems.
   2. Make all adjustments and modifications for system gain structure per recommendations of major component manufacturers.
   3. Properly configure all EDID and HDCP settings to allow for proper function of all video systems.
   4. Install all programming for digital mixing consoles, DSP, Control and any other software based devices in the systems, and verify that audio and video signal passes as designed through these systems. Verify that control systems function as specified. Contractor to provide initial DSP and control system programming prior to acceptance testing, one full set of programming changes and adjustments, prior to handover to the Owner, and one additional set of changes and adjustments during the initial warranty period, as part of the base scope of work.
   5. Properly adjust delay and equalization for all loudspeaker systems using SIM, SMAART or other similar dual FFT type measurement devices. All testing and adjustment shall be in accordance with all manufacturer recommendations and industry standard practice. Contact the Systems Designer for further system delay and equalization requirements.
   6. Capture traces showing magnitude and phase response for each loudspeaker or loudspeaker cluster before and after equalization and delay adjustments.
   7. Capture traces showing magnitude and phase response for the systems operating as a whole from 3 locations in each major seating area. One of these areas should be the House Mix Position, if applicable.
   8. Equalization and timing of the loudspeaker systems shall be further adjusted as required by the Systems Designer and Owner during Acceptance Testing.

3.12 VERIFICATION TEST REPORT

A. Submit written report detailing the results of Initial Adjustments and Verification Tests. Report to include, at minimum, the following:
   1. Copies of all relevant drawings, charts, test instrument data, and photographs.
      a. PDF copies of all available manufacturers' operation and service literature for each major system component.
      b. Copy of all programming files including, but not limited to, Audio DSP programming and Graphic User Interface (GUI) files, Control system Touch Panel GUI files and control system control programming files including un-compiled source codes.
      c. All other documentation and results of testing and initial settings as referenced in 3.11, and 3.12 above.
      d. Written certification that the installation conforms to the requirements stated herein, is complete in all respects, and is ready for inspection, Acceptance Testing, and tuning.
   2. Prepare and submit an InfoComm standard Commissioning Checklist for each system in this specification.

3. Prepare and submit a training syllabus for Owner training (see section 3.15).

B. This report shall be completed and submitted to the Systems Designer for review a minimum of five (5) days prior to Acceptance Testing and final tuning.

3.13 ACCEPTANCE TESTING

A. Acceptance Testing shall be performed by the Systems Designer and Contractor during a period designated by the Architect. Contractor shall furnish a minimum of two (2) technicians or one technician per Systems Designer commissioning team, for the acceptance testing period, and one or more engineers fully capable of programming DSP and Control systems, and making any other engineering adjustments to equipment in the systems. Contact Systems Designer for number of commissioning teams that will be deployed. For Bid purposes assume there will be 1 commissioning team(s).

B. The minimum time required for Acceptance Testing is 2 working days, including 1 days of dedicated quiet time. Coordinate this time period so that free access, work lighting, and electrical power are available on the site.

C. Ensure that Systems areas are in a clean and orderly condition ready for acceptance testing.

D. Provide test equipment (meeting the following minimum specifications) on site, at all times during Acceptance Testing. Prior to Acceptance Testing, provide the Systems Designer with a listing of the specific equipment to be made available (**).

1. Oscilloscope: 10MHz Bandwidth, Sensitivity – 1mV/cm
2. Digital Multi-meter: 1% Accuracy
3. Function Generator: 1MHz Bandwidth, Distortion < 1%
4. Real Time Analyzer: 1/3 Octave with microphone
5. SMAART Analysis package with V.8 software and a minimum of two matching test microphones (Earthworks M30 or better)
6. Pink Noise Source: 20 Hz – 20 kHz Bandwidth
7. Test mic tone calibrator
8. Impedance Sweep Meter: 20 Hz – 20 kHz Range, 1 Ohm – 50 kOhm
9. Polarity Checker: Mic, line, or loudspeaker level
10. Video Test Signal Generator(s): must provide all signals, resolutions, and output formats as needed to fully test the systems.

** Note: Systems Designers may choose to supply some of their own test equipment. Confirm specific requirements prior to commissioning.

E. Be prepared to verify the performance of any portion of the system by demonstration, listening tests and instrumented measurements.

F. Be prepared to facilitate the visual inspection of system components and wiring, including removal of termination panels for inspection of wiring termination and wire management practices.

G. Be prepared to demonstrate all software and control systems.

H. Be prepared to go through the commissioning checklist and verify all items as complete.

I. Make additional mechanical and electrical adjustments within the scope of the work and which are deemed necessary by the Systems Designer as a result of the Acceptance Tests. This may include realigning of loudspeaker systems, changes in system gain structures, grounding, filtering or interfaces.

J. Final acceptance will be contingent upon issuance by the Systems Designer of a letter of acceptance stating that the work has been completed and is in accordance with the contract documents.

K. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for Systems Designer's Acceptance Testing.

3.14 user training

A. Contractor will provide in-depth training in operation and regular maintenance of all systems and on all equipment included in the scope of work contained in this specification and the AV large format drawings.

B. Training to include (but is not limited to):
1. Detailed operation of mixing consoles, video switchers and routers, computer control systems and other essential system elements as relevant to their installation in this project.
2. Maintenance and repair of system equipment, including replacement procedures for user-replaceable parts.
3. Review of Operation and Maintenance Manual (See 3.16)

C. Contractor will provide a minimum of 2 training sessions of four hours each with times and dates to be approved by the Owner.

D. The first session shall take place in the presence of the Systems Designer and shall occur directly after the completion of Acceptance Testing. If the Systems Designer, Owner, and/or Architect judge any work to be deficient and/or not substantially complete at the time scheduled for training, the training will be postponed until the Systems Designer, Owner, and Architect judge the entire AV system conforms to this specification and the AV large format drawings.

E. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for User Training.

3.15 SYSTEM DOCUMENTATION

A. Within thirty (30) days of the Acceptance Testing, prepare and submit a CD-ROM of the preliminary Operation and Maintenance manual for approval by the Systems Designer. Manual to include, at minimum, the following documents in PDF format:
1. Table of contents
2. Written Guarantee and service policy
3. Basic power on/off and operational procedure
4. Copies of all shop drawings which have been updated to include any changes made during the installation process

5. All available manufacturers' operation and service literature for each major system component
6. One line signal flow diagram with all cable runs and patch points identified by alpha-numeric character
7. Copy of the Verification Test report
8. Copy of conduit riser diagram
9. Copy of the final tuning settings as provided by the Systems Designer
10. Copy of the IP Addressing table
11. Copy of all uncompiled source codes and configuration files which have been updated to include any changes made during the installation process.

B. Systems Designer will review the above system documentation. Upon approval, Contractor shall prepare and submit to the Owner:
   1. Five (5) copies of the final Operation and Maintenance manual on CD-ROM or DVD.
   2. Two (2) hard copies of the final Operation and Maintenance manual printed and neatly bound

C. Provide framed or laminated copy of the as-built signal flow diagram for each theater to be mounted in each control room. This diagram shall have all cable runs and patch points identified by alpha-numeric character.

APPENDIX(ES) TO FOLLOW

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SECTION 274100 APPENDIX A – NARRATIVE SYSTEM DESCRIPTION

PART 1 GENERAL

The systems described here are meant to act as an extension of Audio and Video systems included in the base project scope and are intended to augment production audio and video functionalities to better provide access to professional production equipment, workflows, and processes. Contractor to refer to Phase 1 scope of work that has been provided for reference and to provide clarity on scope. Included systems shall make use of professional standards for equipment specifications, signal transport, and system use.

1.1. MULTIPURPOSE ROOM A131

A. Audio
1. A digital mixing console with a portable road case is provided for in-room audio mixing of live performance audio sources such as wired and wireless microphones, musical instruments, and audio feeds from computers. IP based stage interface boxes are provided for remote input/output of audio signals to mixing consoles.
2. The digital mixing console shall interface with the AV panels in the room using the existing infrastructure for the Dante audio network and audio tie lines that patch to the Control Room and in the existing equipment rack.
3. In addition to this a quantity of wired microphones, microphone stands, and cables shall be provided to allow for flexible micing of events such as multi-panelist discussions and basic music performances.
4. Portable active loudspeakers are provided to be used as monitor loudspeakers for performances and other similar applications.

1.2. CONTROL ROOM A104

A. Audio
1. Network switches shall be provided to allow the existing Dante audio network to integrate with the new digital mixing console. A Fiber uplink shall be provided to expand the current network topology and ensure that bandwidth is available for audio and video transport across the system.
2. A pair of studio monitors and headphones are provided for in room audio mixing and audio playback.
3. A portable rack of microphone splitters shall be provided to allow for independent control of microphone inputs from the in-room audio console to the broadcast mix console in the control room.

B. Video
1. The scope described in this section is in addition to the systems that were provided as part of the Phase 1 scope.

2. As part of the Phase 1 scope a Tricaster was provided for simple switching of in room PTZ cameras and portable cameras in the space.
3. As part of the Phase 2 scope, (2) two large format wall mounted displays are being provided for a Multiview output and/or a preview/program output from the Tricaster and NDI network. The desktop monitor that was included in the Phase 1 scope shall be used as one of the monitors for the in-room PC.
4. A second computer monitor for the PC shall be provided to review audio content and display video content that shall be output to the Tricaster to be switched and used as required for events.
5. Signal converters are provided to encode video signals for IP based distribution. This will allow live video feeds from the Digital Media Room to be archived using the recording decks, mixed in the Control Room, and presented in the Multipurpose Room, or distributed from the Multipurpose Room to the Control Room and Digital Media Room.
6. A universal clocking system shall be provided to ensure sync across the audio and video broadcast systems. The clock system shall ensure that the timing of digitizing audio and video signals are kept in sync. The universal clock shall have PTP to serve as a clocking bridge between IP infrastructure and legacy equipment.

C. Additional Items
1. A purpose-built height adjustable table shall be included as part of this design. The intent is that the Control Room equipment that was included in Phase 1 and the new equipment that is included in this Phase 2 scope shall be integrated together and be placed on this table.

1.3. DIGITAL MEDIA ROOM 109

A. Audio
1. A digital mixing console is provided for in-room audio mixing and computer audio interface for recording and audio editing. USB and IP based audio transport is included for both connection to a local production computer and to the building Audio Network. The Digital Media Room is designed to be a flexible audio/video production space. Some use cases shall include video and audio Podcast recording, video recording for advertisement, talk shows, and similar program. The Digital Media room shall also serve as a space for broadcast mix splits from the Multipurpose Room allowing the users to utilize the Digital Media Room to recording and edit content for postproduction.
2. The digital mixing console shall be placed on a purpose-built audio mastering station.
3. Network switches shall be provided to allow the existing Dante audio network to integrate with the digital mixing console. A Fiber uplink shall be provided to expand the current network topology and ensure that bandwidth is available for audio and video transport across the system.
4. In addition to this a quantity of wired microphones, microphone stands, and cables shall be provided to allow for a variety of applications including, but not limited to video and audio Podcast recording, video recording for advertisement, talk shows, and similar program.
5. Vocal mics on table mounted booms shall be mounted to the purpose-built furniture and connected to the rack mounted stage box to be interfaced with the production computer by means of the audio network and the digital mixing consoles USB interface.
6. A pair of studio monitors and headphones are provided for in room audio mixing and audio playback.

7. A quantity of portable headphones and headphones amplifiers are provided to be used by talents as required for audio foldback and playback.
8. Audio editing software shall be provided by the owner for contractor to install to provide for post-production editing of recorded audio content and for pre and post-production audio mixing for video.
9. Portable active loudspeakers are provided to be used as monitor loudspeakers for talents other similar applications.

B. Video

1. A professional multi-camera package is included for remote recordings, studio shoots, or multi-camera video archive of live events. Included with the package are studio accessories such as camera tripods and tripod dollies, and reference monitors. This system is an extension of the system that was provided in Phase 1. Similar cameras and accessories are provided for ease of use and interoperability of systems.
2. Video recording decks are provided for uncompressed video recording direct from camera. The cameras also provide local storage for field recording.
3. Local and remote recording of up to (3) discrete video feeds is done via the local recorders that are connected to the video network.
4. A video switcher/Tricaster shall be provided to allow for video routing of all cameras and video signals in the Digital Media Lab, the Multipurpose Room and Meeting Rooms.
5. (2) large format wall mounted displays are being provided for a Multiview output and/or a preview/program output from the Tricaster and NDI network.
6. Signal converters are provided to encode video signals for IP based distribution. This will allow live video feeds from the Digital Media Room to be archived using the recording decks, mixed in the Control Room, and presented in the Multipurpose Room, or distributed from the Multipurpose Room to the Control Room and Digital Media Room.
7. A universal clocking system shall be provided to ensure sync across the audio and video broadcast systems. The clock system shall ensure that the timing of digitizing audio and video signals are kept in sync. The universal clock shall have PTP to serve as a clocking bridge between IP infrastructure and legacy equipment.
8. The coax infrastructure documented in Phase 1 shall be terminated to a local patchbay in the mixing station to allow for clock and other similar video signals to be distributed as required during production recordings.
9. A video editing workstation and machine, with video and audio editing software shall be provided by the owner for contractor to install, is provided to allow for post-production editing of recorded video content and for pre and post-production audio mixing for video.

1.4. ALTERNATE 1 – CONFERENCING AND CLASSROOM EQUIPMENT

A. Description

1. (2) two USB web cameras shall be deployed as needed or used as attic stock.
2. Hybrid Video Conferencing system shall be included to be deployed as needed for large meeting spaces.
3. Touch Screen Display on a rolling cart shall be used as a classroom or meeting device that will be deployed as needed.

1.5. ALTERNATE 2 – STUDIO MIDI KEYBOARD

A. Description

1. A MIDI controller keyboard shall be purchased to be integrated with mixing and production workstations that were provided in Phase 1 and Phase 2 scope of work.

1.6. ALTERNATE 3 – ADDITIONAL AUDIO DESKTOPS

A. Description

1. (2) additional hybrid laptop touch screen workstations shall be provided with software described in the base bid scope of work and shall be deployed as needed.

1.7. ALTERNATE 4 – CONTROL ROOM A104 MIXING CONSOLE

A. Description

1. A dedicated digital mixing console is provided for multichannel audio archive and broadcast audio mixing. IP based signal transport allows for multicast audio flows so that multichannel audio productions may be independently mixed specifically for streaming broadcast or performance archive purposes.

1.8. ALTERNATE 5 – HOURLY RATE FOR ADDITIONAL END USER TRAINING

A. Description

1. Contractor to provide a fixed hourly rate for additional training of specified AV systems for end users at the Meriden Public Library.

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SECTION 274100 APPENDIX B - EQUIPMENT LIST

NOTE: For every line item indicating “Allow”, contractor must use stated amount as bid price (included with base proposal) for each respective line item. This is not a set aside allowance, this is a fixed unit price. Owner and A/E team shall select, at a later date, actual equipment/model to be submitted procured and installed as part of the base proposal. All equipment is Contractor Furnished Contractor Installed, unless otherwise noted.

Owner Furnished Contractor Installed = OFCI
Owner Furnished Owner Installed = OFOI
Owner Existing Equipment = OEEI

MULTIPURPOSE ROOM A131

Console

Manufacturer	*Model*	*Name*	*QTY*
Gator Cases	G-Tour 6U	6U, Standard Audio Road Rack Case	1
Gator Cases	GTOURAHSQ5NDH	Road Case for Allen & Heath SQ-5 Mixer	1
Whirlwind	MLTSP1X2	1RU 4 Channel Microphone Splitter	4
Allen & Heath	AH-M-SQ-SDANTE-A	64 X 64 SQ Dante Card 96kHz / 48kHz	1
Allen & Heath	AH-SQ-5	96kHz processing, 48 Input Channels,17 Faders / 6 Layers, 12 Stereo mixes+LR, 3 Stereo Matrix, 7” capacitive touchscreen	1
Allen & Heath	AH-DT168	16 x 8 Dante audio expander with dLive 96kHz mic preamps,	2
Allen & Heath	AH-AP11332	Dust cover for SQ-5	1

Wired Microphones

Shure	BETA 52A	Dynamic Kick Drum Microphone with High Output Neodymium Element	1
Shure	SM57-LC	Cardioid Dynamic Microphone	6
Shure	SM58-LC	Cardioid Dynamic Microphone	6
Shure	SM81-LC	Cardioid Condenser Microphone with 10dB Attenuator and 3 Position Low-Cut Filter, with Foam Windscreen	4
Sennheiser	e 906	Professional super-cardioid, dynamic instrument mic with switchable presence filter	2

Accessories

Whirlwind	MK410	Microphone Cable - 10'	10
Whirlwind	MK425	Microphone Cable - 25'	10
Whirlwind	PA1	Personal Headphone Monitor	4
QSC	K12.2	Portable loudspeaker system, 2000W active, 12" woofer, 1" compression driver, 75°	2
SKB Cases	3i-2015-MC24	iSeries 2015-7 24-Mic Case	1
Sony	MDR-7506	Stereo Professional Headphones	1

Microphone Stands

K&M	259	Microphone Stand 17-25" & Boom 18-30"	4

Manufacturer	*Model*	*Name*	*QTY*
K&M	27195	Microphone Stand 35-63" & Boom 18-30"	8
Atlas Audio	MS-12CE	Microphone Stand 34-62in	6
K&M	21110-500-55	Microphone Boom 19-30in	4

CONTROL ROOM A104A

Loudspeakers

Genelec	8030C	Loudspeaker Powered	2

Accessories

BirdDog	BDMINIHDMI	Mini HDMI to NDI Encoder/Decoder	1
LG	27UP850	27" 4K IPS Production Monitor	2
ZeeVee	ZyPerUHD-D	ZyPerUHD Decoder	1
Sony	MDR-7506	Stereo Professional Headphones	2

ZC Rack

Netgear	$400 Allowance	SFP Fiber Module 1GB	2

Network

Netgear	$400 Allowance	SFP Fiber Module 1GB	2
Netgear	GSM4212P	8x1G PoE+ 125W 2x1G and 2xSFP Managed Switch	1
Gator Cases	G-TOUR EFX4	4U, Shallow Audio Road Rack Case	1
Netgear	GSM4230P	24x1G PoE+ 300W 2x1G and 4xSFP Managed Switch	1

Racks & Furniture

TBC	See Quote: # JAFFH -15581-24	Control Room Desk	1

Displays

NEC	ME431	43" Ultra High Definition Commercial Display with Wall Mount	2

DIGITAL MEDIA ROOM

Cameras

PortaBrace	PB-AGCX350DKOR	Wheeled Hard Case with Divider Kit for Panasonic AG-CX350	2
Neewer	66601068	Neewer Teleprompter x17 w RT10 remote + app control	1
Zoom	H4N Pro Black	4-Input / 4-Track Portable Handy Recorder with Onboard X/Y Mic Capsule with 32GB SD Card	1
Marshall	V-LCD70-AFHD	Broadcast LCD Monitor with V-H70MD Hood	3
Manfrotto	MVR901ECPL	Clamp-On Zoom Remote Control	3
TBD	TBD - Allow $1000	Cine Camera Gimbal Stabilizer	1
Sony	MDR-7506	Stereo Professional Headphones	2

Manufacturer	*Model*	*Name*	*QTY*
TBD	TBD (E-Image GA780-KIT, 780FH, and Foldable Tripod Dolly with 3" casters basis of design)	Camera Pedestal Tripod w/ Fluid Head and Tripod Dolly Kit	2
Panasonic	AG-VBR118G	Battery	2
Panasonic	AG-CX350	Professional Camera Recorder 4K/UHD	2
Panasonic	AG-BRD50P	Battery Charger	2
Panasonic	RP-SDZA128AK	SDXC cards	2
Wireless Microphones			
Lectrosonics	ZS-LRLT-B1	L-Series Camera-Mount Wireless Omni Lavalier Microphone System	2
Video Capture & Editing			
Vizrt	FG-002778-R004	Control Surface	1
Blackmagic Design	BMD-HYPERD/RSTEX4KHDR	HyperDeck Extreme 4K HDR	1
BirdDog	BDMINIHDMI	Mini HDMI to NDI Encoder/Decoder	2
Vizrt	FG-003288-R001	TriCaster Mini Go	1
Console			
Allen & Heath	AH-SQ-5-RK19	19” Rack Mounting Kit (12u)	1
Allen & Heath	AH-M-SQ-SDANTE-A	64 X 64 SQ Dante Card 96kHz / 48kHz	1
Allen & Heath	AH-SQ-5	96kHz processing, 48 Input Channels, 17 Faders / 6 Layers, 12 Stereo mixes+LR, 3 Stereo Matrix, 7” capacitive touchscreen	1
Allen & Heath	AH-DT168	16 x 8 Dante audio expander with dLive 96kHz mic preamps,	1
Allen & Heath	AH-AP11332	Dust cover for SQ-5	1
Computers			
Apple	Mac Pro	OFE	1
LG	27UP850	27" 4K IPS Production Monitor	2
NEC	ME431	43" Ultra High Definition Commercial Display with wall mount	2
Loudspeakers			
Genelec	8030C	Loudspeaker Powered	2
QSC	K8.2	Portable loudspeaker system, 2000W active, 8" woofer, 1" compression driver, 105°	2
Racks & Furniture			
TBC	Custom Quote: #JAFFH-15581-24	Custom Furniture	1

181601

Manufacturer	*Model*	*Name*	*QTY*
AVP	WKM-UD116E2-Z-B81	1x16 1RU Universal XLR Patch Panel	3
Blackbox	C6AFP70S-24	CAT6A RJ45 Shielded Feed-Through Patch Panel, 24-Port	1
Network			
Netgear	$400 Allowance	SFP Fiber Module 1GB	2
Netgear	GSM4230P	24x1G PoE+ 300W 2x1G and 4xSFP Managed Switch	1
Netgear	GSM4212P	8x1G PoE+ 125W 2x1G and 2xSFP Managed Switch	1
Wired Microphones			
Rode	PSA1	Desk-mounted Broadcast Microphone Boom Arm	2
Royer Labs	PS101	Pop Filter with Gooseneck	2
Rode	RONTG4PHDK	Shotgun Microphone Location Recording Kit	2
Shure	SM7B	Cardioid Dynamic Studio Vocal Microphone, includes standard and close-talk windscreens	3
Shure	SM58-LC	Cardioid Dynamic Microphone	4
Accessories			
LaCie	STFR2000403	2TB USB 3.1 Gen 1 Type-C Rugged Secure Portable Hard Drive	2
K&M	23200-300-55	Table microphone stand	3
Sony	MDR-7506	Stereo Professional Headphones	3
Mackie	HM-400	Rack-Mountable, 4-channel Headphone Amplifier	1
Whirlwind	MK410	Microphone Cable - 10'	15
Whirlwind	MK425	Microphone Cable - 25'	15
Whirlwind	MIC5	3' - XLR-XLR Patch Cable	20
Whirlwind	PA1	Personal Headphone Monitor	4
Sync Generator			
Brainstorm Electronics	DXD-8	Universal Clock, Precision Reference Generator with 8 Universal Outputs with PTP option	1

ALTERNATE 1 - CONFERENCING AND CLASSROOM EQUIPMENT

Equipment			
Logitech	C920	Web Camera	2
Owl Labs	Meeting Owl 3	Hybrid Video Conferencing System	1
Vibe	Vibe Board Pro 75″	Touch Screen Display on Rolling Cart	1

ALTERNATE 2 - STUDIO MIDI KEYBOARD

Equipment			
Focusrite	NOVLKE61MK3	Launchkey 61 [MK3]	1

ALTERNATE 3 - ADDITIONAL AUDIO DESKTOPS

Manufacturer	*Model*	*Name*	*QTY*
Equipment			
Microsoft	Surface Pro 9 or latest model	12th Gen Intel® Core™ i7, WiFi 16GB RAM, 1TB SSD	2

ALTERNATE 4 - CONTROL ROOM A104A MIXING CONSOLE

Mixing Console			
Allen & Heath	AH-SQ-5	96kHz XCVI FPGA processing, 48 Input Channels, DEEP Processing Ready, 17 Faders / 6 Layers, 12 Stereo mixes+LR, 3 Stereo Matrix, 7” capacitive touchscreen	1
Allen & Heath	AH-M-SQ-SDANTE-A	64 X 64 SQ Dante Card 96kHz / 48kHz	1
Allen & Heath	AH-AP11332	Dust cover for SQ-5	1

ALTERNATE 5 - HOURLY RATE FOR ADDITIONAL END USER TRAINING

Additional Training			
By Contractor	By Contractor	Hourly Rate for End User Training	1

AUDIO/VIDEO WIRE TYPES

AUDIO/VIDEO SYSTEM WIRING IS DIVIDED INTO GROUPS ACCORDING TO NOMINAL VOLTAGE LEVELS

	WIRING TYPE
GROUP A	MICROPHONE AND OTHER SENSITIVE WIRING (0mV to 100 mV)
GROUP B	LINE LEVEL WIRING (100 mV to 10V)
GROUP C	LOUDSPEAKER AND CONTROL WIRING (10 V TO 70 V)
GROUP D	VIDEO, CONTROL AND DIGITAL CIRCUITS
GROUP E	DATA AND FIBER OPTIC CABLE
GROUP F	SPARE CONDUIT

NOTE: THESE WIRING GROUPS MUST NEVER BE INTERMIXED WITHIN A GIVEN CONDUIT RUN OR JUNCTION BOX!

AUDIO/VIDEO CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING WIRING OF DIFFERENT GROUPS IS:

	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E
GROUP A	ADJACENT	6"	12"	12"	12"
GROUP B	--	ADJACENT	12"	6"	6"
GROUP C	--	--	ADJACENT	6"	6"
GROUP D	--	--	--	ADJACENT	ADJACENT
GROUP E	--	--	--	--	ADJACENT
GROUP F	12"	12"	12"	12"	12"

NOTE: NINETY DEGREE CROSSINGS IN CLOSE PROXIMITY ARE ACCEPTABLE. SEPARATIONS MUST BE MAINTAINED UNTIL WITHIN SIX FEET OF BOX OR GUTTER ENTRY.

ELECTRICAL CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING AUDIO/VIDEO WIRING AND OTHER ELECTRICAL SERVICE CONDUIT IS:

	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E	GROUP F
DIMMER CONTROLED LIGHTING	24"	12"	6"	12"	12"	24"
SCR CONTROLLED SERVICES	24"	12"	6"	12"	12"	24"
220/440VAC CIRCUITS	6"	6"	ADJACENT	ADJACENT	ADJACENT	24"
ALL OTHER SERVICES	6"	6"	ADJACENT	ADJACENT	ADJACENT	24"

NOTE: HEAVY CURRENT DEMANDS IN, OR LONG PARALLEL RUN WITH THE ABOVE SERVICES MAY DICTATE GREATER SEPARATIONS TO AVOID INTERFERENCE IN THE SYSTEMS. SEPARATIONS MUST BE MAINTAINED UNTIL WITHIN SIX FEET OF BOX OR GUTTER ENTRY.

EXCEPTIONS:

1. THE CONDUIT SEPARATIONS ABOVE ARE BASED ON THE USE OF EMT CONDUIT FOR ALL AV AND OTHER SIGNALS.
2. SEPARATIONS WHERE RIGID CONDUIT IS UTILIZED FOR AV SYSTEMS AND/OR OTHER ADJACENT SYSTEMS MAY BE HALVED.
3. SEPARATIONS WHERE PVC CONDUIT IS UTILIZED FOR AV SYSTEMS AND/OR OTHER ADJACENT SYSTEMS MUST BE DOUBLED.
4. THE CONTRACTOR MUST HAVE WRITTEN AUTHORIZATION FROM THE SYSTEMS DESIGNER FOR ANY CONDUIT INSTILLATION WHICH DOES NOT CONFORM TO THESE REQUIREMENTS.

1 CONDUIT INFORMATION
NTS

GENERAL NOTES:

1. SEE AUDIO/VIDEO SYSTEMS WRITTEN SPECIFICATION FOR WORK SCOPE DETAILS.
2. ALL CUSTOM PANELS SHALL BE NUMBERED ACCORDING TO AUDIO/VIDEO SYSTEM SIGNAL FLOW.
3. ALL AUDIO/VIDEO SYSTEM TECHNICAL AND COMMON POWER IS PROVIDED AS PART OF ELECTRICAL CONTRACT.
4. LINE VOLTAGE RECEPTACLES INDICATED AS PART OF CUSTOM AUDIO.VIDEO PANELS ARE PROVIDED AND INSTALLED BY THE AUDIO/VIDEO CONTRACTOR.
5. ALL LINE VOLATAGE RECEPTACLES AND WIRING TO BE PHYSICALLY SEPARATED FROM THE LOW VOLTAGE WIRING BY MEANS OF A METALLIC VOLTAGE BARRIER. IF BACK BOX SIZE INDICATED IN DETAIL DRAWINGS CANNOT ACCOMODATE THE REQUIRED VOLTAGE BARRIER RESIZE BACKBOX ACCORDINGLY.
6. CONFIRM FLUSH OR SURFACE MOUNT WITH ARCHITECT FOR ALL BACKBOX DEVICES PRIOR TO INSTALLATION.
7. CONFIRM ANY CUSTOM COLOR REQUIREMENTS WITH ARCHITECT PRIOR TO FABRICATION.
8. DRAWINGS ARE CONCEPT ONLY AND DETAILED ONLY TO THE EXTENT NECESSARY TO SHOW DESIGN INTENT AND SIGNAL FLOW. IT IS UNDERSTOOD AND AGREED BY THE CONTRACTOR THAT A COMPLETE AND WORKING SYSTEM SHALL BE SUPPLIED WHICH FULFILLS THE INTENT INDICATED IN THE DESIGN DOCUMENTS.

2 GENERAL AUDIO/VIDEO NOTES
NTS

AV WIRE TYPES					
SIGNAL TYPE	DESCRIPTION	DESCRIPTOR	MANUFACTURER	WIRE NUMBER	OUTER DIAMETER
A	MICROPHONE	MIC	Belden	9451	0.135
B	COMM SYSTEM	COMM	Belden	9460	0.23
B	TIE LINES	LINE	Belden	1696A	0.234
C	TWISTED JACKETED 14 AWG	70V4	West Penn	226	0.234
C	TWISTED JACKETED 16 AWG	70V6	West Penn	225	0.182
C	TWISTED JACKETED 16 AWG - REMOTE POWER	CAMPWR	West Penn	225	0.182
C	TWISTED JACKETED 16 AWG - INDUCTION LOOP	LOOP	West Penn	225	0.182
C	TWISTED JACKETED 8 AWG	LS08	West Penn	C208	0.498
C	TWISTED UNJACKETED 10 AWG	LS10	West Penn	NJ210BKWH	0.326
C	TWISTED UNJACKETED 12 AWG	LS12	West Penn	C207	0.26
C	TWISTED UNJACKETED 14 AWG	LS14	West Penn	C206	0.222
C	(4 COND) JACKETED 18 AWG	LSXP	Belden	1502R	0.25
C	(4 COND) JACKETED 16 AWG - VOLUME CONTROL	VOL	West Penn	245	0.217
D	RF-MICS AND RF-ALS	ANT	Belden	7810A	.403
D	VIDEO COAX	COAX	Belden	1794a	0.32
D	MIDI	MIDI	Belden	9941	0.23
D	CONTROL SYSTEM RELAY	RLY	Belden	9460	0.23
D	RMS	RMS	Belden	8205	0.18
D	CONTROL SYSTEM 232/485 AND IR	SER	Belden	9460	0.23
E	MULTI MODE FIBER (6 ct.) OM4	MMF	Belden	FI4D006R9A	0.17
E	SINGLE MODE FIBER (6 ct.) OS2	SMF	Belden	FISD006R9	0.17
E	SMPTE HYBRID	SMPTE	Gepco	HDC920R	0.362
E	SHIELDED CAT6A	STP	Belden	10GX52F	0.3
E	UNSHIELDED CAT6A	UTP	Belden	2412	0.22
F	BEVWAY DUCT	BVWY	Kelly Bevway	8" SYSTEM	
F	FIRE STOPPED CABLE PASS TRIPLE	CBP3	Abesco	3X 31942 + 31986	
F	FIRE STOPPED CABLE PASS SINGLE	CPB1	Abesco	31942 + 31982	
F	EMPTY CONDUIT - 1"	ECO1			
F	EMPTY CONDUIT - 2"	ECO2			

AV Sheet List	
Sheet Number	Sheet Name
AV-0.01	GENERAL NOTES
AV-0.02	AV SYMBOLS
AV-0.04	AV SCHEDULES
AV-0.30	AV SIGNAL FLOWS
AV-0.30A	AV SIGNAL FLOWS - ADDITION
AV-0.31	AV SIGNAL FLOWS
7 AV-0.31A	AV SIGNAL FLOWS - ADDITION
AV-0.32A	AV SIGNAL FLOWS - ADDITION
AV-1.01A	FIRST FLOOR PLAN - ADDITION
AV-2.01A	REFLECTED CEILING PLAN FIRST FLOOR - ADDITION
AV-2.02A	REFLECTED CEILING SECOND FLOOR - ADDITION
AV-3.00A	SECTIONS - ADDITION
AV-3.01A	SECTIONS - ADDITION
AV-3.02	SECTIONS
7 AV-3.02A	SECTIONS - ADDITION
AV-4.01	AV DETAILS
AV-9.01	AV PLATES AND PANELS 1
AV-9.02	AV PLATES AND PANELS 2
AV-9.03	AV PLATES AND PANELS 3

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MERIDEN PUBLIC LIBRARY RENOVATIONS PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

GENERAL NOTES

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	NTS
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS
7	03/04/2024	Phase 2

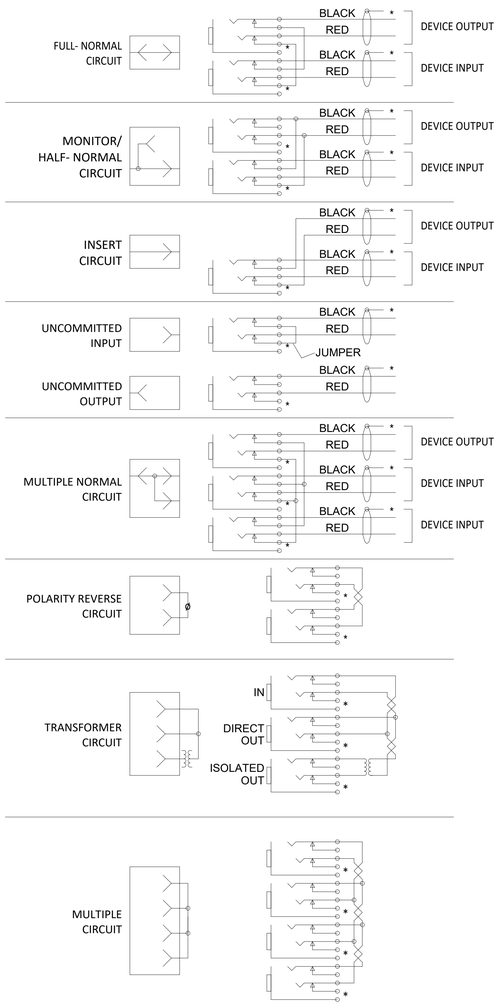
AV-0.01

KEY - SIGNAL FLOW

# AV### — REFERENCE NUMBER; SIGNAL DESTINATION FLAG; GO TO SHEET NUMBER IF ROUTING BETWEEN DRAWING SHEETS	
SWITCH — DEVICE DESCRIPTION; DEVICE FLAG	
XX	TERMINATION LABEL
	SIGNAL CONTINUATION
	LOOSE CABLE
	MULTIPIN TAIL FAN OUT
	CONNECTION POINT
	VOLUME ATTENUATOR
	PROVIDE CABLE AND CONNECTOR TERMINATION WITHIN RACK (NO CONNECTION AT THIS TIME)
	AMPLIFIER
	LOUDSPEAKER
	PATCH BAY (SEE COVER SHEET FOR WIRING CONVENTIONS)
	TRANSFORMER
	'X'P3T SWITCH (X = CHOOSE ADDITIONAL POLES FOR BALANCED CIRCUITS AS REQUIRED) 'X'PDT RELAY
	CIRCUIT PATH JUNCTION CIRCUIT PATH CROSS NO JUNCTION MULTIPLE CIRCUIT PATHS GROUPED FOR CLARITY NO JUNCTION

1 SIGNAL FLOW STANDARD SYMBOLS
NTS

PATCHBAY WIRING CONVENTIONS



* TERMINATE ALL CABLE SHIELDS AND GROUNDS AS REQUIRED FOR PROPER CIRCUIT OPERATION AND GROUNDING.

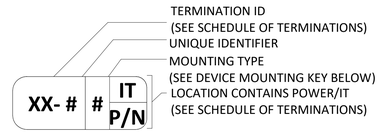
2 AUDIO PATCHBAY WIRING CONVENTIONS
NTS

KEY TO STANDARD CONNECTORS

DEVICE	DESCRIPTION	DEVICE	DESCRIPTION
W3	WHIRLWIND W3CRP MASS CONNECTOR		MALE XLR PANEL CONNECTOR NEUTRIK NC3MD-L-BAG-1
			FEMALE XLR PANEL CONNECTOR NEUTRIK NC3FD-L-BAG-1
W4	WHIRLWIND W4CRP MASS CONNECTOR		1/4" T.R.S. PANEL CONNECTOR NEUTRIK NJ3FP6C-BAG
			RCA PANEL CONNECTOR NEUTRIK NF2D-B-x
W5	WHIRLWIND W5CRP MASS CONNECTOR		3.5MM STEREO PANEL - SWITCHCRAFT EH35MMSSCB
			BNC PANEL CONNECTOR NEUTRIK NBB75DFIB
	CAT6A SHIELDED JACK HUBBELL HJS6A USE WITH HUBBELL NS6## DECORA		CAT6A SHIELDED PANEL CONNECTOR NEUTRIK NE8FDX-Y6-B
			FIBER OPTIC PANEL CONNECTOR NEUTRIK NO2-4FDW-1-A
	ILLUMINATED MOMENTARY PUSHBUTTON EAO SERIES 31	M	SPEAKON MALE 4-PIN PANEL CONNECTOR NEUTRIK NL4MP-UC
	TOGGLE SWITCH ALCOSWITCH MTA-106D	M	SPEAKON STX SERIES MALE 4-PIN PANEL CONNECTOR NEUTRIK NLT4MP-BAG
	HD15 FEMALE PANEL CONNECTOR NEUTRIK NADB15FF-B	F	SPEAKON STX SERIES FEMALE 4-PIN PANEL CONNECTOR NEUTRIK NLT4FP-BAG
	DB9 PANEL CONNECTOR NEUTRIK NADB9xx-B		SPEAKON MALE 8-PIN PANEL CONNECTOR NEUTRIK NL8MPR-BAG
	HDMI FEMALE PANEL CONNECTOR NEUTRIK NAHDMI-W-B		SMPTE 304 PANEL CONNECTOR LEMO 3K.93C
ON OFF	SEQUENCER POWER SWITCH LYNTEC SS2-PL		
	20A NEMA 5-20R ISOLATED GROUND SINGLE RECEPTACLE HUBBELL IG8310		20A NEMA 5-20R ISOLATED GROUND DUPLEX RECEPTACLE HUBBELL IG5362
	POWERCON TRUE1 20A PANEL CONNECTOR NEUTRIK NAC3FPX	P	POWERCON PANEL POWER OUTLET NEUTRIK NAC3MPB-BAG
	30A NEMA L5-30 120V 30A RECEPTACLE		30A NEMA L6-30 240V 30A RECEPTACLE
	30A NEMA L21-30 120/208V 30A RECEPTACLE (5-WIRE)		DC POWER TWIST-LOCK HUBBELL 7468 (MATING PLUG: 7465V)

3 STANDARD CONNECTORS & SYMBOLS
NTS

TERMINATION SYMBOL KEY



DEVICE MOUNTING TYPE KEY
- A - MOUNT IN CEILING .
- B - MOUNT AT PROJECT OUTLET HEIGHT.*
- C - MOUNT AT PROJECT SWITCH HEIGHT. *
- D - MOUNT AT PROJECT CONTROLS HEIGHT.*
- E - MOUNT AT 84" AFF.
- F - MOUNT PER NOTE OR SPECIAL DETAIL DRAWING.
- G - CLAMP TO STRUCTURE.
- H - FREE STANDING.
- J - FLUSH MOUNT IN FLOOR.

*REFER TO ARCHITECTURAL DRAWINGS FOR PROJECT STANDARD MOUNTING HEIGHTS.

POWER & IT NETWORK REQUIREMENTS KEY
- P = AUDIO VIDEO TECHNICAL POWER
- N = NON TECHNICAL POWER
- IT = IT NETWORK RECEPTACLE

POWER BY THE ELECTRICAL CONTRACTOR AND IT BY THE STRUCTURED CABLING CONTRACTOR.
AV TECHNICAL POWER & IT INFRASTRUCTURE NOT INCLUDED IN AV SYSTEM CONTRACT.
-SEE ELECTRIC & IT INFRASTRUCTURE DIVISIONS-

4 AUDIO/VIDEO TERMINATION KEY
NTS

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MERIDEN PUBLIC LIBRARY RENOVATIONS PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE
AV SYMBOLS

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	As indicated
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
7	03/04/2024	Phase 2

AV-0.02

AV Schedule of Terminations				
TERM	QTY	Wire Type	Route To	Spares Required
B	2	LINE		1
D	2	COAX		1
E	2	STP		1
AA - FLOOR POCKET INTERFACE				
A	8	MIC	ZC	2
B	4	LINE	ZC	2
E	1	SMF	ZC	0
E	4	STP	ZC	2
AB - UPSTAGE INTERFACE				
A	2	MIC	ZC	1
E	1	STP	ZC	1
AE - FLOOR POCKET INTERFACE				
E	2	STP	DE	1
AJ - FLOOR POCKET INTERFACE				
B	8	LINE	ZC	4
E	1	SMF	ZC	0
E	4	STP	ZC	2
AK - CONTROL BOOTH INTERFACE				
B	2	LINE	ZC	1
D	2	COAX	ZC	1
E	2	SMF	ZC	0
E	4	STP	ZC	2
AM - MICROPHONE ANTENNA INTERFACE				
D	1	ANT	ZA	1
AQ - CAMERA INTERFACE				
D	2	COAX	ZC	1
E	2	STP	ZC	1
BB - COLUMN ARRAY				
C	1	LS10	ZC	2
BD - DISPLAY SPEAKERS				
C	2	LS10	ZC	1
BG - MULTIPURPOSE ROOM - CEILING				
C	1	70V4	ZC	1

AV Schedule of Terminations				
TERM	QTY	Wire Type	Route To	Spares Required
BO - CEILING P & P LOUDSPEAKER				
C	1	70V4	ZC	1
CA - ALS ANTENNA				
D	1	ANT	ZC	1
CI - CEILING MIC ARRAY				
E	1	STP	ZC	1
CO - CEILING POE P & P LOUDSPEAKER				
E	1	STP	AE, DE	1
CS - PROJECTION SCREEN CONTROL				
D	1	SER	ZC	1
CX - CONTROL PANEL				
E	1	STP	AE, DE, ZC	1
DB - DISPLAY INTERFACE - DIGITAL SIGNAGE				
E	2	STP	ZC	1
DD - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
DE - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
DF - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
DP - PROJECTOR INTERFACE				
E	2	STP	ZC	1
DT - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
EA - ANCILLARY INTERFACE				
B	2	LINE	EB	1
D	2	COAX	EB	1
E	1	SMF	ZC	0
E	2	STP	EB	1
E	2	STP	ZC	1
EB - ANCILLARY INTERFACE				
E	2	SMF	ZC	0
TA - VIDEO INTERFACE				
	1	STP	DT	1

AV Back Box Schedule		
Term	QTY	Box Type
AA	1	FSR FL-600P-4-B
AB	2	4x6x4
AE	3	FSR FL-500P-4-B
AJ	1	FSR FL-600P-4-B
AM	2	4x4x4
AQ	2	4x4x4
BB	2	4x4x4
BG	6	LOUDSPEAKER TYPE 1
CA	2	4x4x4
CI	5	
CO	12	LOUDSPEAKER TYPE 1
CS	1	SINGLE GANG
CX	5	DOUBLE GANG
DB	2	RPV WALLMATE 16
DD	1	RPV WALLMATE 16
DE	3	RPV WALLMATE 16
DF	2	RPV WALLMATE 16
DP	1	4x4x4
DT	3	RPV WALLMATE 16
EA	1	6x10x4
EB	1	6x10x4
TA	3	4x4x4

*ALL CABLING NOTED IS PROVIDED FOR REFERENCE ONLY. INFRASTRUCTURE CABLING HAS BEEN PROVIDED IN PHASE 1 SCOPE OF WORK.

7

AV Conduit Schedule					
Note: (*) Multiple wire types in conduit.					
Wire Group	Route To	QTY of Wire in Conduiit	Note	Conduit Fill	Min. Conduit Size
B		3		40%	3/4"
D		3		40%	1"
E		3		40%	1"
AA					
A	ZC	10		40%	3/4"
B	ZC	6		40%	1"
E	ZC			40%	1 1/4"
AB					
A	ZC	3		40%	3/4"
E	ZC	2		31%	1"
AE					
E	DE	3		40%	1"
AJ					
B	ZC	12		40%	1 1/2"
E	ZC			40%	1 1/4"
AK					
B	ZC	3		40%	3/4"
D	ZC	3		40%	1"
E	ZC			40%	1 1/4"
AM					
D	ZA	2		31%	1 1/4"
AQ					
D	ZC	3		40%	1"
E	ZC	3		40%	1"
BB					
C	ZC	3		40%	1"
BD					
C	ZC	3		40%	1"

AV Conduit Schedule					
Note: (*) Multiple wire types in conduit.					
Wire Group	Route To	QTY of Wire in Conduiit	Note	Conduit Fill	Min. Conduit Size
BG					
C	ZC	2		31%	3/4"
BO					
C	ZC	2		31%	3/4"
CA					
D	ZC	2		31%	1 1/4"
CI					
E	ZC	2		31%	1"
CO					
E	AE, DE	2		31%	1"
CS					
D	ZC	2		31%	3/4"
CX					
E	AE, DE, ZC	2		31%	1"
DB					
E	ZC	3		40%	1"
DD					
E	ZC	3		40%	1"
DE					
E	ZC	3		40%	1"
DF					
E	ZC	3		40%	1"
DP					
E	ZC	3		40%	1"
DT					
E	ZC	3		40%	1"
EA					
B	EB	3		40%	3/4"
D	EB	3		40%	1"
E	EB	3		40%	1"
E	ZC	4		40%	1"
EB					
E	ZC	2		31%	3/4"
TA					
	DT	2		31%	

1. The conduit calculations above meet NEC and ANSI/TIA/EIA requirements. Required spare cabling is factored into the equation. Refer to Specification section 27 41 00 – 3.3, 3.4, 3.7, and 3.8 for requirements specific to AV wire, conduit, and boxes.

2. These calculations are based on the use of EMT conduit. It is the responsibility of the contractor to determine sizing requirements for other allowed conduit types.

3. The calculations are accurate for use of unterminated cabling as specified and not applicable for any pre-terminated cabling that may be specified to run in conduit (HDMI, pre-terminated fiber, etc.).

4. Flexible conduit is not allowed unless specifically approved in writing by the systems designer. Conduit upsizing will be required and it is the responsibility of the contractor to determine those sizing requirements

5. All AV conduit must meet NEC and ANSI/TIA/EIA-569 standards. Refer to AV Specification 27 41 00 – 3.3 for maximum allowable bend requirements.

6. The conduit sizing information provided above does not release the electrical contractor from the requirement to provide a conduit riser for the AV conduit systems (27 41 00 – 1.12 Work Scope Summary Table) as a submittal for approval prior to installing conduit for the AV systems.

7. The table above indicates terminal conduit sizing at each termination for each signal group. This in no way means that individual conduit runs must be home run from every termination. While that approach is allowable it is often not feasible. It is highly recommended that conduits of like signal group traveling to the same or adjacent location(s) be combined/split at junction boxes (maintaining separations by signal type) and run long distances in larger conduits, as there is often not enough physical space to run them individually and still maintain proper separations.

8. Pay careful attention to distance limitations for certain types of AV cabling (27 41 00 – 3.8.N, 3.8.O). Electrical Contractor must not install conduit for the cable types mentioned in the referenced sections that will require that the cabling exceed the distance limitations (27 41 00 – 3.3.G).

AV Power Schedule				
NOTE: ALL CIRCUIT COUNTS ARE PER TERMINATION.				
POWER TYPE	V/A/PH	CIRCUIT QTY	RECEPTACLE TYPE	RECEPTACLE QTY
AB				
NTP	120V/20A/1PH	1	DUPLEX	1
AE				
NTP	120V/20A/1PH		DUPLEX	2
AK				
NTP	120V/20A/1PH	1	DUPLEX	1
AQ				
NTP	120V/20A/1PH	1	DUPLEX	1
DB				
NTP	120V/20A/1PH	1	DUPLEX	1
DD				
NTP	120V/20A/1PH	1	DUPLEX	1
DE				
NTP	120V/20A/1PH	1	DUPLEX	2
DF				
NTP	120V/20A/1PH	1	DUPLEX	1
DP				
NTP	208V/30A/3PH	1	L6-20	1
DT				
NTP	120V/20A/1PH	1	DUPLEX	1
EA				
NTP	120V/20A/1PH	1	DUPLEX	1
EB				
NTP	120V/20A/1PH	1	DUPLEX	1
TA				
NTP	120V/20A/1PH	1	DUPLEX	1
ZC				
NTP	120V/20A/1PH	4	TAILS	1

AV IT Location Schedule	
Wire Type	Wire QTY
AB	
CATEGORY	2
AE	
CATEGORY	2
AK	
CATEGORY	2
DB	
CATEGORY	2
DD	
CATEGORY	2
DE	
CATEGORY	2
DF	
CATEGORY	2
DT	
CATEGORY	2
EA	
CATEGORY	2
EB	
CATEGORY	2
TA	
CATEGORY	2
ZC	
CATEGORY	2

AV Display Schedule						
Term	Unique ID Number	Display Size	Display Type	Center AFF	Bottom AFF	SUBSYSTEM
DISPLAY TYPE 1						
	0	43"	DISPLAY TYPE 1	5' - 0"	4' - 0 29/32"	
DISPLAY TYPE 3						
	2	55"	DISPLAY TYPE 3	5' - 0"	3' - 10 1/16"	
	3	55"	DISPLAY TYPE 3	5' - 0"	3' - 10 1/16"	
DISPLAY TYPE 4						
DB						
DB	2	65"	DISPLAY TYPE 4	5' - 0"	3' - 7 9/16"	
DISPLAY TYPE 5						
	4	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DB						
DB	1	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DT						
DT	1	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DT	2	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DISPLAY TYPE 6						
DE						
DE	2	85"	DISPLAY TYPE 6	5' - 0"	3' - 2 17/32"	
DISPLAY TYPE 7						
	1	98"	DISPLAY TYPE 7	5' - 0"	2' - 11 13/32"	
DE						
DE	1	98"	DISPLAY TYPE 7	5' - 0"	2' - 11 13/32"	
DE	3	98"	DISPLAY TYPE 7	5' - 0"	2' - 11 13/32"	

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MERIDEN PUBLIC LIBRARY RENOVATIONS
PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

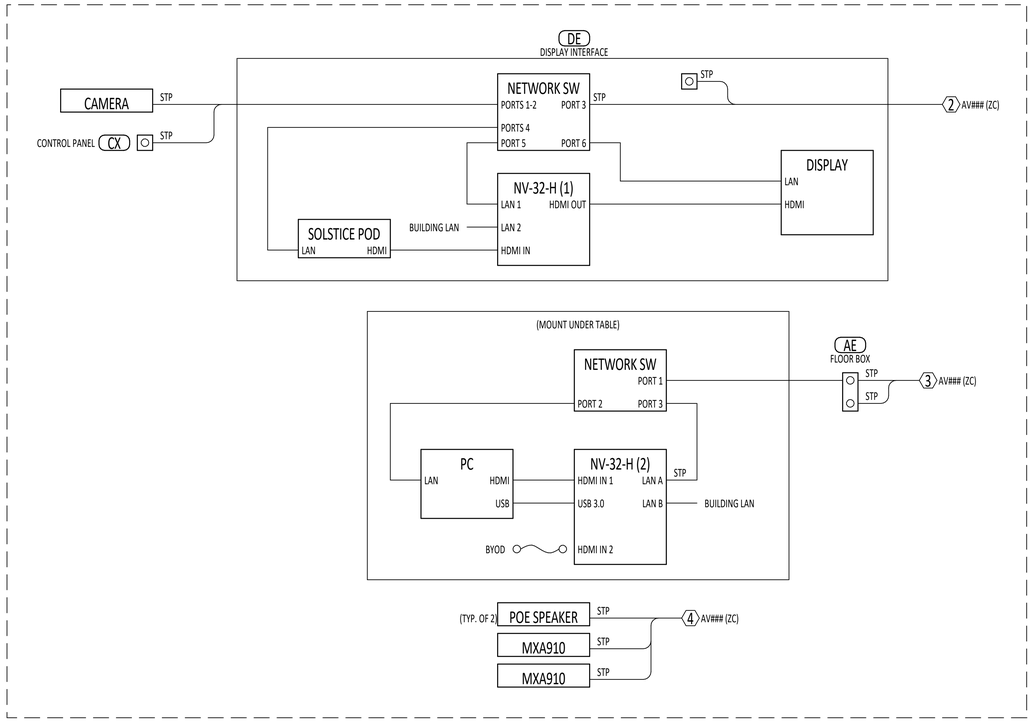
AV SCHEDULES

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

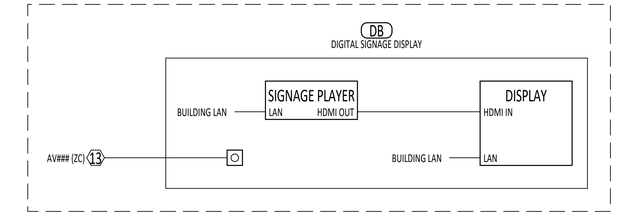
ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
7	03/04/2024	Phase 2

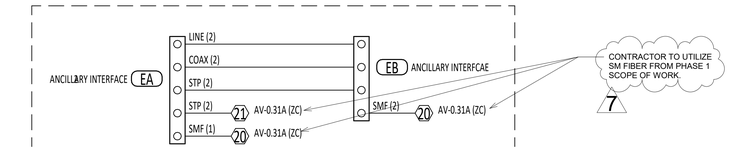
AV-0.04



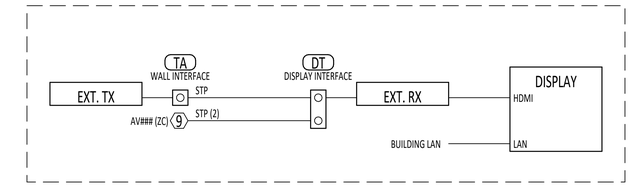
1 AV - Signal Flows - SEMINAR ROOM 127 - ADDITION
NTS



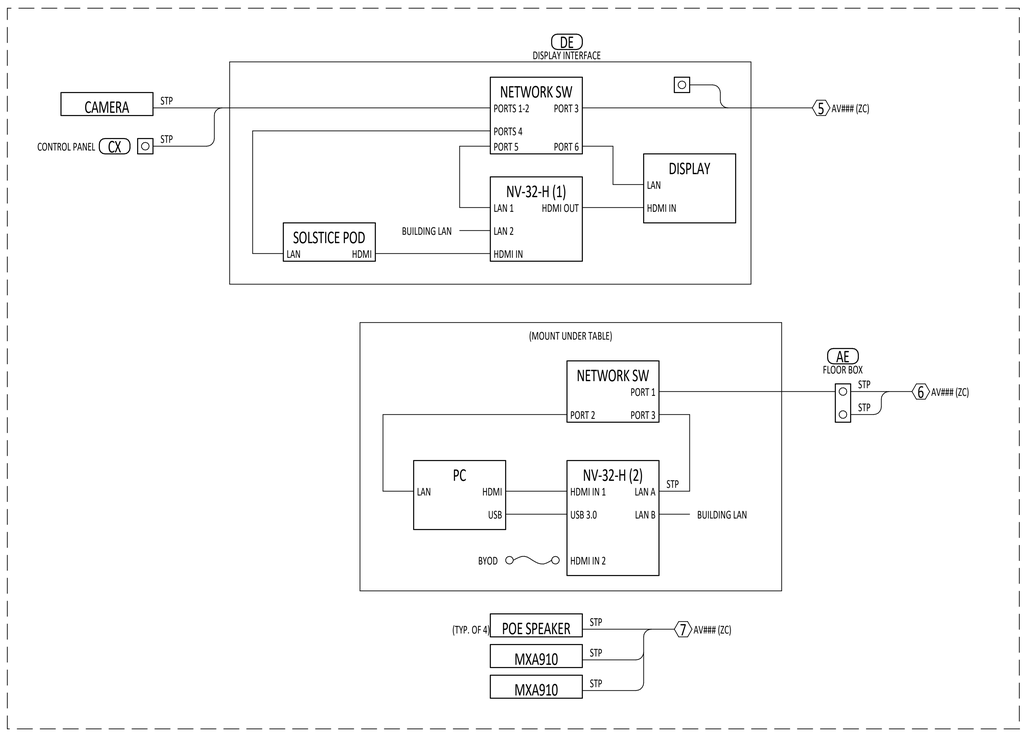
3 AV - Signal Flows - DIGITAL SIGNAGE - ADDITION
NTS



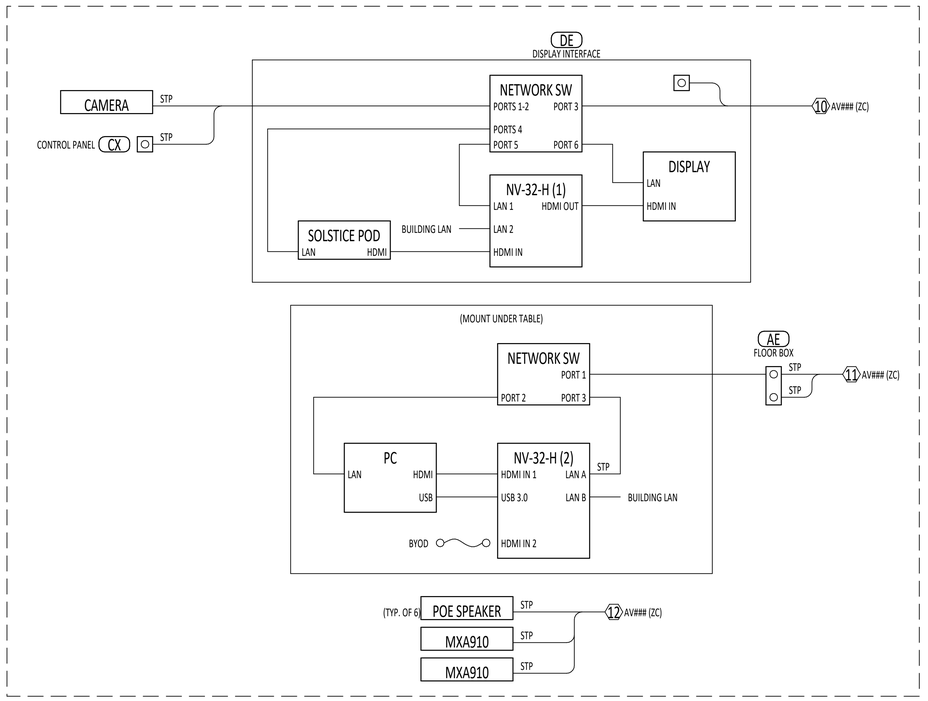
4 AV - Signal Flows - DIGITAL MEDIA ROOM 109 - ADDITION
NTS



5 AV - Signal Flows - TEEN & STORY AREAS - ADDITION
NTS



2 AV - Signal Flows - MEETING ROOM 126 - ADDITION
NTS



6 AV - Signal Flows - MULTIPURPOSE PROGRAM ROOM 105 - ADDITION
NTS

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MERIDEN PUBLIC LIBRARY RENOVATIONS PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

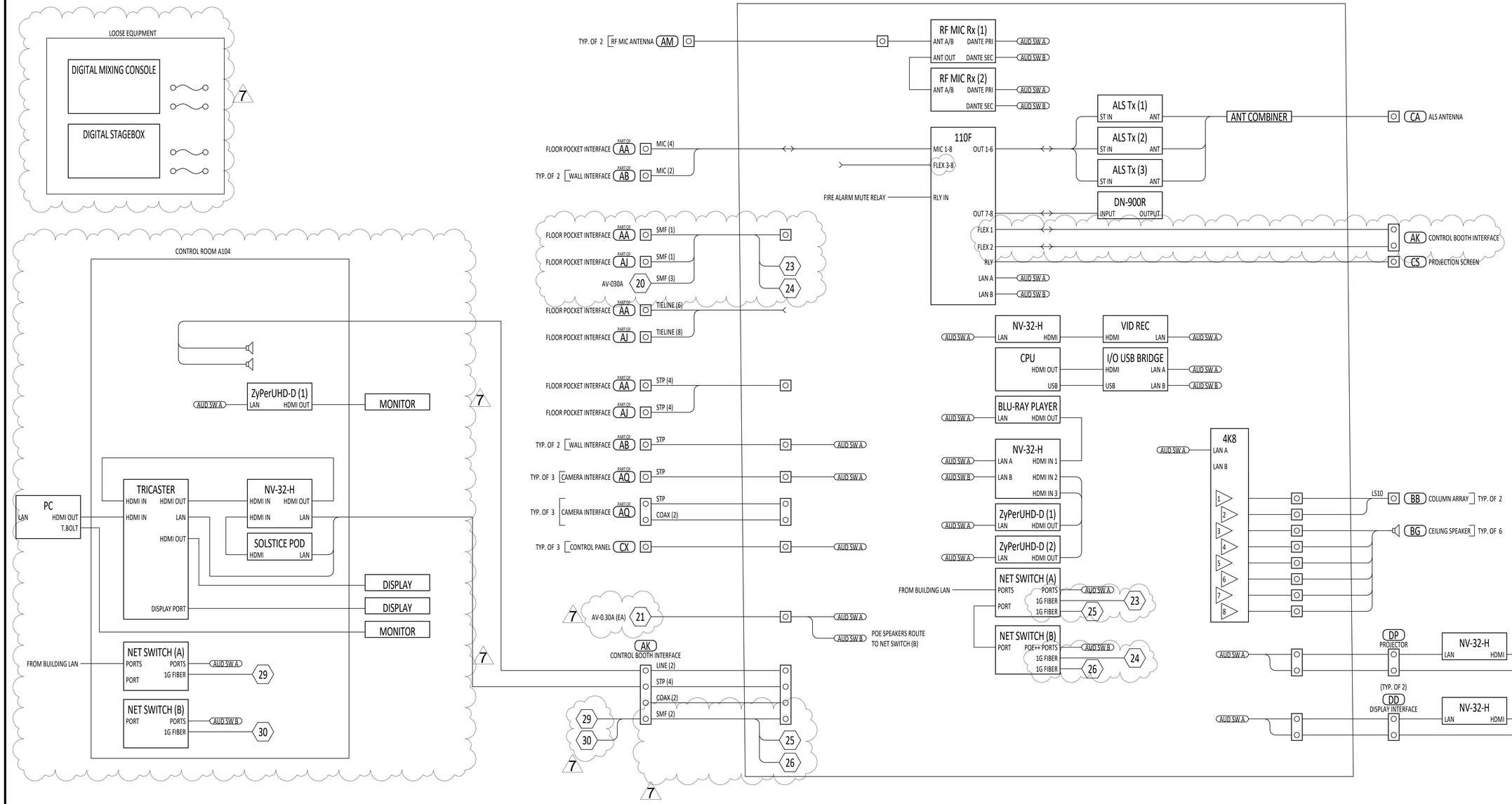
AV SIGNAL FLOWS - ADDITION

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	NTS
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS
7	03/04/2024	Phase 2

AV-0.30A



1 AV - Signal Flows - MULTI PURPOSE ROOM 124 - ADDITION
NTS

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MERIDEN PUBLIC LIBRARY RENOVATIONS PHASE 2

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

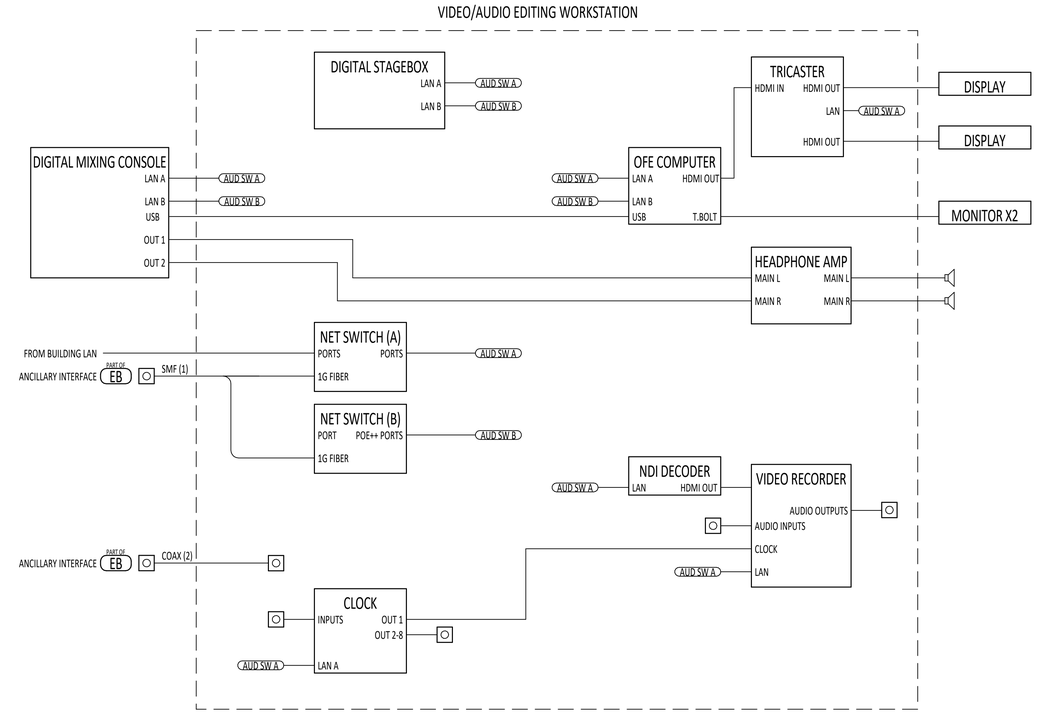
AV SIGNAL FLOWS - ADDITION

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	NTS
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS
7	03/04/2024	Phase 2

AV-0.31A



1 AV - Signal Flows - DIGITAL MEDIA ROOM 109 - VIDEO/AUDIO EDITING WORKSTATION
NTS

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105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV SIGNAL FLOWS - ADDITION

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	NTS
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
7	03/04/2024	Phase 2

7 AV-0.32A

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105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

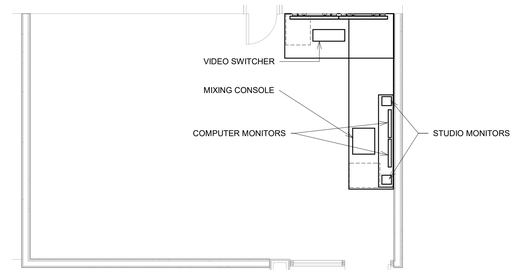
FIRST FLOOR PLAN - ADDITION

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	1/8" = 1'-0"
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
5	05/25/2022	AV REVISIONS
7	03/04/2024	Phase 2

AV-1.01A

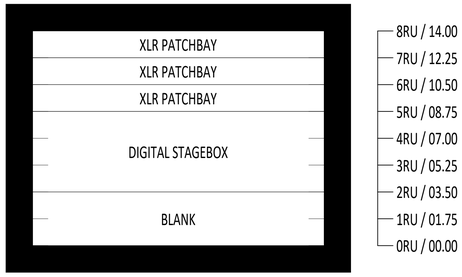


2 DIGITAL MEDIA ROOM
1/4" = 1'-0"

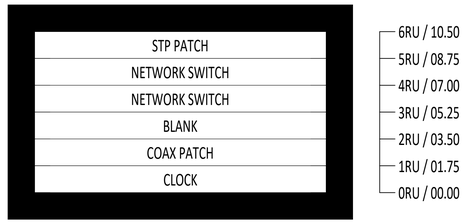
TOP LEFT

TOP RIGHT

BOTTOM LEFT



BOTTOM RIGHT



1 AV - Rack Elevations - VIDEO/AUDIO EDITING WORKSTATION
3" = 1'-0"

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MERIDEN PUBLIC LIBRARY RENOVATIONS
PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

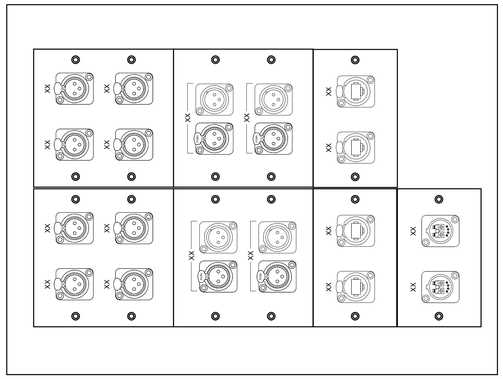
DRAWING TITLE
AV DETAILS

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	As indicated
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

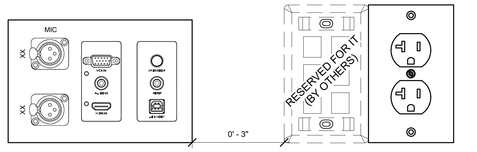
ISSUE DATES

NO.	DATE	PURPOSE
7	03/04/2024	Phase 2

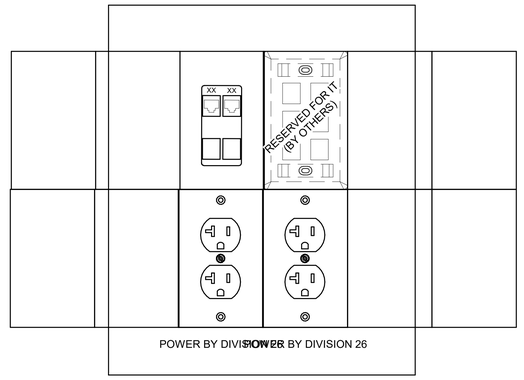
AV-4.01
7



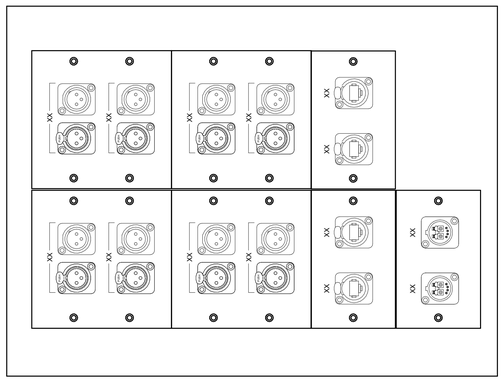
1 Panel AA - FLOOR POCKET INTERFACE
BOX TYPE - FL-600-P-4-B



2 Panel AB - UPSTAGE INTERFACE
BOX TYPE - 4x6x4



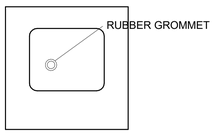
3 Panel AE - FLOOR BOX INTERFACE
BOX TYPE - FL-500-P-4-B



4 Panel AJ - FLOOR POCKET INTERFACE
BOX TYPE - FL-600-P-4-B

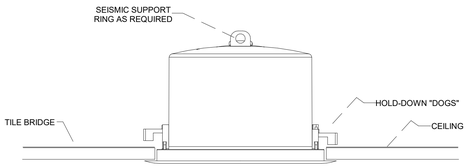
5 Panel AM - MICROPHONE ANTENNA INTERFACE
BOX TYPE - 4x4x4

6 Panel AQ - CAMERA INTERFACE
BOX TYPE - 4x4x4



7 Panel BB - COLUMN ARRAY
BOX TYPE - 4x4x4

8 Panel BD - DISPLAY SPEAKERS
BOX TYPE - 4x4x4



NOTES:
1. AUDIO CONTRACTOR RESPONSIBLE FOR DETERMINING FINAL MOUNTING METHOD AND REQUIRED MOUNTING ACCESSORIES BASED ON CEILING TYPE AND INSTALLATION REQUIREMENTS.
2. USE SHORT LENGTH OF FLEX CONDUIT FROM ADJACENT LOW-VOLTAGE J-BOX TO RUN SIGNAL CABLE.

9 Panel BG - MULTIPURPOSE ROOM - CEILING

7 *PROVIDED FOR REFERENCE ONLY

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MERIDEN PUBLIC LIBRARY RENOVATIONS PHASE 2
105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

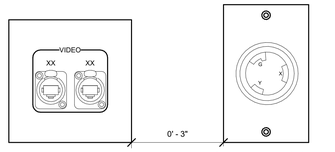
AV PLATES AND PANELS 1

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	1:2
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

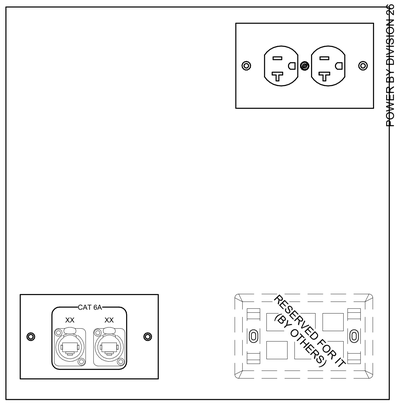
NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
7	03/04/2024	Phase 2

AV-9.01

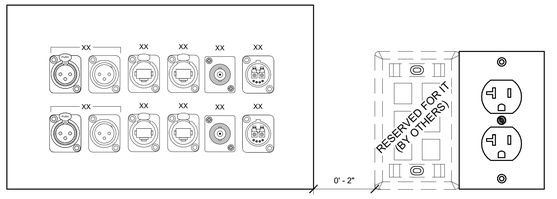


POWER BY DIVISION 26

1 Panel DP - PROJECTOR INTERFACE
BOX TYPE - 4x4x4

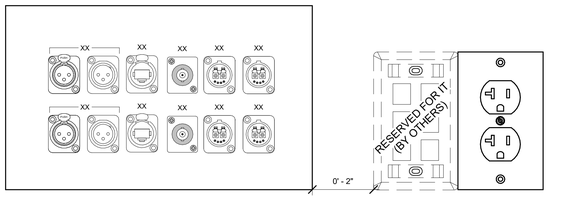


2 Panel DT - DISPLAY INTERFACE - PRESENTATION
BOX TYPE - RPV WALLMATE 16



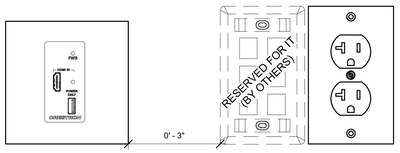
POWER BY DIVISION 26

3 Panel EA - ANCILLARY INTERFACE
BOX TYPE - 6X10x4



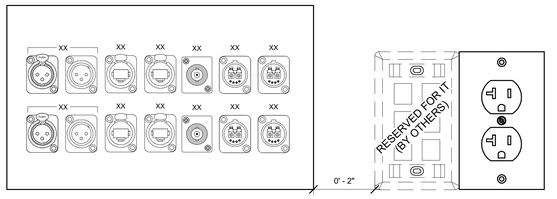
POWER BY DIVISION 26

4 Panel EB - ANCILLARY INTERFACE
BOX TYPE - 6X10x4



POWER BY DIVISION 26

5 Panel TA - VIDEO INTERFACE
BOX TYPE - 4x4x4



POWER BY DIVISION 26

6 Panel AK - CONTROL BOOTH INTERFACE
BOX TYPE - 6X10x4

7 *PROVIDED FOR REFERENCE ONLY

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KEY PLAN

DRAWING TITLE

AV PLATES AND PANELS 3

MERIDEN BID NO.	B024-17R
PROJ. NO.	181601
SCALE	1:2
DATE	03/04/2024
DRAWN BY	MMA
APPROVED BY	BBA

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS
7	03/04/2024	Phase 2

AV-9.03

REFERENCE DOCUMENTS

Meriden Library – Phase I Reference Drawings

Meriden Library – Phase I AV Specifications 274100

***PHASE 1 WORK NOT IN CONTRACT - PROVIDED FOR INFROMATION ONLY**

AUDIO/VIDEO WIRE TYPES

AUDIO/VIDEO SYSTEM WIRING IS DIVIDED INTO GROUPS ACCORDING TO NOMINAL VOLTAGE LEVELS

	WIRING TYPE
GROUP A	MICROPHONE AND OTHER SENSITIVE WIRING (0mV to 100 mV)
GROUP B	LINE LEVEL WIRING (100 mV to 10V)
GROUP C	LOUDSPEAKER AND CONTROL WIRING (10 V TO 70 V)
GROUP D	VIDEO, CONTROL AND DIGITAL CIRCUITS
GROUP E	DATA AND FIBER OPTIC CABLE
GROUP F	SPARE CONDUIT

NOTE: THESE WIRING GROUPS MUST NEVER BE INTERMIXED WITHIN A GIVEN CONDUIT RUN OR JUNCTION BOX!

AUDIO/VIDEO CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING WIRING OF DIFFERENT GROUPS IS:

	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E
GROUP A	ADJACENT	6"	12"	12"	12"
GROUP B	--	ADJACENT	12"	6"	6"
GROUP C	--	--	ADJACENT	6"	6"
GROUP D	--	--	--	ADJACENT	ADJACENT
GROUP E	--	--	--	--	ADJACENT
GROUP F	12"	12"	12"	12"	12"

NOTE: NINETY DEGREE CROSSINGS IN CLOSE PROXIMITY ARE ACCEPTABLE. SEPARATIONS MUST BE MAINTAINED UNTIL WITHIN SIX FEET OF BOX OR GUTTER ENTRY.

ELECTRICAL CONDUIT SEPARATION

MINIMUM CONDUIT SEPARATION BETWEEN CONDUITS CARRYING AUDIO/VIDEO WIRING AND OTHER ELECTRICAL SERVICE CONDUIT IS:

	GROUP A	GROUP B	GROUP C	GROUP D	GROUP E	GROUP F
DIMMER CONTROLED LIGHTING	24"	12"	6"	12"	12"	24"
SCR CONTROLLED SERVICES	24"	12"	6"	12"	12"	24"
220/440VAC CIRCUITS	6"	6"	ADJACENT	ADJACENT	ADJACENT	24"
ALL OTHER SERVICES	6"	6"	ADJACENT	ADJACENT	ADJACENT	24"

NOTE: HEAVY CURRENT DEMANDS IN, OR LONG PARALLEL RUN WITH THE ABOVE SERVICES MAY DICTATE GREATER SEPARATIONS TO AVOID INTERFERENCE IN THE SYSTEMS. SEPARATIONS MUST BE MAINTAINED UNTIL WITHIN SIX FEET OF BOX OR GUTTER ENTRY.

EXCEPTIONS:

1. THE CONDUIT SEPARATIONS ABOVE ARE BASED ON THE USE OF EMT CONDUIT FOR ALL AV AND OTHER SIGNALS.
2. SEPARATIONS WHERE RIGID CONDUIT IS UTILIZED FOR AV SYSTEMS AND/OR OTHER ADJACENT SYSTEMS MAY BE HALVED.
3. SEPARATIONS WHERE PVC CONDUIT IS UTILIZED FOR AV SYSTEMS AND/OR OTHER ADJACENT SYSTEMS MUST BE DOUBLED.
4. THE CONTRACTOR MUST HAVE WRITTEN AUTHORIZATION FROM THE SYSTEMS DESIGNER FOR ANY CONDUIT INSTILLATION WHICH DOES NOT CONFORM TO THESE REQUIREMENTS.

1 CONDUIT INFORMATION
NTS

GENERAL NOTES:

1. SEE AUDIO/VIDEO SYSTEMS WRITTEN SPECIFICATION FOR WORK SCOPE DETAILS.
2. ALL CUSTOM PANELS SHALL BE NUMBERED ACCORDING TO AUDIO/VIDEO SYSTEM SIGNAL FLOW.
3. ALL AUDIO/VIDEO SYSTEM TECHNICAL AND COMMON POWER IS PROVIDED AS PART OF ELECTRICAL CONTRACT.
4. LINE VOLTAGE RECEPTACLES INDICATED AS PART OF CUSTOM AUDIO.VIDEO PANELS ARE PROVIDED AND INSTALLED BY THE AUDIO/VIDEO CONTRACTOR.
5. ALL LINE VOLATAGE RECEPTACLES AND WIRING TO BE PHYSICALLY SEPARATED FROM THE LOW VOLTAGE WIRING BY MEANS OF A METALLIC VOLTAGE BARRIER. IF BACK BOX SIZE INDICATED IN DETAIL DRAWINGS CANNOT ACCOMODATE THE REQUIRED VOLTAGE BARRIER RESIZE BACKBOX ACCORDINGLY.
6. CONFIRM FLUSH OR SURFACE MOUNT WITH ARCHITECT FOR ALL BACKBOX DEVICES PRIOR TO INSTALLATION.
7. CONFIRM ANY CUSTOM COLOR REQUIREMENTS WITH ARCHITECT PRIOR TO FABRICATION.
8. DRAWINGS ARE CONCEPT ONLY AND DETAILED ONLY TO THE EXTENT NECESSARY TO SHOW DESIGN INTENT AND SIGNAL FLOW. IT IS UNDERSTOOD AND AGREED BY THE CONTRACTOR THAT A COMPLETE AND WORKING SYSTEM SHALL BE SUPPLIED WHICH FULFILLS THE INTENT INDICATED IN THE DESIGN DOCUMENTS.

2 GENERAL AUDIO/VIDEO NOTES
NTS

AV WIRE TYPES					
SIGNAL TYPE	DESCRIPTION	DESCRIPTOR	MANUFACTURER	WIRE NUMBER	OUTER DIAMETER
A	MICROPHONE	MIC	Belden	9451	0.135
B	COMM SYSTEM	COMM	Belden	9460	0.23
B	TIE LINES	LINE	Belden	1696A	0.234
C	TWISTED JACKETED 14 AWG	70V4	West Penn	226	0.234
C	TWISTED JACKETED 16 AWG	70V6	West Penn	225	0.182
C	TWISTED JACKETED 16 AWG - REMOTE POWER	CAMPWR	West Penn	225	0.182
C	TWISTED JACKETED 16 AWG - INDUCTION LOOP	LOOP	West Penn	225	0.182
C	TWISTED JACKETED 8 AWG	LS08	West Penn	C208	0.498
C	TWISTED UNJACKETED 10 AWG	LS10	West Penn	NJ210BKWH	0.326
C	TWISTED UNJACKETED 12 AWG	LS12	West Penn	C207	0.26
C	TWISTED UNJACKETED 14 AWG	LS14	West Penn	C206	0.222
C	(4 COND) JACKETED 18 AWG	LSXP	Belden	1502R	0.25
C	(4 COND) JACKETED 16 AWG - VOLUME CONTROL	VOL	West Penn	245	0.217
D	RF-MICS AND RF-ALS	ANT	Belden	7810A	.403
D	VIDEO COAX	COAX	Belden	1794a	0.32
D	MIDI	MIDI	Belden	9941	0.23
D	CONTROL SYSTEM RELAY	RLY	Belden	9460	0.23
D	RMS	RMS	Belden	8205	0.18
D	CONTROL SYSTEM 232/485 AND IR	SER	Belden	9460	0.23
E	MULTI MODE FIBER (6 ct.) OM4	MMF	Belden	FI4D006R9A	0.17
E	SINGLE MODE FIBER (6 ct.) OS2	SMF	Belden	FISD006R9	0.17
E	SMPTE HYBRID	SMPTE	Gepco	HDC920R	0.362
E	SHIELDED CAT6A	STP	Belden	10GX52F	0.3
E	UNSHIELDED CAT6A	UTP	Belden	2412	0.22
F	BEVWAY DUCT	BVWY	Kelly Bevway	8" SYSTEM	
F	FIRE STOPPED CABLE PASS TRIPLE	CBP3	Abesco	3X 31942 + 31986	
F	FIRE STOPPED CABLE PASS SINGLE	CPB1	Abesco	31942 + 31982	
F	EMPTY CONDUIT - 1"	ECO1			
F	EMPTY CONDUIT - 2"	ECO2			

AV Sheet List	
Sheet Number	Sheet Name
AV-0.01	GENERAL NOTES
AV-0.02	AV SYMBOLS
AV-0.04A	AV SCHEDULES - ADDITION
AV-0.30	AV SIGNAL FLOWS
AV-0.30A	AV SIGNAL FLOWS - ADDITION
AV-0.31	AV SIGNAL FLOWS
AV-0.31A	AV SIGNAL FLOWS - ADDITION
AV-1.01A	FIRST FLOOR PLAN - ADDITION
AV-2.01A	REFLECTED CEILING PLAN FIRST FLOOR - ADDITION
AV-3.00A	SECTIONS - ADDITION
AV-3.01A	SECTIONS - ADDITION
AV-3.02	SECTIONS
AV-3.02A	SECTIONS - ADDITION
AV-9.01	AV PLATES AND PANELS 1
AV-9.02	AV PLATES AND PANELS 2
AV-9.03	AV PLATES AND PANELS 3

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KEY PLAN

DRAWING TITLE
GENERAL NOTES

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	NTS
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

AV-0.01

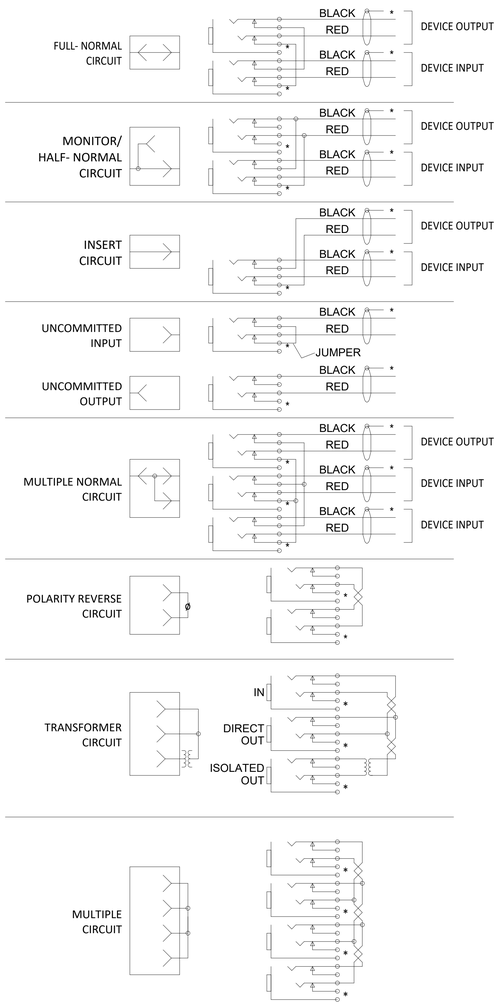
***PHASE 1 WORK NOT IN CONTRACT - PROVIDED FOR INFROMATION ONLY**

KEY - SIGNAL FLOW

# AV### — REFERENCE NUMBER; SIGNAL DESTINATION FLAG; GO TO SHEET NUMBER IF ROUTING BETWEEN DRAWING SHEETS	
SWITCH — DEVICE DESCRIPTION; DEVICE FLAG	
XX	TERMINATION LABEL
	SIGNAL CONTINUATION
	LOOSE CABLE
	MULTIPIN TAIL FAN OUT
	CONNECTION POINT
	VOLUME ATTENUATOR
	PROVIDE CABLE AND CONNECTOR TERMINATION WITHIN RACK (NO CONNECTION AT THIS TIME)
	AMPLIFIER
	LOUDSPEAKER
	PATCH BAY (SEE COVER SHEET FOR WIRING CONVENTIONS)
	TRANSFORMER
	'X'P3T SWITCH (X = CHOOSE ADDITIONAL POLES FOR BALANCED CIRCUITS AS REQUIRED) 'X'PDT RELAY
	CIRCUIT PATH JUNCTION CIRCUIT PATH CROSS NO JUNCTION MULTIPLE CIRCUIT PATHS GROUPED FOR CLARITY NO JUNCTION

1 SIGNAL FLOW STANDARD SYMBOLS
NTS

PATCHBAY WIRING CONVENTIONS



* TERMINATE ALL CABLE SHIELDS AND GROUNDS AS REQUIRED FOR PROPER CIRCUIT OPERATION AND GROUNDING.

2 AUDIO PATCHBAY WIRING CONVENTIONS
NTS

KEY TO STANDARD CONNECTORS

DEVICE	DESCRIPTION	DEVICE	DESCRIPTION
W3	WHIRLWIND W3CRP MASS CONNECTOR		MALE XLR PANEL CONNECTOR NEUTRIK NC3MD-L-BAG-1
			FEMALE XLR PANEL CONNECTOR NEUTRIK NC3FD-L-BAG-1
W4	WHIRLWIND W4CRP MASS CONNECTOR		1/4" T.R.S. PANEL CONNECTOR NEUTRIK NJ3FP6C-BAG
			RCA PANEL CONNECTOR NEUTRIK NF2D-B-x
W5	WHIRLWIND W5CRP MASS CONNECTOR		3.5MM STEREO PANEL - SWITCHCRAFT EH35MMSSCB
			BNC PANEL CONNECTOR NEUTRIK NBB75DFIB
	CAT6A SHIELDED JACK HUBBELL HJS6A USE WITH HUBBELL NS6## DECORA		CAT6A SHIELDED PANEL CONNECTOR NEUTRIK NE8FDX-Y6-B
			FIBER OPTIC PANEL CONNECTOR NEUTRIK NO2-4FDW-1-A
	ILLUMINATED MOMENTARY PUSHBUTTON EAO SERIES 31	M	SPEAKON MALE 4-PIN PANEL CONNECTOR NEUTRIK NL4MP-UC
	TOGGLE SWITCH ALCOSWITCH MTA-106D	M	SPEAKON STX SERIES MALE 4-PIN PANEL CONNECTOR NEUTRIK NLT4MP-BAG
	HD15 FEMALE PANEL CONNECTOR NEUTRIK NADB15FF-B	F	SPEAKON STX SERIES FEMALE 4-PIN PANEL CONNECTOR NEUTRIK NLT4FP-BAG
	DB9 PANEL CONNECTOR NEUTRIK NADB9xx-B		SPEAKON MALE 8-PIN PANEL CONNECTOR NEUTRIK NL8MPR-BAG
	HDMI FEMALE PANEL CONNECTOR NEUTRIK NAHDMI-W-B		SMPTE 304 PANEL CONNECTOR LEMO 3K.93C
ON OFF	SEQUENCER POWER SWITCH LYNTEC SS2-PL		
	20A NEMA 5-20R ISOLATED GROUND SINGLE RECEPTACLE HUBBELL IG8310		20A NEMA 5-20R ISOLATED GROUND DUPLEX RECEPTACLE HUBBELL IG5362
	POWERCON TRUE1 20A PANEL CONNECTOR NEUTRIK NAC3FPX	P	POWERCON PANEL POWER OUTLET NEUTRIK NAC3MPB-BAG
	30A NEMA L5-30 120V 30A RECEPTACLE		30A NEMA L6-30 240V 30A RECEPTACLE
	30A NEMA L21-30 120/208V 30A RECEPTACLE (5-WIRE)		DC POWER TWIST-LOCK HUBBELL 7468 (MATING PLUG: 7465V)

3 STANDARD CONNECTORS & SYMBOLS
NTS

TERMINATION SYMBOL KEY

XX- # # IT P/N

- TERMINATION ID (SEE SCHEDULE OF TERMINATIONS)
- UNIQUE IDENTIFIER
- MOUNTING TYPE (SEE DEVICE MOUNTING KEY BELOW)
- LOCATION CONTAINS POWER/IT (SEE SCHEDULE OF TERMINATIONS)

DEVICE MOUNTING TYPE KEY

- A - MOUNT IN CEILING .
- B - MOUNT AT PROJECT OUTLET HEIGHT.*
- C - MOUNT AT PROJECT SWITCH HEIGHT. *
- D - MOUNT AT PROJECT CONTROLS HEIGHT.*
- E - MOUNT AT 84" AFF.
- F - MOUNT PER NOTE OR SPECIAL DETAIL DRAWING.
- G - CLAMP TO STRUCTURE.
- H - FREE STANDING.
- J - FLUSH MOUNT IN FLOOR.

*REFER TO ARCHITECTURAL DRAWINGS FOR PROJECT STANDARD MOUNTING HEIGHTS.

POWER & IT NETWORK REQUIREMENTS KEY

- P = AUDIO VIDEO TECHNICAL POWER
- N = NON TECHNICAL POWER
- IT = IT NETWORK RECEPTACLE

POWER BY THE ELECTRICAL CONTRACTOR AND IT BY THE STRUCTURED CABLING CONTRACTOR.
AV TECHNICAL POWER & IT INFRASTRUCTURE NOT INCLUDED IN AV SYSTEM CONTRACT.
-SEE ELECTRIC & IT INFRASTRUCTURE DIVISIONS-

4 AUDIO/VIDEO TERMINATION KEY
NTS

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KEY PLAN

DRAWING TITLE

AV SYMBOLS

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	As indicated
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE

AV-0.02

***PHASE 1 WORK NOT IN CONTRACT - PROVIDED FOR INFROMATION ONLY**

AV Schedule of Terminations - Addition				
TERM	QTY	Wire Type	Route To	Spares Required
AA - FLOOR POCKET INTERFACE				
A	8	MIC	ZC	2
B	4	LINE	ZC	2
E	4	STP	ZC	2
AB - UPSTAGE INTERFACE				
A	2	MIC	ZC	1
E	1	STP	ZC	1
AE - FLOOR POCKET INTERFACE				
E	2	STP	ZC	1
AJ - FLOOR POCKET INTERFACE				
B	8	LINE	ZC	4
E	4	STP	ZC	2
AK - CONTROL BOOTH INTERFACE				
B	2	LINE	ZC	1
D	2	COAX	ZC	1
E	4	STP	ZC	2
AM - MICROPHONE ANTENNA INTERFACE				
D	1	ANT	ZA	1
AQ - CAMERA INTERFACE				
D	2	COAX	ZC	1
E	2	STP	ZC	1
BB - COLUMN ARRAY				
C	1	LS10	ZC	2
BD - DISPLAY SPEAKERS				
C	2	LS10	ZC	1
BG - MULTIPURPOSE ROOM - CEILING				
C	1	70V4	ZC	1
BLx - CEILING P & P LOUDSPEAKER				
C	1	70V4	BLx ON SAME CIRGUIT OR ZC	1

6

AV Schedule of Terminations - Addition				
TERM	QTY	Wire Type	Route To	Spares Required
BO - CEILING P & P LOUDSPEAKER				
C	1	70V4	ZC	1
CA - ALS ANTENNA				
D	1	ANT	ZC	1
CI - CEILING MIC ARRAY				
E	1	STP	ZC	1
CS - PROJECTION SCREEN CONTROL				
D	1	SER	ZC	1
CX - CONTROL PANEL				
E	1	STP	DE, ZC	1
DB - DISPLAY INTERFACE - DIGITAL SIGNAGE				
E	2	STP	ZC	1
DD - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
DE - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
DP - PROJECTOR INTERFACE				
E	2	STP	ZC	1
DT - DISPLAY INTERFACE - PRESENTATION				
E	2	STP	ZC	1
EA - ANCILLARY INTERFACE				
B	2	LINE	EB	1
D	2	COAX	EB	1
E	2	STP	EB	1
E	2	STP	ZC	1
EB - ANCILLARY INTERFACE				
B	2	LINE		1
D	2	COAX		1
E	2	STP		1
TA - VIDEO INTERFACE				
E	1	STP	DT	1

5

AV Back Box Schedule - Addition		
Term	QTY	Box Type
AA	1	FSR FL-600P-4-B
AB	2	4x6x4
AE	3	FSR FL-500P-4-B
AJ	1	FSR FL-600P-4-B
AK	1	4x6x4
AM	2	4x4x4
AQ	3	4x4x4
BB	2	4x4x4
BG	4	LOUDSPEAKER TYPE 1
BL1	8	LOUDSPEAKER TYPE 1
BL2	4	LOUDSPEAKER TYPE 1
BL3	8	LOUDSPEAKER TYPE 1
BL4	9	LOUDSPEAKER TYPE 1
BL5	4	LOUDSPEAKER TYPE 1
BL6	2	LOUDSPEAKER TYPE 1
BL7	15	LOUDSPEAKER TYPE 1
BL8	19	LOUDSPEAKER TYPE 1
BO	12	LOUDSPEAKER TYPE 1
CA	1	4x4x4
CI	6	SHURE MXA910
CS	1	SINGLE GANG
CX	6	DOUBLE GANG
DB	2	RPV WALLMATE 16
DD	2	RPV WALLMATE 16
DE	5	RPV WALLMATE 16
DP	1	4x4x4
DT	3	RPV WALLMATE 16
EA	1	6x8x4
EB	1	6x8x4
TA	3	4x4x4

6

AV Conduit Schedule - Addition					
Note: (*) Multiple wire types in conduit.					
Wire Group	Route To	QTY of Wire in Conduiit	Note	Conduit Fill	Min. Conduit Size
AA					
A	ZC	10		40%	3/4"
B	ZC	6		40%	1"
E	ZC	6		40%	1 1/4"
AB					
A	ZC	3		40%	3/4"
E	ZC	2		31%	1"
AE					
E	ZC	3		40%	1"
AJ					
B	ZC	12		40%	1 1/2"
E	ZC	6		40%	1 1/4"
AK					
B	ZC	3		40%	3/4"
D	ZC	3		40%	1"
E	ZC	6		40%	1 1/4"
AM					
D	ZA	2		31%	1 1/4"
AQ					
D	ZC	3		40%	1"
E	ZC	3		40%	1"
BB					
C	ZC	3		40%	1"
BD					
C	ZC	3		40%	1"
BG					
C	ZC	2		31%	3/4"
BLx					
C	BLx ON SAME CIRCUIT OR ZC	2		31%	3/4"

6

AV Conduit Schedule - Addition					
Note: (*) Multiple wire types in conduit.					
Wire Group	Route To	QTY of Wire in Conduiit	Note	Conduit Fill	Min. Conduit Size
BO					
C	ZC	2		31%	3/4"
CA					
D	ZC	2		31%	1 1/4"
CI					
E	ZC	2		31%	1"
CS					
D	ZC	2		31%	3/4"
CX					
E	DE, ZC	2		31%	1"
DB					
E	ZC	3		40%	1"
DD					
E	ZC	3		40%	1"
DE					
E	ZC	3		40%	1"
DP					
E	ZC	3		40%	1"
DT					
E	ZC	3		40%	1"
EA					
D		3		40%	1"
B	EB	3		40%	3/4"
E	EB	3		40%	1"
E	ZC	3		40%	1"
EB					
B		3		40%	3/4"
E		3		40%	1"
D	EB	3		40%	1"
TA					
E	DT	2		31%	1"

5

1. The conduit calculations above meet NEC and ANSI/TIA/EIA requirements. Required spare cabling is factored into the equation. Refer to Specification section 27 41 00 – 3.3, 3.4, 3.7, and 3.8 for requirements specific to AV wire, conduit, and boxes.

2. These calculations are based on the use of EMT conduit. It is the responsibility of the contractor to determine sizing requirements for other allowed conduit types.

3. The calculations are accurate for use of unterminated cabling as specified and not applicable for any pre-terminated cabling that may be specified to run in conduit (HDMI, pre-terminated fiber, etc.).

4. Flexible conduit is not allowed unless specifically approved in writing by the systems designer. Conduit upsizing will be required and it is the responsibility of the contractor to determine those sizing requirements

5. All AV conduit must meet NEC and ANSI/TIA/EIA-569 standards. Refer to AV Specification 27 41 00 – 3.3 for maximum allowable bend requirements.

6. The conduit sizing information provided above does not release the electrical contractor from the requirement to provide a conduit riser for the AV conduit systems (27 41 00 – 1.12 Work Scope Summary Table) as a submittal for approval prior to installing conduit for the AV systems.

7. The table above indicates terminal conduit sizing at each termination for each signal group. This in no way means that individual conduit runs must be home run from every termination. While that approach is allowable it is often not feasible. It is highly recommended that conduits of like signal group traveling to the same or adjacent location(s) be combined/split at junction boxes (maintaining separations by signal type) and run long distances in larger conduits, as there is often not enough physical space to run them individually and still maintain proper separations.

8. Pay careful attention to distance limitations for certain types of AV cabling (27 41 00 – 3.8.N, 3.8.O). Electrical Contractor must not install conduit for the cable types mentioned in the referenced sections that will require that the cabling exceed the distance limitations (27 41 00 – 3.3.G).

AV Power Schedule - Addition				
NOTE: ALL CIRCUIT COUNTS ARE PER TERMINATION.				
POWER TYPE	V/A/PH	CIRCUIT QTY	RECEPTACLE TYPE	RECEPTACLE QTY
AB				
NTP	120V/20A/1PH	1	DUPLEX	1
AE				
NTP	120V/20A/1PH	1	DUPLEX	1
AK				
NTP	120V/20A/1PH	1	DUPLEX	1
AQ				
NTP	120V/20A/1PH	1	DUPLEX	1
DB				
NTP	120V/20A/1PH	1	DUPLEX	1
DD				
NTP	120V/20A/1PH	1	DUPLEX	1
DE				
NTP	120V/20A/1PH	1	DUPLEX	1
DP				
NTP	208V/30A/3PH	1	L6-20	1
DT				
NTP	120V/20A/1PH	1	DUPLEX	1
EA				
NTP	120V/20A/1PH	1	DUPLEX	1
EB				
NTP	120V/20A/1PH	1	DUPLEX	1
TA				
NTP	120V/20A/1PH	1	DUPLEX	1
ZC				
NTP	120V/20A/1PH	4	TAILS	1

AV IT Location Schedule...	
Wire Type	Wire QTY
AB	
CATEGORY	2
AE	
CATEGORY	2
AK	
CATEGORY	2
DB	
CATEGORY	2
DD	
CATEGORY	2
DE	
CATEGORY	2
DT	
CATEGORY	2
EA	
CATEGORY	2
EB	
CATEGORY	2
TA	
CATEGORY	2
ZC	
CATEGORY	2

5

AV Display Schedule - Addition						
Term	Unique ID Number	Display Size	Display Type	Center AFF	Bottom AFF	SUBSYSTEM
DISPLAY TYPE 3						
DE						
DE	4	55"	DISPLAY TYPE 3	5' - 0"	3' - 10 1/16"	
DE	5	55"	DISPLAY TYPE 3	5' - 0"	3' - 10 1/16"	
DISPLAY TYPE 4						
DB						
DB	2	65"	DISPLAY TYPE 4	5' - 0"	3' - 7 9/16"	
DISPLAY TYPE 5						
	4	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DB						
DB	1	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DT						
DT	1	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DT	2	75"	DISPLAY TYPE 5	5' - 0"	3' - 5 3/32"	
DISPLAY TYPE 6						
	5	85"	DISPLAY TYPE 6	5' - 0"	3' - 2 17/32"	
DE						
DE	6	85"	DISPLAY TYPE 6	5' - 0"	3' - 2 17/32"	
DE	7	85"	DISPLAY TYPE 6	5' - 0"	3' - 2 17/32"	
DISPLAY TYPE 7						
DD						
DD	1	98"	DISPLAY TYPE 7	5' - 0"	2' - 11 13/32"	
DE						
DE	3	98"	DISPLAY TYPE 7	5' - 0"	2' - 11 13/32"	

5

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MERIDEN PUBLIC LIBRARY RENOVATIONS

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV SCHEDULES - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
5	05/25/2022	AV REVISIONS
6	09/12/2022	PR-26

AV-0.04A

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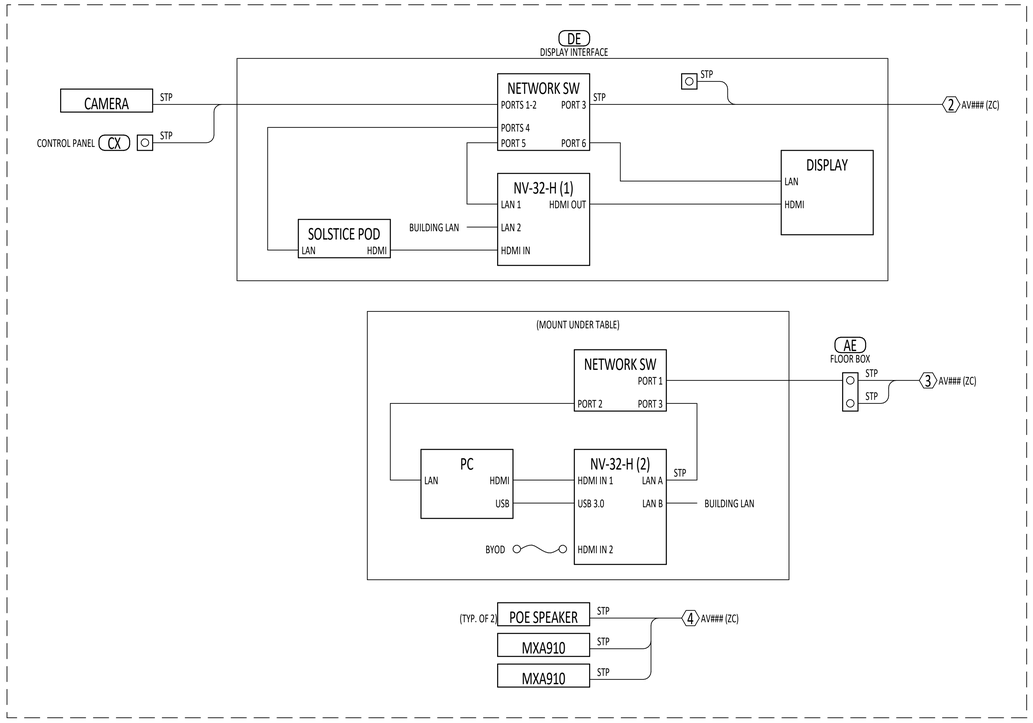
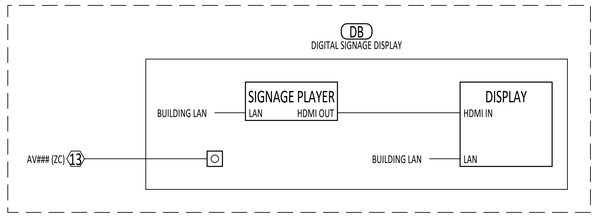
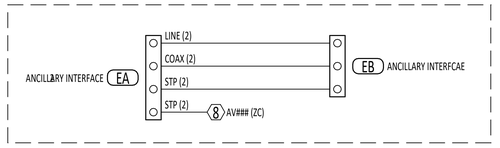


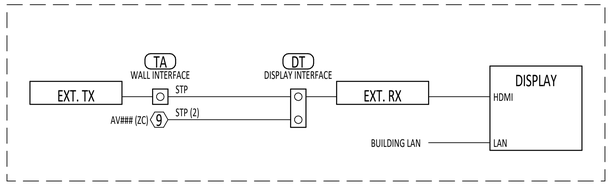
1 AV - Signal Flows - SEMINAR ROOM 127 - ADDITION
NTS



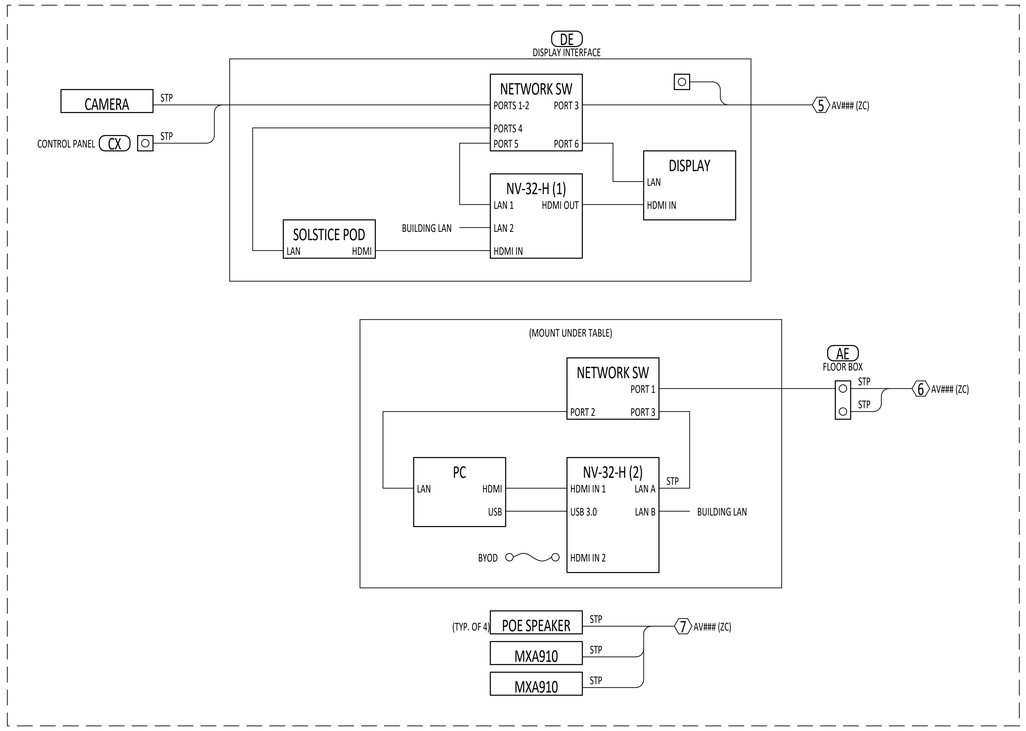
3 AV - Signal Flows - DIGITAL SIGNAGE - ADDITION
NTS



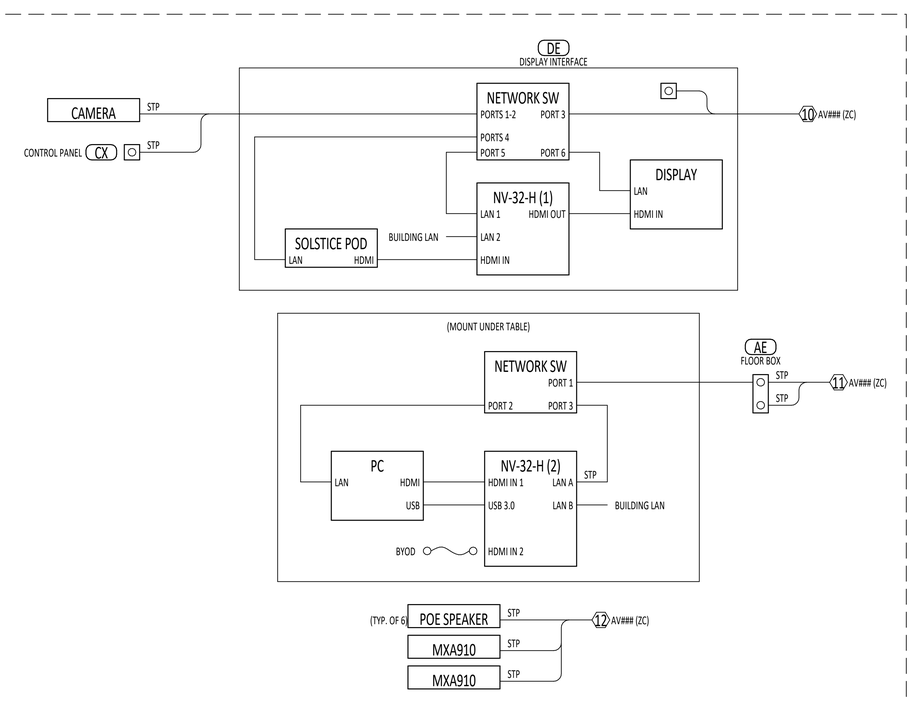
4 AV - Signal Flows - DIGITAL MEDIA ROOM 109 - ADDITION
NTS



5 AV - Signal Flows - TEEN & STORY AREAS - ADDITION
NTS



2 AV - Signal Flows - MEETING ROOM 126 - ADDITION
NTS



6 AV - Signal Flows - MULTIPURPOSE PROGRAM ROOM 105 - ADDITION
NTS

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CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV SIGNAL FLOWS - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	NTS
DATE	12/15/21
DRAWN BY	GB
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ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

AV-0.30A

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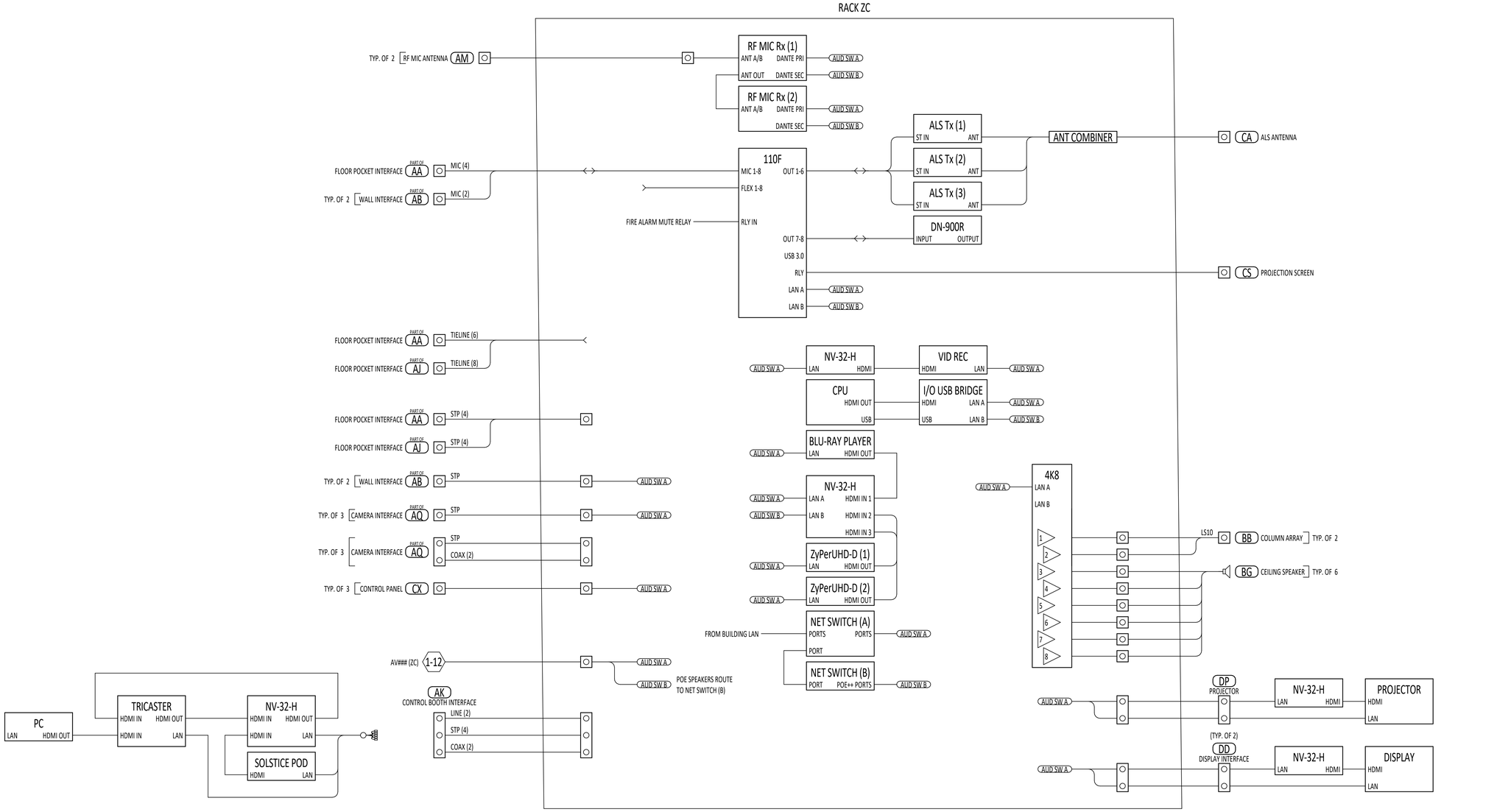

1 AV - Signal Flows - MULTI PURPOSE ROOM 124 - ADDITION
NTS

5

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KEY PLAN

DRAWING TITLE

AV SIGNAL FLOWS - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	NTS
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

AV-0.31A

5/25/2022 5:48:14 PM BIM 360://Meriden Public Library/181601-Meriden PublicLibrary-AV-2021.rvt

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COURTYARD C102
READING AREA A122
TELEPHONE 120
ELECTRIC 119
F.O.L. 118
STAIR #2 S02
SERVICE ENTRANCE 116
ELEV E02
EL. MECH 117
STOR. 116B
BOOK MOBILE GARAGE 115
MEETING ROOM 113
HOLOCAUST 112
STACKS A121
COMPUTERS A123
MEETING ROOM A128
SEMINAR A127
MEETING ROOM A129
MEETING ROOM A126
MAIN LOBBY A101
VESTIBULE A100B
CORRIDOR A102
STORAGE A107
AV RM A104A
TOILET A106
CONTROL RM A104
SERVICE A105
MULTIPURPOSE ROOM A131
ELEV E01
STOR. 102D
STOR. A102F
STOR. A102G
STOR. A102H
PERIODICALS 111
SERVICE DESK A110
STAFF TOILET 106A
STAIR #1 S01
ELEV E01
REFERENCE STACKS 107A
DIGITAL MEDIA ROOM 109
STAFF 106
MENS TOILET 101C
IT 106C
OFFICE 106B
WOMENS TOILET 101D
MAIN LOBBY A101A
TOILET 101B
TOILET 102C
STORAGE 102B
STORAGE 104A
WELCOME SECURITY 101A
PROJECT RM 104
WORKROOM 103
OFFICE 103A
CHILDREN'S SECTION 102
STORY AREA 102A
TEEN AREA 108
REFERENCE AREA 107
MULTIPURPOSE PROGRAM RM 105
SPRINKLER RM 107C
VESTIBULE 100A

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105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

FIRST FLOOR PLAN - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1/8" = 1'-0"
DATE	12/15/21
DRAWN BY	GB
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ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
5	05/25/2022	AV REVISIONS

AV-1.01A

5/25/2022 5:39:56 PM BIM 360://Meriden Public Library/181601-Meriden PublicLibrary-AV-2021.rvt

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READING AREA A122
COMPUTERS A123
STACKS A121
HOLOCAUST 112
PERIODICALS 111
STAIR #2 S02
MEETING ROOM 113
DIGITAL MEDIA ROOM 109
REFERENCE STACKS 107A
TEEN AREA 108
REFERENCE AREA 107
SERVICE DESK A110
MEETING ROOM A128
SEMINAR A127
MEETING ROOM A129
MEETING ROOM A126
STAFF 106
STAFF TOILET 106A
IT 106C
OFFICE 106B
MENS TOILET 101C
WOMENS TOILET 101D
JAN 101E
MULTIPURPOSE PROGRAM RM 105
VESTIBULE A100B
VESTIBULE 100A
STORAGE A107
TOILET A106
SERVICE A105
CONTROL RM A104
MULTIPURPOSE ROOM A133
MULTIPURPOSE ROOM A132
MULTIPURPOSE ROOM A131
TOILET 101B
STORAGE 102C
STORAGE 102B
STORAGE 104A
WELCOME SECURITY 101A
PROJECT RM 104
WORKROOM 103
OFFICE 103A
STORY AREA 102A

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KEY PLAN

DRAWING TITLE

REFLECTED CEILING PLAN FIRST FLOOR - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1/8" = 1'-0"
DATE	12/15/21
DRAWN BY	GB
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ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4
5	05/25/2022	AV REVISIONS
6	09/12/2022	PR-26

AV-2.01A

9/12/2022 11:02:19 AM BIM 360://Meriden Public Library/181601-Meriden PublicLibraryAV-2021.rvt

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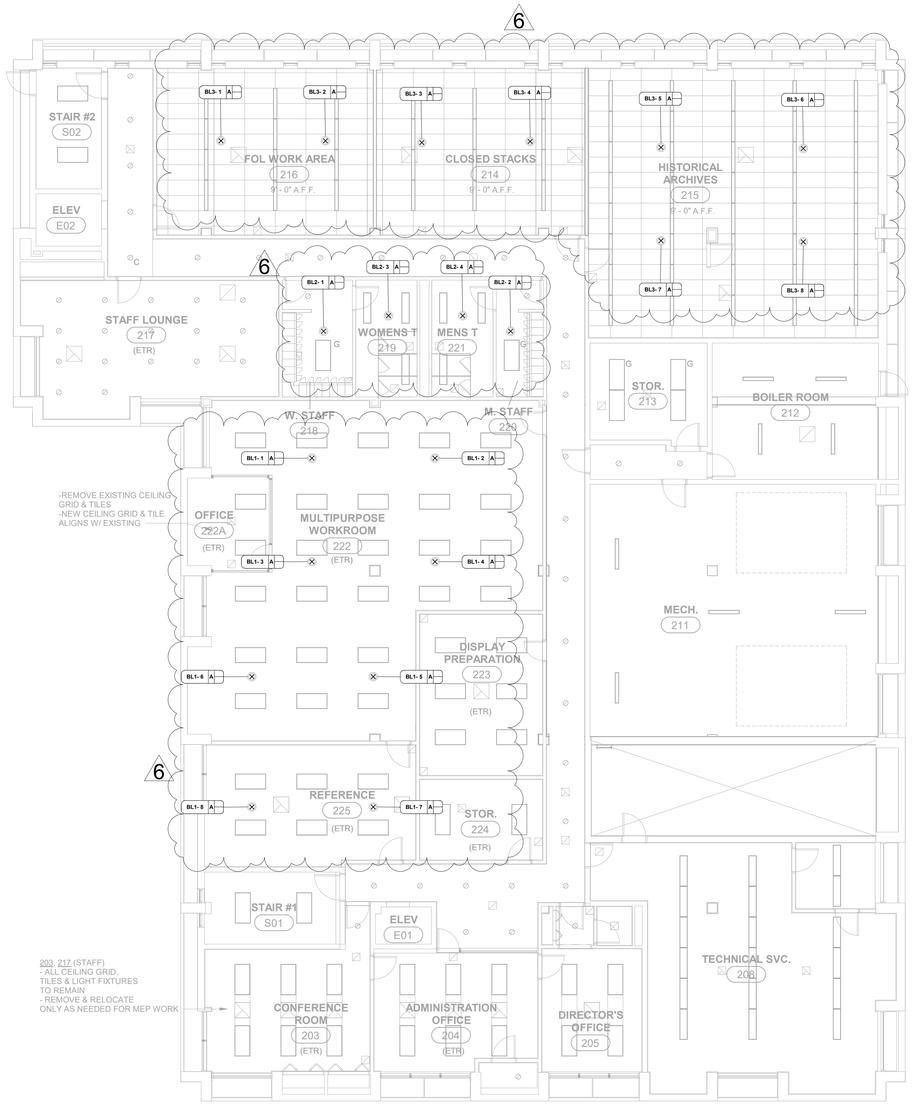
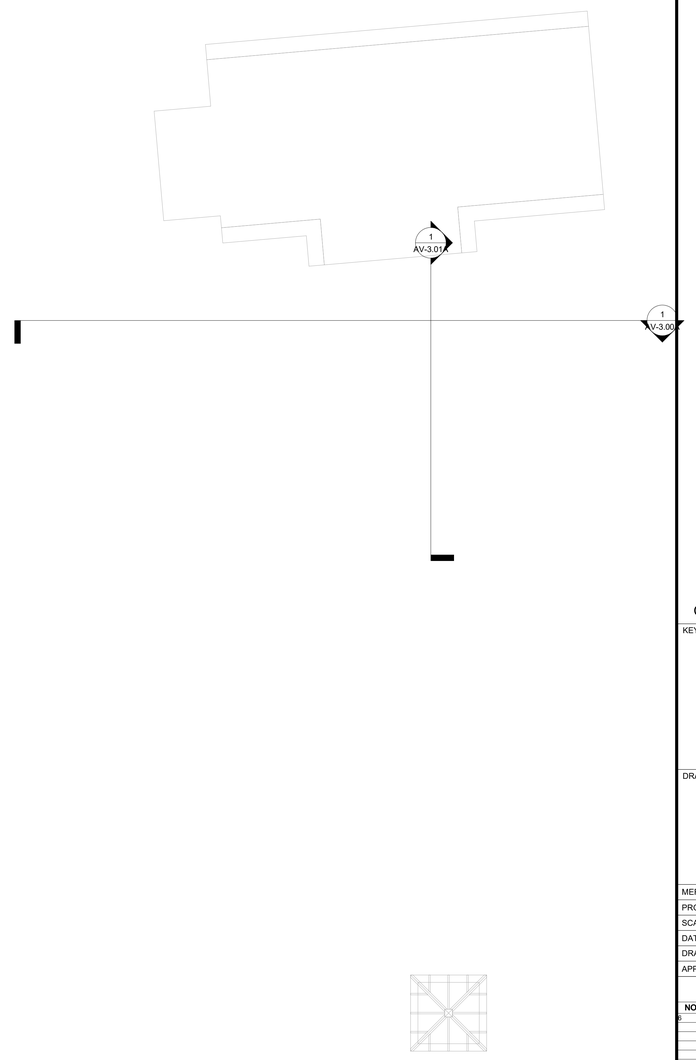


1 SECOND FLOOR
1/8" = 1'-0"



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CONFORMANCE SET

KEY PLAN

DRAWING TITLE

REFLECTED CEILING SECOND FLOOR - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1/8" = 1'-0"
DATE	12/15/21
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE
6	09/12/2022	PR-26

AV-2.02A

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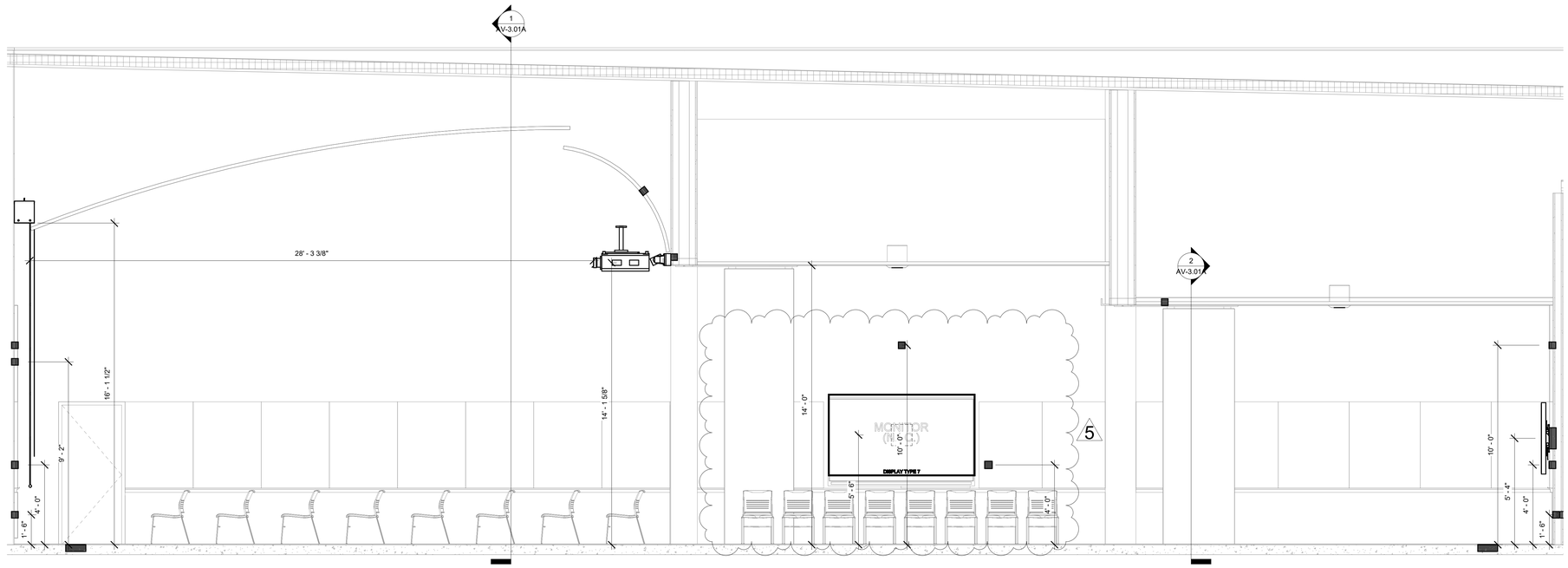
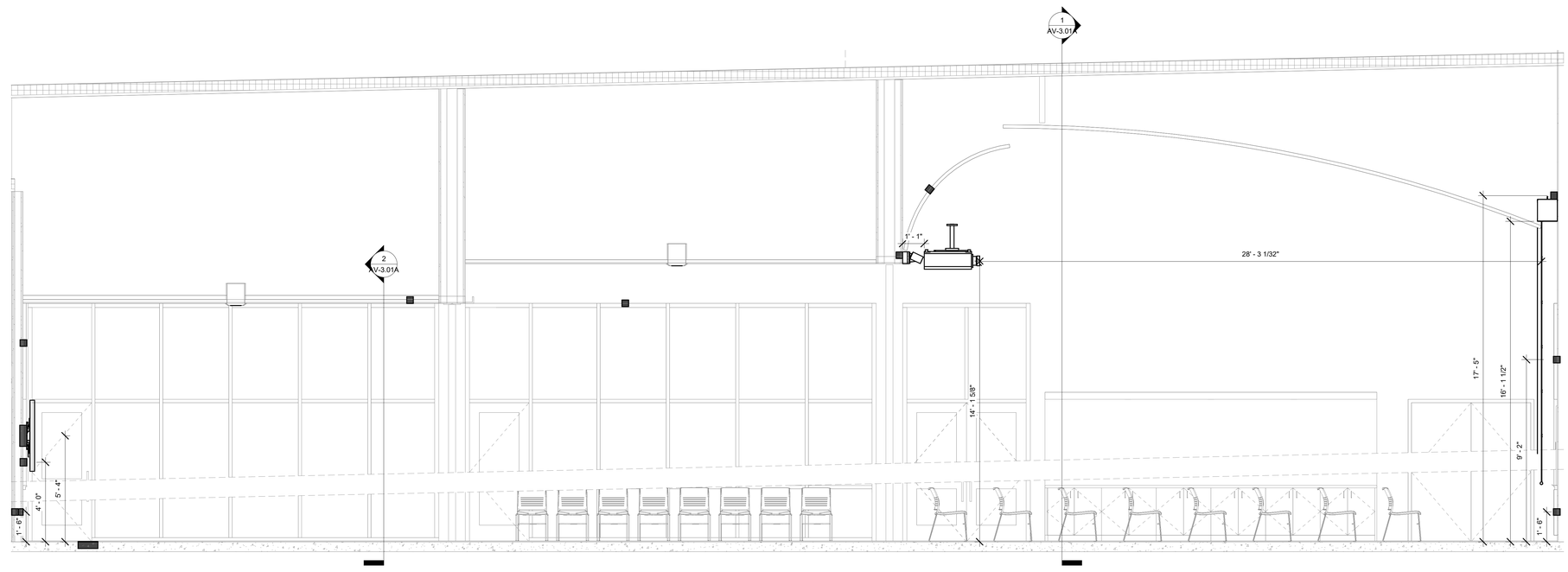


1 MULTIPURPOSE A131-NORTH - ADDITION
3/8" = 1'-0"



2 MULTIPURPOSE A131-SOUTH - ADDITION
3/8" = 1'-0"

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KEY PLAN

DRAWING TITLE

SECTIONS - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	3/8" = 1'-0"
DATE	12/15/21
DRAWN BY	GB
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ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

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5/25/2022 5:40:10 PM BIM 360://Meriden Public Library/181601-Meriden PublicLibrary-AV-2021.rvt

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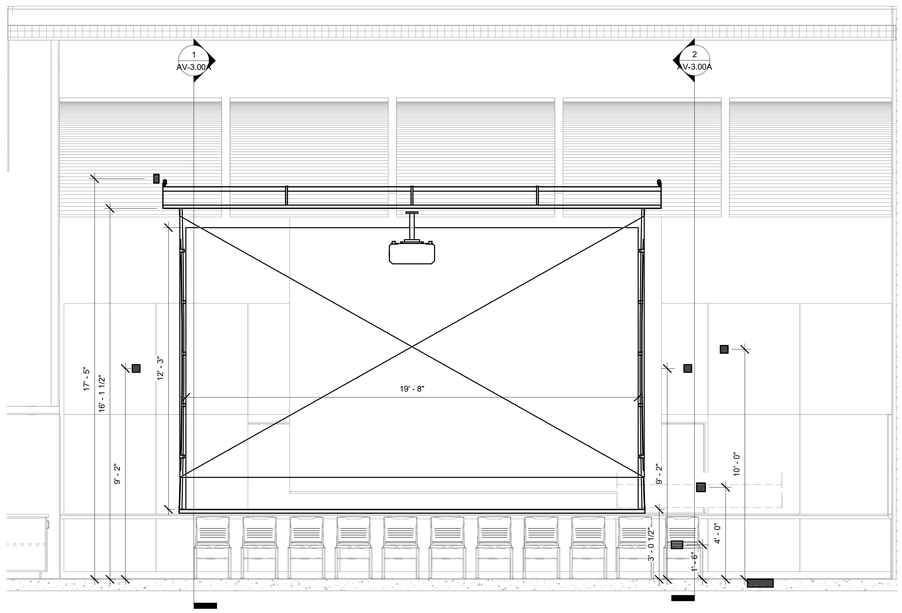
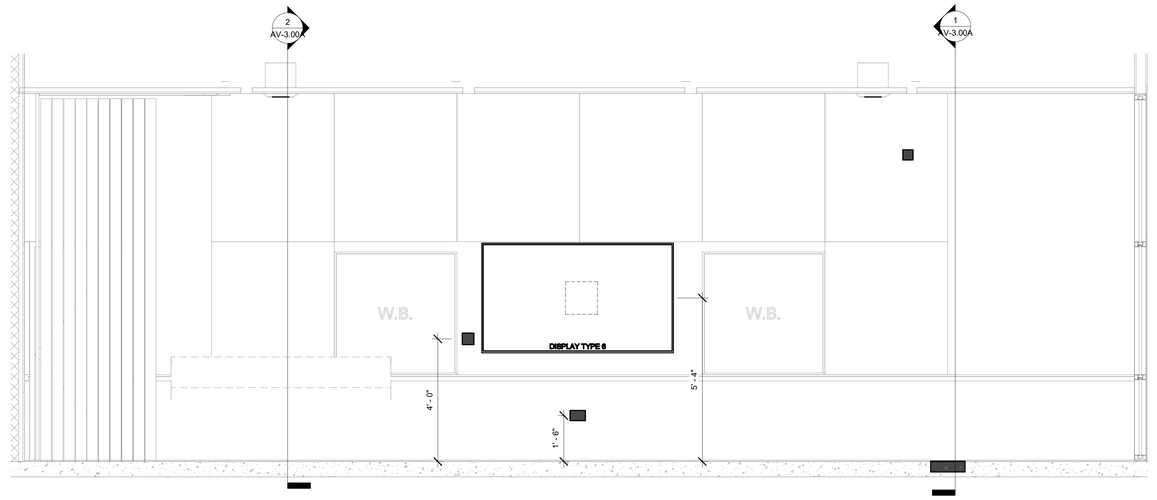
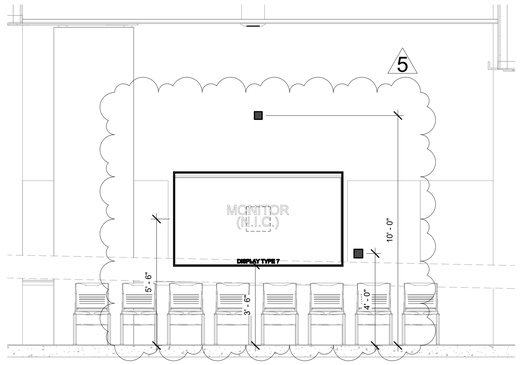


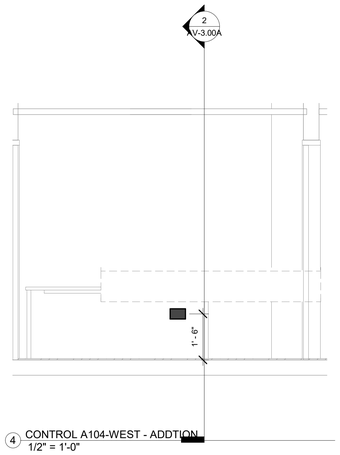
1 MULTIPURPOSE A131-WEST - ADDITION
3/8" = 1'-0"



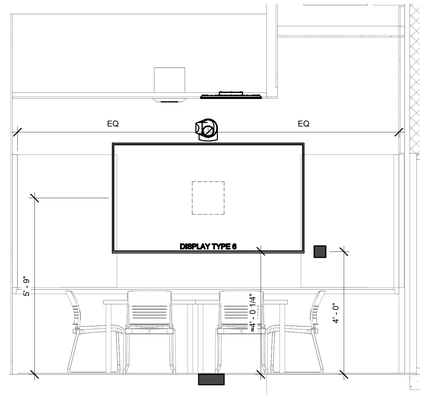
2 MULTIPURPOSE A133-EAST - ADDITION
1/2" = 1'-0"



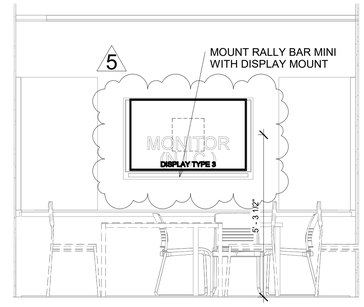
3 MULTIPURPOSE A132-NORTH - ADDITION
3/8" = 1'-0"



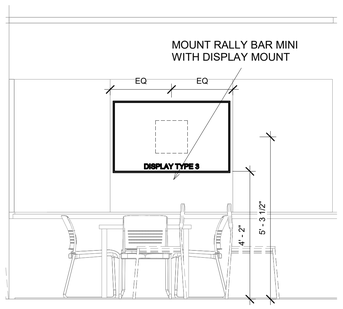
4 CONTROL A104-WEST - ADDTION
1/2" = 1'-0"



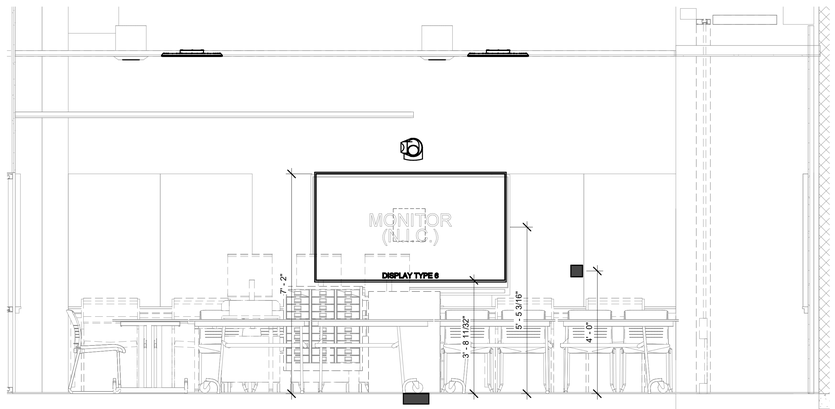
5 SEMINAR A127-SOUTH - ADDITION
1/2" = 1'-0"



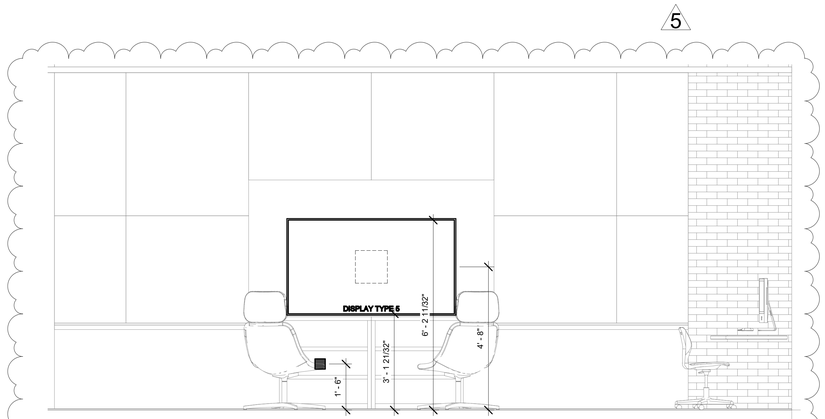
6 MEETING A128-WEST - ADDITION
1/2" = 1'-0"



7 MEETING A129-WEST - ADDITION
1/2" = 1'-0"



8 MEETING A126-SOUTH - ADDITION
1/2" = 1'-0"



9 TEEN AREA 108-NORTH
1/2" = 1'-0"

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MERIDEN PUBLIC LIBRARY RENOVATIONS

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

SECTIONS - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	As indicated
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

AV-3.01A

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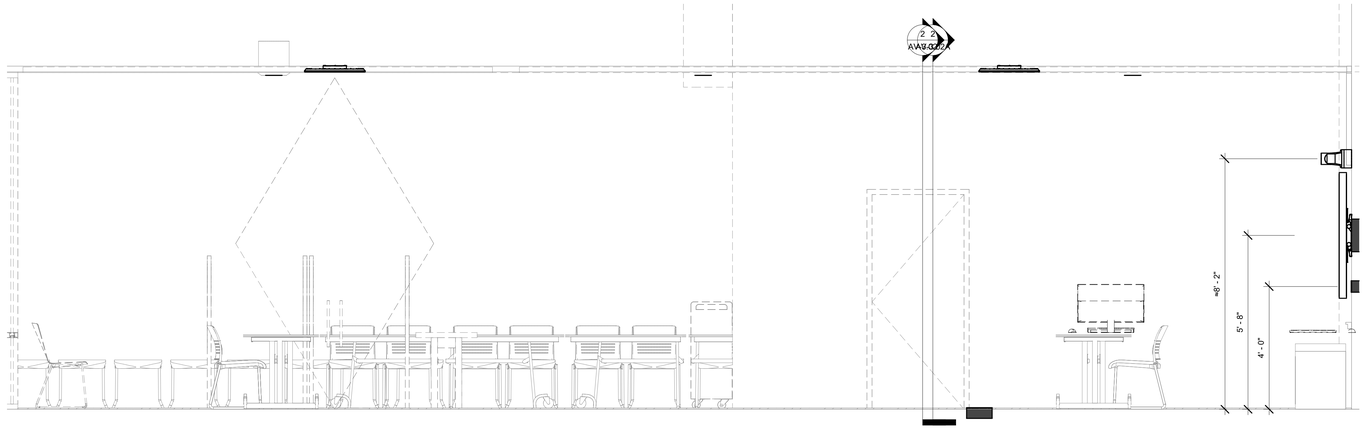
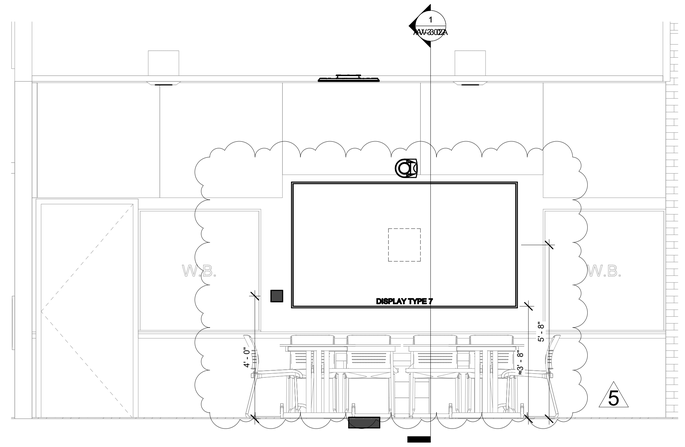
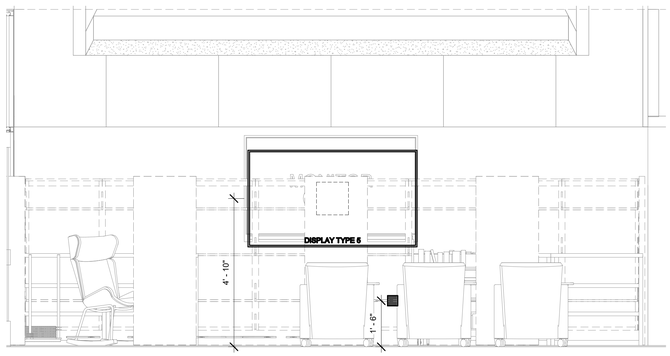


1 MULTIPURPOSE PGM 105-SOUTH - ADDITION
1/2" = 1'-0"



2 MULTIPURPOSE PGM 105-WEST - ADDITION
1/2" = 1'-0"



3 STORY AREA 102A-WEST - ADDITION
1/2" = 1'-0"

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CONFORMANCE SET

KEY PLAN

DRAWING TITLE

SECTIONS - ADDITION

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1/2" = 1'-0"
DATE	12/15/21
DRAWN BY	Author
APPROVED BY	Approver

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

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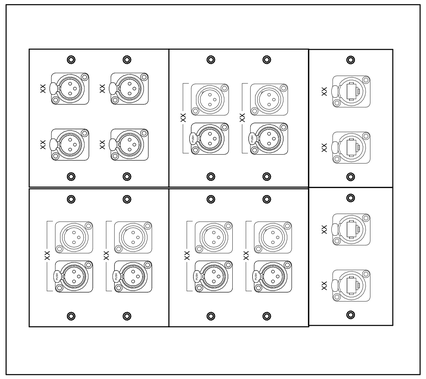
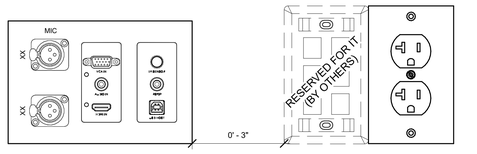
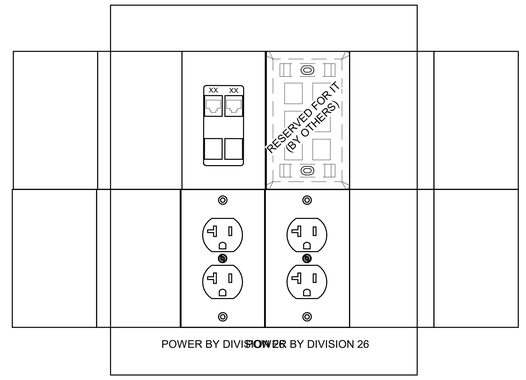


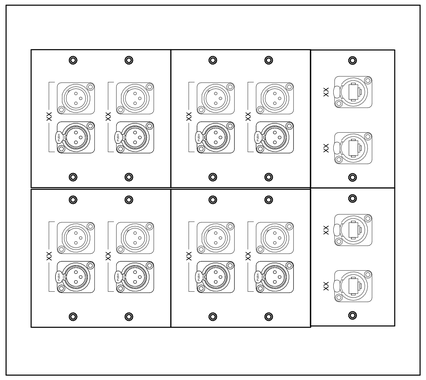
1 Panel AA - FLOOR POCKET INTERFACE
BOX TYPE - FL-600-P-4-B



2 Panel AB - UPSTAGE INTERFACE
BOX TYPE - 4x6x4



3 Panel AE - FLOOR BOX INTERFACE
BOX TYPE - FL-500-P-4-B



4 Panel AJ - FLOOR POCKET INTERFACE
BOX TYPE - FL-600-P-4-B

5 Panel AM - MICROPHONE ANTENNA INTERFACE
BOX TYPE - 4x4x4

6 Panel AQ - CAMERA INTERFACE
BOX TYPE - 4x4x4

7 Panel BB - COLUMN ARRAY
BOX TYPE - 4x4x4

8 Panel BD - DISPLAY SPEAKERS
BOX TYPE - 4x4x4

NOTES:
1. AUDIO CONTRACTOR RESPONSIBLE FOR DETERMINING FINAL MOUNTING METHOD AND REQUIRED MOUNTING ACCESSORIES BASED ON CEILING TYPE AND INSTALLATION REQUIREMENTS.
2. USE SHORT LENGTH OF FLEX CONDUIT FROM ADJACENT LOW-VOLTAGE J-BOX TO RUN SIGNAL CABLE.

9 Panel BG - MULTIPURPOSE ROOM - CEILING

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MERIDEN PUBLIC LIBRARY RENOVATIONS

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV PLATES AND PANELS
1

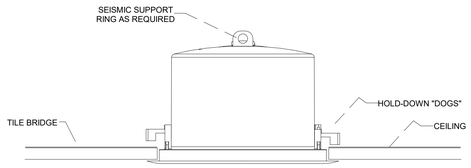
MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1:2
DATE	12/15/21
DRAWN BY	GB
APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE
4	10/05/2021	ADDENDUM 4

AV-9.01

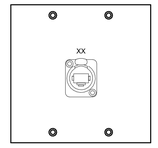
***PHASE 1 WORK NOT IN CONTRACT - PROVIDED FOR INFROMATION ONLY**



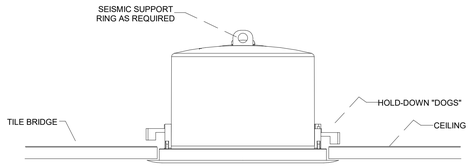
NOTES:
1. AUDIO CONTRACTOR RESPONSIBLE FOR DETERMINING FINAL MOUNTING METHOD AND REQUIRED MOUNTING ACCESSORIES BASED ON CEILING TYPE AND INSTALLATION REQUIREMENTS.
2. USE SHORT LENGTH OF FLEX CONDUIT FROM ADJACENT LOW-VOLTAGE J-BOX TO RUN SIGNAL CABLE.

1 Panel BO - CEILING P & P LOUDSPEAKER

2 Panel CA - ALS ANTENNA
BOX TYPE - 4x4x4

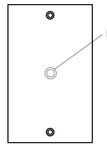


3 Panel CI - CEILING MIC ARRAY
BOX TYPE - 2 GANG

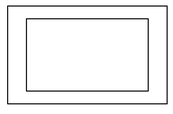


NOTES:
1. AUDIO CONTRACTOR RESPONSIBLE FOR DETERMINING FINAL MOUNTING METHOD AND REQUIRED MOUNTING ACCESSORIES BASED ON CEILING TYPE AND INSTALLATION REQUIREMENTS.
2. USE SHORT LENGTH OF FLEX CONDUIT FROM ADJACENT LOW-VOLTAGE J-BOX TO RUN SIGNAL CABLE.

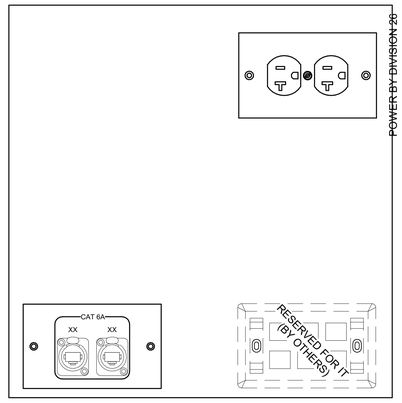
4 Panel CO - CEILING POE P & P LOUDSPEAKER



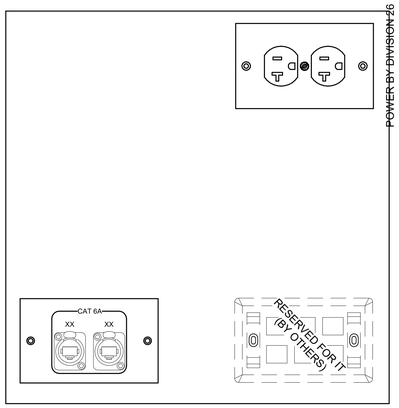
5 Panel CS - PROJECTION SCREEN CONTROL
BOX TYPE - SINGLE GANG



6 Panel CX - CONTROL PANEL
BOX TYPE - 2 GANG

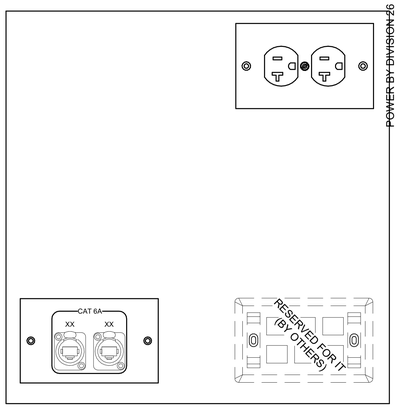


7 Panel DB - DISPLAY INTERFACE - DIGITAL SIGNAGE
BOX TYPE - RPV WALLMATE 16



8 Panel DD - DISPLAY INTERFACE - PRESENTATION
BOX TYPE - RPV WALLMATE 16

9 Panel DE - DISPLAY INTERFACE - MEETING ROOM
BOX TYPE - RPV WALLMATE 32



10 Panel DF - DISPLAY INTERFACE - MEETING ROOM
BOX TYPE - RPV WALLMATE 16

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MERIDEN PUBLIC LIBRARY RENOVATIONS

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV PLATES AND PANELS
2

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1:2
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ISSUE DATES

NO.	DATE	PURPOSE

AV-9.02

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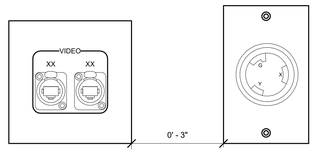
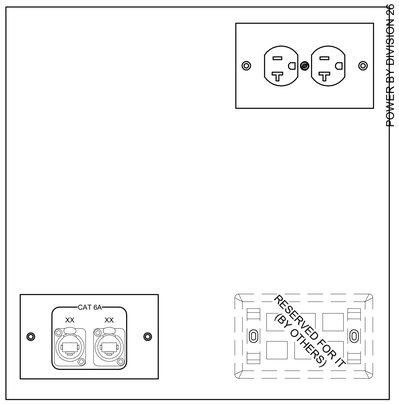
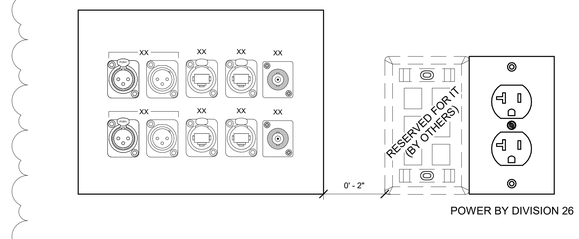


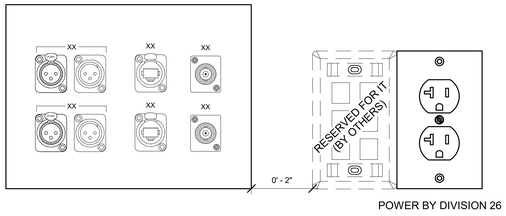
1 Panel DP - PROJECTOR INTERFACE
BOX TYPE - 4x4x4



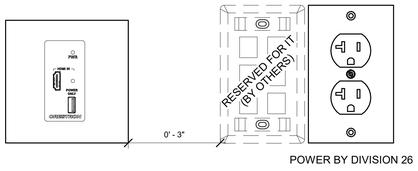
2 Panel DT - DISPLAY INTERFACE - PRESENTATION
BOX TYPE - RPV WALLMATE 16



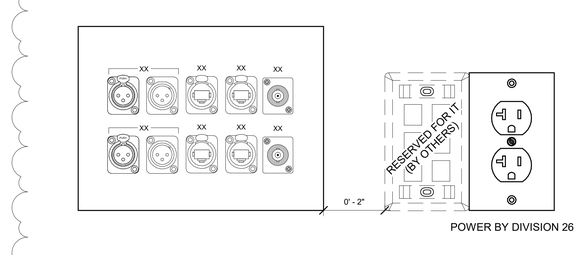
3 Panel EA - ANCILLARY INTERFACE
BOX TYPE - 6x8x4



4 Panel EB - ANCILLARY INTERFACE
BOX TYPE - 6x8x4



5 Panel TA - VIDEO INTERFACE
BOX TYPE - 4x4x4



6 Panel AK - CONTROL BOOTH INTERFACE
BOX TYPE - 6x8x4

5

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MERIDEN PUBLIC LIBRARY RENOVATIONS

105 MILLER ST. MERIDEN, CT

CONFORMANCE SET

KEY PLAN

DRAWING TITLE

AV PLATES AND PANELS
3

MERIDEN BID NO.	B22-01
PROJ. NO.	181601
SCALE	1:2
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APPROVED BY	

ISSUE DATES

NO.	DATE	PURPOSE
5	05/25/2022	AV REVISIONS

AV-9.03

5/25/2022 5:40:18 PM BIM 360://Meriden Public Library/181601-Meriden PublicLibary-AV-2021.rvt

SECTION 274100 - AUDIO/VIDEO SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work specified in this Section.

B. Coordinate work of this Section with work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the work of other Sections.

1.2 SCOPE OF SPECIFICATION

A. The following terms are defined for this specification section:
1. “Owner” or “End User” is Meriden Public Library.
2. “Architect” is the Architect for the project: TSKP STUDIO.
3. “Systems” are the audio and video systems.
4. “Designer” or “Systems Designer” is the designer of the audio and video systems: Jaffe Holden Acoustics, Inc.
5. “Electrical Engineer” is the designer of the Electrical Pathway & Wiring Systems.
6. “General Contractor” is the General Contractor or Construction Manager responsible for the construction of the project.
7. “Contractor” or “Systems Contractor” is the specialty contractor working under the General Contractor, responsible for the installation of the audio and video systems.

B. This specification covers all Systems as described below for the project. The objective is to provide professional systems, installed, acceptance tested, and ready for use.

C. The written specification and the large format AV drawings shall be collectively referred to herein as the Contract documents. System features which are mentioned in one part may not be shown in the others. In case of conflict between the written specification and the drawings, Contractor must seek clarification from the Systems Designer. In the event that the Contractor fails to obtain such clarification, the interpretation of the Systems Designer will prevail.

1.3 CONTRACTOR RESPONSIBILITY

A. Specification drawings are detailed only to the extent necessary to show design intent and signal flow. It is understood and agreed by the Contractor that the work herein described shall be complete in every detail to supply a complete working system.

B. Equipment not mentioned herein nor shown on drawings but necessary to meet this requirement shall be provided without claim for additional payment.

1.4 SUMMARY DESCRIPTION

A. Appendix A contains the Summary Systems Description.

B. Specific products to meet the system requirements described in Appendix A will be called out in the contract documents.

1.5 SCOPE OF WORK

A. Furnish all materials, labor and any engineering services to provide complete and professionally installed Systems in working order as described herein. Labor furnished shall be specialized and experienced in Systems installation.

B. Furnish all back boxes and enclosures.

C. Deliver to the job site all back boxes which are to be installed by others.

D. Furnish and install all wire and cable.

E. Contractor to provide initial DSP and control system programming prior to acceptance testing, one full set of programming changes and adjustments, prior to handover to the Owner, and one additional set of changes and adjustments during the initial warranty period, as part of the base scope of work.

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, signal format converters, line/distribution amplifiers and other devices for proper installation, interface, isolation or gain structure.

G. Furnish shop drawings and receive approval, prior to fabrication and installation.

H. Provide frequency scanning and coordination for all audio/video systems wireless transmitters and receivers. Coordinate with other Contractors and Owner as necessary to account for local frequencies used by others within the building, and to account for available spectrum in the surrounding area.

I. Perform initial adjustments and verification tests. Submit verification test report.

J. Participate in acceptance tests and perform final adjustments.

K. Provide training sessions, as specified in section 3.15, to the Owner.

L. Provide any manufacturer required commissioning and/or training and properly schedule with the manufacturer for their staff to attend. Coordinate schedule and training syllabus with owner and consultant.

M. Provide system documentation including copies of all relevant drawings and equipment manuals.

N. Provide maintenance services for the specified period from the date of acceptance.

O. Guarantee all equipment and components for the specified period from the date of acceptance.

P. Requirements and materials that apply to the work of others related to the Systems are listed to define and establish Systems requirements.

Q. Work scope does not include the AC power system except as specifically called out in these specifications or in the drawings.

R. Coordination with the Electrical Contractor is required to assure correct Systems conduit routing, Systems backbox locations, and clean power circuit locations as specified in Division 26 - Electrical.

S. See Work Scope Summary Table at the end of Part One (Paragraph 1.12).

1.6 SUBMITTALS

A. Pre-Bid Submittals
1. All Contractors submitting bids for the Systems specified herein must be qualified by the Systems Designer.
2. Not later than ten (10) days prior to the bid date, Contractor shall submit to the Systems Designer for approval, brochures containing a statement of the Contractor's qualifications. At minimum, this submittal shall include the following:
   a. A list of Systems of comparable size and scope to that described herein, completed by the Contractor in the last five (5) years. Indicate the project name and address, year of completion, and the name and phone number of a person to contact who is a representative of the Owner or User.
   b. A personal resume of formal education and experience, and a copy of the current CTS-I certificate of the staff member who would act as Leader for the Project. A personal resume of formal education and experience, and a copy of the current CTS-D certificate of the staff member who would act as Project Engineer.
   c. A description of the Contractor's capabilities and facilities for rack assembly, shop fabrication, repair, and servicing of Systems
   d. A description of the Contractor's capabilities and facilities for generating CAD (or other high-quality graphics) documentation for the Shop Drawings and As-Built Drawings
3. The following Contractors have submitted the required qualifications and have been approved to bid:

a.	Masque Sound 21 East Union Ave. East Rutherford, NJ 07073	Contact: Jeanne Wu Phone: 201-939-8666 Email: jeannewu@masquesound.com
b.	North American Theatrix 60 Industrial Dr. Southington, CT 06489	Contact: Gary Peck Phone: 860-863-4112 Email: gpeck@natheatrix.com
c.	Sound Associates 979 Saw Mill River Road Yonkers, NY 10710	Contact: Phillip Peglow Phone: 914-963-3452 Email: ppeglow@soundassociates.com.com

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 these documents. Discrepancies between drawings

and specifications or obvious omissions shall be referred to the Systems Designer for clarification before the bid date. Where discrepancies occur and pre-bid instructions have not been obtained, the contractor agrees to abide by the Systems Designer's decision.

2. Bid proposals shall include all work and all equipment as specified, as well as any other equipment and materials to be used in assembling the system.
3. Requests for clarification of specification intent shall be made, in writing, not later than ten (10) days prior to bid date.
4. No portion of the work herein may be assigned or sub-contracted to others unless the following requirements have been satisfied:
    a. The names of any proposed sub-contractors shall have been disclosed in the bid proposal.
    b. A statement of qualifications for each sub-contractor shall have been included with the bid proposal.
    c. All terms of this contract, including bidding and qualification requirements, shall apply to the sub-contractor.
5. The bid submittals shall include the following:
    a. The total Contract price.
    b. The total price for any Add-Alternates (See Paragraph 2.02.D)
    c. An itemized list of all equipment and materials to be used in assembling the system
    d. Unit pricing for all items on the specified equipment list
    e. Lot pricing for miscellaneous items not on the specified equipment list
    f. A breakdown of the number of staff hours allotted for:
        1) Preparation of submittals, shop drawings, and system documentation
        2) On site coordination meetings and supervision
        3) In shop engineering, fabrication, and assembly
        4) On site fabrication, assembly, and installation
        5) On site verification and acceptance testing

C. Shop Drawing Submittals:
1. Within thirty (30) days after contract award, submit a Work Scope plan that lists all actions required to complete the work in this section. The Work Scope plan must include a complete schedule of all activities, particularly activities that require coordination with other trades, Architect, Owner, and Systems Designer, and must reference all relevant documents related to each activity. Critical path must be identified, and all key moments relating to procurement and installation must be identified. All points of coordination must be vetted with the other affected parties prior to submittal to the Owner for review.
2. Within sixty (60) days after contract award, submit digital PDF files of detailed shop drawings to the Architect for approval. All shop drawings shall be marked with the related drawing number when submitted. Do not begin installation or fabrication without the approval of the Architect and Systems 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 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. Systems Designer will review submittals twice only without additional cost being charged to the project. If a submittal or portion of a submittal is rejected after two attempts, the Contractor is liable for additional cost for further reviews.

6. At minimum, the Shop Drawings shall include electronically bound copies of the following:
   a. Table of Contents
   b. Itemized list of all equipment and materials to be used in assembling the system
   c. Catalog cut sheets or data sheets for each listed item.
      1) Product data sheets must not be web page captures of specifications, unless there is no other recourse.
      2) Product data sheets with multiple options or part numbers must clearly be marked with the selection to be used for this project. All options must be called out. Anything the Contractor is not supplying that is shown on the sheet must be called out as an exclusion.
   d. One-line signal flow diagrams for all systems showing point to point wiring interconnection 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. A complete list of all wire run numbers along with the termination location of each end of each wire run
   f. Detailed 3-wire schematic diagrams for any custom circuitry
   g. Detailed 3-wire schematic diagrams for typical connections between audio lines, patch bays, and rack mounted equipment
   h. Drawings of all items which are to be custom fabricated or modified. Drawings shall be of scale suitable for use in fabrication. They shall show materials, finishes and panel/control markings. Submit samples of lettering/label size and typeface to be employed on custom plates, panels and other equipment.
   i. Full size drawings illustrating the physical layout and labeling of patch bays
   j. Mechanical drawings of all assemblies, major sub-assemblies, racks, and enclosures
   k. Mechanical drawings showing proposed mounting details of all loudspeakers and associated rigging, and interface with adjacent architecture
   l. All mounting systems not provided as a complete package from a single manufacturer must be engineered, approved, and have drawings stamped by a professional rigging engineer or licensed structural engineer, as approved by the General Contractor. The engineer shall verify that the design meets or exceeds design criteria for this particular use case. Each mounting system solution must be separately engineered, verified, and stamped.
   m. Provide a detailed written plan for EDID and HDCP management for all video signals and interconnections between video devices.
   n. Provide an IP Address table and addressing protocol in coordination with Owner's IT department.
   o. Provide a mockup of all system graphical user interface screens and all source code/configuration files required for proper system operation.
7. For the ease of drawing review, the following guidelines must be adhered to:
   a. Plot styles should be utilized so that color is only used for emphasis of specific line types.
   b. The paper size for all shop drawings must match that of all other construction drawings. All drawings must be legible at ½ size.
   c. Drawings should be in black and white but if color is used the drawings must still be legible with all design information easily seen, when printed black and white.
   d. CAD drawings should be delivered as PDF prints. Provide DWG files upon request.
   e. All revisions of drawings in drawing packages must include a revision number and date, with all changed drawings clearly indicated, with changes clouded and tagged

with the revision number. Drawings that have not changed from previous releases should not be marked as revised. Already revised drawings should have revision clouds and tags removed from the previous revision so that current revisions are clear to see.

8. Document release must be simultaneous unless a tiered release is authorized by the Systems Designer. If utilizing a tiered document release system, each release must be a full release of documents within each tier, within the context of the entirety of this scope of work. The required order for tiered review is:
    a. Equipment and Panel Locations, and Conduit Riser (provided as indicated in the Work Scope Table in this section)
    b. Complete project equipment list and Product data sheets
    c. Single-line drawings, Panel details, Rack elevations, and Patchbay layouts
        1) Patchbay layouts must conform to the guidelines for Patchbay layouts included in this specification and on large format drawings.
        2) Panel drawings must indicate each panel and its engraving individually (if two 'AA' panels exist, for instance, they must have individual panel drawings showing the connector numbering and other engraving specific to that panel at that location)
        3) All custom rack panels must have a panel drawing as part of this submittal.
    d. Rigging and Mounting Details
    e. Control system and DSP system GUI mockup, functional control narrative, initial DSP programming, other software configuration files, HDCP/EDID plan and IP addressing plan.
9. All drawings shall be produced in AutoCAD, Revit, or in a similar and compatible computer drafting/graphics program. All submittal drawings must be engineered and drafted to represent actual fabrication and installation drawings and details. All details that are graphically unclear must be properly noted to clarify intent. Copies of the Contract Drawings are not acceptable as submittal drawings and will be rejected.
10. The use of electronic files generated by anyone other than the Systems Contractor (e.g., architectural backgrounds, Systems Designer's drawings, etc.) will not release the Contractor of the responsibility to supply Shop Drawings that represent a completely engineered, coordinated, and functional solution. The Contractor has the final responsibility to provide systems that meet or exceed all requirements of the contract documents.

D. Substitutions:
   1. Substitutions may be permitted subsequent to Contract award, but only with the express written permission of the Systems Designer. The proposed substitutes must be equivalent to the specified products in quality, performance, construction, function and conformance to system objectives.
   2. It is the responsibility of the Contractor to prove, to the satisfaction of the Systems Designer, that the proposed substitution is equal to the specified product, as demonstrated by submission of the following:
      a. List of advantages to the Owner
      b. Cost savings
      c. Printed specifications or laboratory test data
      d. Previous field experience
   3. The Contractor shall list the unit price of each item proposed for substitution and indicate which specified items are to be deleted.
   4. If the Systems Designer determines that the proposed product is not equal to the specified project, the Contractor shall supply the product specified in the Contract documents.
   5. Where substitute materials or methods are approved, the Contractor shall make all adjustments to contingent work necessary to accommodate the substituted equipment, without claim for additional payment.
   6. In the event that one or more of the products specified herein is unavailable, the Contractor shall make recommendations to the Systems Designer as to what substitutions are available to meet the intent of the specification.
   7. The Systems 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 costs.
   8. Selected items of the systems are subject to rapid technology changes. Items that have a high likelihood of needing re-evaluation prior to installation are highlighted in the equipment list. The Contractor shall not purchase these items without 30 days prior notice to the Systems Designer.

E. Samples:
   1. Submit samples of substitute equipment to the Systems Designer as required to prove equivalency to items specified.
   2. Submit samples of custom work, finishes or other materials as required by the Architect or Systems Designer to verify appearance and quality. All panels within direct view of the public may require a custom finish. Provide the Architect with a list of any panels that meet this criteria so that they may specify custom finishes. A sample of every type of finish specified other than standard finish as detailed in this specification must be provided to the Architect for approval.
   3. Costs for shipping samples shall be the responsibility of the Contractor.
   4. Submitted samples will not be returned.

F. Progress Reports must be submitted to the Owner every two weeks. The progress report will include:
   1. Work Scope Plan updates and any schedule changes
   2. Overall Project Status
   3. Work Completed by percentage complete
   4. Work planned for the next two week period
      a. Call out any coordination requirements for each item.
   5. Procurement report

a. Percentage by dollar value of equipment that has been procured to date
b. Procurement problems or concerns to be addressed by others

6. RFI/Submittal List
   a. List outstanding RFI's and Submittals, showing the assigned document number and the date it was submitted.
   b. Highlight in Yellow any items that are overdue but are not affecting schedule or project quality.
   c. Highlight in red any items that are overdue AND are affecting schedule and/or project quality.

G. Written Guarantee (See Paragraph 1.9)

H. Verification Test Report (See Paragraph 3.13)

I. System Documentation and Operation Manuals (See Paragraph 3.15)

1.7 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 in charge throughout.

B. Cooperate with all appropriate parties in order to achieve well-coordinated progress with the overall construction completion schedule and satisfactory final results.

C. Watch for conflicts with work of other contractors on the job and execute, without claim for extra payment, moderate moves or changes as are necessary to accommodate other equipment or to preserve acoustic performance, symmetry, and pleasing appearance.

D. Immediately report to the Architect and Systems Designer any design or installation irregularities, particularly architectural elements that interfere with the intended coverage angles of loudspeakers, or proper open sightlines to projection surfaces or displays so that appropriate action may be taken.

E. Do all cutting, patching and painting for proper and finished installation of the system and repair any damage done as a result of such installation. Clean up and dispose of trash from all Systems work areas.

1.8 QUALITY ASSURANCE

A. Parts listed shall be complete, type numbers accurate and equipment furnished shall conform to manufacturer's specifications.

B. All materials shall be new and shall conform to applicable provisions of Underwriters Laboratories and the American Standards Association.

C. Procure and pay for all permits, licenses and inspections and observe any requirements stipulated therein.

D. Comply with federal, state and local labor regulations and applicable union regulations.

E. Installation shall conform to latest federal, state and local electrical and safety codes or those of other authorities having jurisdiction. Where conflicts exist, the most stringent code or regulation shall apply.

F. If additional work by the Systems Designer is required as a direct result of deviations from approved drawings and specifications during construction, the General Contractor and/or Systems Contractor will be liable for those additional costs that the Owner may incur.

G. Government Standards: The Systems Contractor is to comply with all government regulations, standards, and laws that apply to the installation and use of the AV equipment and/or other scope of work specified in this section. The following agencies have laws and rules that apply.
   1. Federal Communications Commission (FCC): FCC rules are located in Title 47 of the Code of Federal Regulations. The following is a partial list of the FCC regulations that apply to equipment specified in this section of work:
      a. Part 15: Radio frequency devices
      b. Part 22: Public mobile services.
      c. Part 24: Personal communications services.
      d. Part 25: Satellite communications.
      e. Part 27: Wireless communications service.
      f. Part 51: Interconnection.
      g. Part 74: Experimental radio, special broadcast, and other program distribution services.
      h. Part 95: Personal radio services.
   2. Occupational Safety and Health Administration (OSHA) – Follow all applicable standards for health and safety particularly sound pressure level exposure.
   3. ANSI Standards: American National Standards Institute (ANSI) standards cover safety, fabrication, assembly, installation, rigging, equipment handling, and testing.
   4. Contributing Organizations – The Organizations listed below have published standards used to establish the technical references to be followed under this scope of work.
      a. Acoustical Society of America (ASA) (ASC S1)
      b. Alliance for Telecommunications Industry (ATIS) (ASC T1)
      c. American Society of Safety Engineers (ASSE) (ASC A1264)
      d. Audio Engineering Society (AES) (ASC S4)
      e. Electronics Industry Alliance (EIA) (CEMA)
      f. Entertainment Services and Technology Association (ESTA) (ASC E1)
      g. Institute of Electrical and Electronics Engineers (IEEE) (ASC C136) (802.1)
         1) IEEE 802.1AS: This standard specifies the protocol and procedures used to ensure that the synchronization requirements are met for time sensitive applications, such as audio and video, across Bridged and Virtual Bridged Local Area Networks consisting of LAN media where the transmission delays are fixed and symmetrical.
         2) IEEE 802.1QAT: This standard specifies protocols, procedures and managed objects, usable by existing higher layer mechanisms, that allow network resources to be reserved for specific traffic streams traversing a bridged local area network. It identifies traffic streams to a level sufficient for bridges to determine the required resources and provides a mechanism for dynamic maintenance of those resources.
         3) IEEE 802.1QAV: This standard allows bridges to provide guarantees for time-sensitive (i.e. bounded latency and delivery variation), loss-sensitive

real-time audio video (AV) data transmission (AV traffic). It specifies per priority ingress metering, priority regeneration, and timing-aware queue draining algorithms. This standard uses the timing derived from IEEE 802.1AS. Virtual Local Area Network (VLAN) tag encoded priority values are allocated, in aggregate, to segregate frames among controlled and non-controlled queues, allowing simultaneous support of both AV traffic and other bridged traffic over and between wired and wireless Local Area Networks (LANs). Bridges are increasingly used to interconnect devices that support audio and video streaming application. This standard will specify enhancements to bridge relay function to provide performance guarantees to allow for time-sensitive traffic in a local area network and harmonize delay jitter and packet loss for wired (e.g., IEEE 802.3 - "Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications"), wireless (e.g., IEEE Std 802.11 - "Standard for Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan networks - Specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications"), and mixed wired/wireless L2 networks. Most if not all entertainment media going forward is in digital form. Audio and video streaming and interactive applications over bridged LANs need to be enhanced to have comparable real-time performance of legacy out-of-band analog media distribution. There is significant vendor and end-user interest and market opportunity to consolidate layer 2 solution for both computer networking (e.g. internet access) and audio video services (e.g. home consumer electronics, professional A/V applications, etc) in mixed wired and wireless environments. The use of such consolidated network will realize operational and equipment cost benefits. This standard defines a set of enhancements to the Virtual Bridged LAN (802.1Q - "Standards for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks").This will enable end-to-end quality of service guarantee agreement for audio and video streaming negotiated over SRP protocol to be realized in a bridged LAN, while interoperating with existing 802.1D - "Standard for Local and Metropolitan Area Networks: Media Access Control (MAC) Bridges" and Q bridges. There is currently no interoperability among bridges that support Audio and Video streaming, nor generally accepted means of achieving such service guarantees in a bridged LAN.

4) IEEE 802.3 – 2008: A revision of base standard incorporating the 802.3an/ap/aq/as amendments, two corrigenda and errata. Link aggregation was moved to 802.1AX.
5) IEEE 802.3AZ: Energy Efficient Ethernet is scheduled for release in September 2010.
6) IEEE 802.3bd: Defines a MAC Control Frame to support 802.1Qbb Priority-based Flow Control.

h. International Cable Engineers Association (ICEA) Formerly IPCEA
i. International Standards Organization (ISO)
j. National Electrical Manufacturer’s Association (NEMA) (ASC C119)
k. National Fire Protection Associations (NFPA)
l. National Safety Council (NSC) (ASC A10)
m. Photographic and Imaging Manufacturer’s Association (PIMA)

n. Society of Motion Picture and Television Engineers (SMPTE)
o. Telecommunications Industry Association (TIA)
p. Underwriters Laboratories (UL) (ASC C101) (CE)
q. NTSC
r. National Association of Broadcasters (NAB) – System technical standards for video and RF compliance are listed in the most recent edition of the NAB Handbook

5. Safety Standards – Contractor will adhere to the following Safety Standards for all work identified in Division 27 41 00 and as part of the General and Supplementary sections of the Division-1 Specifications.
   a. ANSI A14.2-2000: Safety Requirements for Portable Metal Ladders
   b. ANSI A14.7-2000: Safety Requirements for Mobile Ladder Stands and Mobile Work Platforms.
   c. ANSI C2-2002: National Electrical Safety Code
   d. ANSI Z136.1-2000: Safe Use of Lasers and laser systems
   e. ANSI Z136.2-1997: Safe Use of Optical Fiber
   f. ANSI Z359.1-1992 (R1999): Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components.
   g. ANSI/PIMA IT7.101-1999: Recommended Practice for the Safe Handling and Operating of Audiovisual Equipment.
   h. IEEE 142-1991: Grounding of Industrial and Commercial Power Systems
   i. UL 514A: Scrub Water exclusion from AV Floor Boxes
   j. UL 1419-1995: Standard for Safety for Professional Video and Audio Equipment in accordance with the National Electrical Code, ANSI/NFPA 70
   k. UL 1492-1994: Standard for Safety for Audio-Video Products and Accessories
   l. UL 1651-1997: Standard for Safety for single and multiple Optical Fiber Cable
   m. UL 1667-1996: Audiovisual Systems Safety Standard for Tall AV Institutional Carts for use with Audio, Video, etc.
   n. ANSI E1.1-1999: Construction and Use of Wire Rope Ladders to prevent most injuries
   o. ANSI A10.8-2001: Safety Requirements for Scaffolding
   p. ANSI A10.42-2000: Rigging Qualifications and Responsibilities
6. Applicable Performance Standards – Execute all Division work in accordance with the following standards:
   a. ANSI S4.48-1992 (R1998): Recommended Practice for the Application of Connectors, Part 1, XLR-Type polarity, and gender
   b. ANSI S4.55-1997: Recommended Practice for conservation of the Polarity of Audio Signals
   c. ANSI S4.56-1997: Recommended Practice for the subjective evaluation of Loudspeakers
   d. ANSI S12.2-1995 (R1999): Criteria for Evaluating Room Noise
   e. ANSI T1.217-1991 (R1998): Integrated Services Digital Network (ISDN) Management –Primary Rate Physical Layer
   f. ANSI T1.522-2000: Quality of Service (QOS) for Business Multimedia Conferencing. Specifies classes of Service for conferencing on IP Networks
   g. AES15: ANSI S4.49: AES Recommended practice for Sound Reinforcement Systems –Communications Interface PA-422.
   h. AES-R1-1997 AES project report for professional audio: Specifications for audio on high capacity media
   i. AES14-1992 (r1998) AES standard for professional audio equipment -- Application of connectors, part 1, XLR-type polarity and gender

j. AES24-1-1999, (Revision of AES24-1-1995) AES standard for sound system control - Application protocol for controlling and monitoring audio devices via digital data networks
k. AES26-2001 (Revision of AES26-1995) AES recommended practice for professional audio -- Conservation of the polarity of audio signals
l. ANSI/TIA/EIA 606-1993: Standard for the Telecommunications Infrastructure of Commercial Buildings
m. ANSI/TIA/EIA 607-1994: Commercial Building Grounding and Bonding Requirements for Telecommunications
n. IEEE 149-1979 (R1990): Test Procedure for Antennas
o. IEEE 1100-1999: Powering and Grounding Sensitive Electronic Equipment
p. NEMA 250-2001: Enclosures for Electrical Equipment
q. SMPTE 292M: SMPTE 292M defines the base 1.485Gbps HD-SDI. Note: This standard can handle all HD formats except 1920*1080 @ 50P and 60P.
r. SMPTE 372M: Uncompressed Dual-Link HD-SDI for 50P & 60P
s. SMPTE 424M: 2.97 Gbps HD-SDI for 50P & 60P
t. TIA/EIA-568-B: Digital audio over Cat5 audio cable
u. UL 1047-1999: Isolated Power Systems Equipment
v. UL 1581-1998: Reference Standard for Electrical Wires, Cables, and Flexible Cords
w. UL 1682-1998: Standard for Safety for Plugs, Receptacles, and Cable Connectors, of the Pin and Sleeve Type up to 800 Amperes and up to 600 volts ac or dc.
x. UL 467-1998: Grounding and Bonding Equipment
y. UL 813-1999: Commercial Audio Equipment and accessories for use in commercial enterprises… this standard was originally listed for public review in the October 13, 1995 issue of Standards Action. It is being resubmitted owing to substantive changes in the text.
z. ANSI/TIA/EIA-568-A: Commercial Building Telecommunications Cabling
aa. ANSI/TIA/EIA-569-A: Commercial Building Standard for Telecommunications Pathways and Spaces
bb. ANSI/TIA/EIA-607: Commercial Building Grounding and Bonding Requirements for Telecommunications
cc. ANSI/TIA/EIA TSB-72: Centralized Optical Fiber Cabling Guidelines
dd. ANSI/TIA/EIA-526-14A: Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
ee. ANSI/TIA/EIA-526-7 Measurement of Optical Power Loss of Installed Single mode Fiber Cable Plant
ff. ANSI/IEEE C-2 National Electrical Safety Code how to install cabling in accordance with the most recent edition of BICSI® publications:
gg. BICSI Telecommunications Distribution Methods Manual
hh. BICSI Cabling Installation Manual

1.9 GUARANTEE AND SERVICE

A. All systems and components shall be guaranteed free of defects in materials and workmanship for a period of one (1) year (or to the length of the Manufacturer's warranty if longer) from the date of acceptance and shall be repaired or replaced within forty-eight (48) hours following report of such defects by the owner.

B. 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. If corrective measures on-site are required they will be performed within 12 hours of the determination of a need for a site visit.

C. If, during the Guarantee period, any component is out of service for more than seven (7) days due to unavailability of parts or service, Contractor shall supply and install an identical new component. If an identical component is not available, Contractor will substitute equivalent equipment, with the approval of the Owner.

D. During the course of the Guarantee period, the Systems Contractor will provide the Owner with a 24 hour service phone number for emergency calls. A service engineer will respond to all emergency calls within one (1) hour. The personnel answering this call must be fully qualified to troubleshoot problems and propose solutions. A qualifying emergency event is defined as an event that may cause severe hardship or cause the systems to be inoperable or unusable for a scheduled class or event.

E. 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. Contractor shall submit proposed schedule for these visits and shall notify Owner and Systems Designer in writing at least one month in advance of each visit.

F. During the course of the guarantee period, the Systems Contractor will supply the Owner with any published updates of manufacturer provided operating programs for any and all software-controlled equipment that are issued to correct “bugs”. During the Guarantee period, the Owner will rely on the Systems Contractor to determine when to update the software, unless it is needed to correct a situation that renders the systems unstable, non-functional, or otherwise affects operations.

G. Repeated device failures, defined as the failure of a device or a single type of device three or more times over three contiguous months, will be considered as a failure of a manufactured system and all items of this type shall be replaced at no charge to the Owner.

H. At least one representative of the Systems Contractor, well versed in the installation and the operation of the systems, shall be on site in support of the Owner for the first significant public event in each space (as determined by the Owner) where the system will be used. The Contractor representative(s) for this event shall also be competent in show operations.

I. Contractor is to coordinate ongoing remote access to AV Systems Networks for support and troubleshooting. Owner to provide the access at their discretion.

1.10 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 Owner relieves the Contractor in writing of this responsibility, whichever is earlier, regardless of the location of the equipment. All equipment is deemed to be under the control of the Systems Contractor until acceptance of the system by the Owner or until Owner relieves the Contractor in writing of this responsibility, whichever is earlier.

1.11 EXISTING CONDITIONS

A. Visit the site prior to making a bid. No subsequent allowance will be made due to failure to thus observe and verify conditions which may affect the work. Report to the Architect and Systems Designer any discrepancies among this specification and existing conditions and similarly report obvious omissions.

1.12 WORK SCOPE SUMMARY TABLE

ITEMS TO BE PROVIDED AND INSTALLED	General Contractor		Electrical Contractor		Systems Contractor	
	Pro-vide	Install	Pro-vide	Install	Pro-vide	Install
Main Power Service Panel Boards and Circuit Breakers			x	x		
• Main Power Service Conduit and Conductors			x	x		
• Main Power Service Termina-tions				x		
Audio & Video Technical Power (AVTP) Transformers			x	x		
• Transformer Conduit and Con-ductors			x	x		
• Transformer Terminations				x		
AVTP Isolated Ground Conduit and Con-ductors			x	x		
• Isolated Ground Terminations				x◊		
AVTP Distribution Panelboards and Cir-cuit Breakers			x	x		
• Distribution Panelboard Conduit and Conductors			x	x		
• Distribution Panelboard Termina-tions				x		
AVTP Standard Load Centers and Circuit Breakers			x	x		
• Standard Load Center Conduit and Conductors			x	x		
• Standard Load Center Termina-tions				x		
AVTP Company Switches for Portable Equipment			x	x		
• Company Switch Conduit and Conductors			x	x		
• Company Switch Terminations				x		
AVTP Outlet Devices for Branch Circuits delivered to Systems Equipment Racks and Devices					x	x
• Equipment Rack Back Boxes and Wall Plates					x	x
• Outlet Device Back Boxes			x	x		
• Outlet Device Wall Plates			x	x		
• Branch Circuit Conduit and Con-ductors			x	x		
• Branch Circuit Termination				x		
Systems Equipment Racks and Devices					x	x

• Metallic Conduit between Systems Devices and Racks			x	x◊		
• Insulation Bushings between Metallic Conduit Racks			x	x◊		
• Systems Equipment Rack Cabling					x	x
• Systems Equipment Rack Terminations						x
Systems Device Back Boxes and Floor Boxes				x◊	x	
• Systems Device Metallic Conduit			x	x◊		
• Systems Device Cabling					x	x
• Systems Device Termination						x
Empty Conduit (for temporary use)			x	x		
• Systems Cable Trays			x	x		
• Systems Cable Sleeves			x	x		
• Systems Pull Boxes			x	x		
Conduit Riser Diagram Submittal			x◊			

◊ Installation criteria to be provided by Systems Contractor

PART 2 - EQUIPMENT

2.1 GENERAL EQUIPMENT

A. Whenever any equipment is specified by manufacturer and model number, it is for 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 provided shall operate at the required AC line voltage and frequency.

D. Contractor shall provide quantities as indicated in the equipment list, detail drawings, location drawings, schedule of terminations, and as required for a complete installation.

E. Audio & Video Wire and Cable
1. All wire numbers listed in the drawings are Belden unless otherwise noted.
2. THHN wire is not an allowable substitute for twisted pair stranded loudspeaker wiring.
3. Approved manufacturers: Belden, Canare, Clark Wire, Gepco, West Penn, Whirlwind
4. Where conflict exists with any codes or ordinances, such codes and ordinances shall take precedence.
5. Where conflict exists with electrical specifications, the higher standard or more stringent requirement shall apply.

F. Wiring Devices
1. Duplex Receptacles: per electrical drawings
2. AV Technical power plates for receptacles must be labeled with the panel number and breaker number for the circuit(s) they are connected to (to be provided and installed by DIV. 26)

G. AV System Plates and Panels:
1. Specifications – Rack Mount Panels
Material: 11 gauge steel or 1/8" Aluminum, minimum thickness
Finish: Black or to match adjacent equipment
Size: 19" wide, standard EIA mounting hole spacing, height as specified
2. Specifications – Back Box Enclosures
Material: Code grade steel
Finish: Black or galvanized
Size: As specified
3. Specifications – Plug Box and Termination Panels
Material: 11 gauge steel or 1/8" Aluminum, minimum thickness
Finish: Black (unless instructed otherwise by Architect)
Size: As specified
4. Approved Manufacturers: Steel City, Raco, Hoffman, Whirlwind, Pro Co, Wireworks

H. Audio Transformers

1. All transformers shall be selected for proper interface and loading in the circuits as required by as-built conditions and per manufacturer's recommendations.

2.2 MAJOR EQUIPMENT

A. Equipment provided shall be that specified herein or approved substitute (see Paragraph 1.6.B).

B. Detailed performance specifications shall be those published by the manufacturer effective on the date of this document for all equipment listed.

C. See spreadsheet of major equipment in Appendix B.

2.3 DETAIL DRAWINGS

A. The drawings herein may detail custom built equipment and system details.

B. Furnish all materials and labor to provide complete and finished work even though not specifically shown on the drawings.

C. Detail drawings are located in large format AV drawings.

PART 3 - EXECUTION

3.1 AUDIO SYSTEM REQUIREMENTS

A. Requirements herein refer to materials and work which are related to or part of the Systems. Where conflict exists with other specifications concerning such work or materials, this specification takes precedence unless otherwise approved in writing by the Owner.

3.2 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. All mounting hardware shall be included.

C. All bolts and fasteners must be Grade 5 or better.

D. All bolted attachments to have lock washers or other self-locking fasteners.

E. Provide all required mounting brackets and framing, hardware and components, safety systems and rigging systems using the following minimum design factors (given as ratio of working load limit (WWL) : rated breaking load):
   1. 5:1 – Minimum design factor for all mounting components regardless of mounting condition.
   2. 5:1-8:1 – Minimum design factor for manufacturer provided mounts & assemblies where engineered stamped documentation and destructive testing data is provided by manufacturer.
   3. 10:1 – For all hardware and connecting assemblies between manufacturer rated assemblies when equipment is hung above the general public. This includes but is not limited to wire rope, bolts, shackles, turnbuckles, beam clamps, supplemental steel provided by Systems contractor and other connecting hardware.
   4. Design factor calculations to be provided with all equipment mounting details.
   5. Systems Contractor shall coordinate required additional blocking, supplemental steel or channel strut supports with Main Contractor & specific trade contractors.
   6. All mounting systems not provided as a complete package from a single manufacturer must be engineered, approved, and have drawings stamped by a professional rigging engineer or licensed structural engineer, as approved by the Main Contractor. The engineer shall verify that the design meets or exceeds design criteria for this particular use case. Each mounting system solution must be separately engineered, verified, and stamped.

F. All supporting structures and enclosures supplied by the Contractor not having a standard factory paint finish shall be painted. Paint specifications will be supplied by the Architect or indicated herein.

G. 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 Architect. This does not exclude equipment or materials where standard colors and finishes may be specified herein.

H. Finish of blank panels and custom assembly panels shall match adjacent equipment panels. Verify all panel colors with Architect. All color choices should be clearly indicated on panel drawing submittals, and on the panel schedule.

I. 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 drawings to ensure consistency and clarity. Verify any changes in working type size and/or placement with the Systems Designer prior to marking.

J. Protect equipment and related wiring where construction conditions may cause damage or environmental conditions exceed manufacturer's specifications.

K. The standard reference for the layout and construction of the system shall be:
1. Giddings, Philip. Audio Systems Design and Installation.

3.3 CONDUIT

A. Review and coordinate Systems conduit installation with the electrical contractor to ensure proper operation of the Systems.

B. All wiring shall be in conduit unless authorized by the Architect, approved by the Systems Designer, and permitted by code. Exceptions are short runs at rack 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 ceilings and shall be supported from walls or ceilings by means of approved galvanized iron clamps or hangers. Conduit connections to equipment racks shall be insulated.

D. Minimum size conduit shall be 3/4 inch. All conduit shall be sized for maximum 40% fill or less if required by code.

E. No conduit run between pull boxes/termination boxes may exceed 100 feet in length.

F. No conduit run shall have more than 180 degrees of combined turns between pull boxes/termination boxes, and no single turn may exceed 90 degrees.

G. Conduit containing STP, UTP, and COAX wire types must be installed so that the final length of the cable runs does not exceed maximum cable lengths as stated in 3.8.N and 3.8.O.

H. All conduits, within 6" of termination box, junction box, gutter or rack/ ladder tray, must be labeled with conduit group and destination of the opposite end of that conduit, as follows: "AV -<Group> - <opposite end>". For example "AV – B – AA stage right". Permanent marker on the conduit where it can be seen from the ground or nearest access point is acceptable.

I. Each termination does not require individual home run conduits. Conduits of like groups (see 3.4 below) may be combined at junction boxes so that a smaller number of larger conduit sizes may be used instead of a larger quantity of smaller individual conduits.

3.4 CONDUIT SEPARATION

A. Systems wiring is divided into wiring groups according to their nominal voltage levels. Cabling may be combined in a single conduit, and/or junction box(es) as long as all cables are of the same wiring group (refer to Schedule of Terminations for cabling, grouping, and destination details, by termination):

	Wiring Type
Group A	Microphones and other sensitive wiring (0 mV to 100 mV)
Group B	Line level wiring (100 mV to 10 V)
Group C	Loudspeaker and control wiring (10 V to 70 V)
Group D	Telephone, video, control and digital circuits
Group E	Category Cable, and Fiber optic cable
Group F	Spare Conduit

Note: These wiring groups must never be intermixed within a given conduit run or junction box.

B. Minimum conduit separation between conduits carrying wiring of different groups is:

	Group A	Group B	Group C	Group D	Group E
Group A	adjacent	6"	12"	12"	12"
Group B	-	adjacent	12"	6"	6"
Group C	-	-	adjacent	6"	6"
Group D	-	-	-	adjacent	adjacent
Group E	-	-	-	-	adjacent
Group F	12”	12”	12”	12”	12”

Note: Ninety degree crossings in close proximity are acceptable. Separations must be maintained until within six feet of box or gutter entry.

C. Minimum conduit separation between conduits carrying Systems wiring and other electrical service conduit is:

	Group A	Group B	Group C	Group D	Group E	Group F
Dimmer controlled lighting	24"	12"	6"	12"	12”	24”
SCR controlled services	24"	12"	6"	12"	12”	24”
220/440V circuits	6"	6"	adjacent	adjacent	adjacent	24”
All other services	6"	6"	adjacent	adjacent	adjacent	24”

Note: Heavy current demands in or long parallel runs with the above services may dictate greater separations to avoid interference in the Systems. Separations must be maintained until within six feet of box or gutter entry.

D. Contractor must have written authorization from the Systems Designer for any conduit installation which does not conform to these requirements. The conduit separations above are based on the use of EMT conduit for all AV and other signals. Separations where Rigid conduit is utilized for AV systems and/or other adjacent systems may be halved. Separations where PVC conduit is utilized for AV systems and/or other adjacent systems must be doubled. Flex conduit is not allowed without written authorization for each separate instance. The Contractor must request information on separation adjustments for each instance where a different type of conduit than what is listed above is used.

3.5 ELECTRICAL POWER

A. Review and coordinate electrical power system installation including grounding with the electrical contractor to ensure proper operation of the Systems.

B. Verify that all AC power circuits designated for Systems equipment are wired with correct polarity and isolated ground. Report in writing any discrepancies found to the Architect for corrective action.

C. Provide distribution of electrical power within the equipment racks with a minimum of one spare AC receptacle for each four in use per branch circuit.

3.6 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, will be permitted except as authorized, in writing, by the Architect.

3.7 BOXES

A. With the exception of portable equipment, all boxes, conduits, cabinets, equipment and related 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 Systems Designer.

D. Clean all box interiors before installing plates, panels or covers.

E. Using permanent marker on the box or on wire tags, indicate the lengths of installed cable for all COAX and Category wiring inside the box.

F. Using permanent marker, inside the box, indicate the box name, for example “AA”.

3.8 WIRING METHODS AND PRACTICES

A. Provide installation of all Systems wire and cable, ensuring proper:
   1. Pulling Tensions
   2. Quantities
   3. Types
   4. Lengths
   5. Routing
   6. Wire Group Separation
   7. Identification

B. The interconnection of equipment in a rack shall use the same wire by type as specified for runs external to racks unless otherwise indicated on AV single line drawings. All wiring within racks shall be direct between devices without splices.

C. Interconnection wire between amplifiers and loudspeaker transition panels will be type LSXFR (refer to wire types on AV0.01).

D. Connector polarity shall be maintained except for terminations at equipment manufactured to other standards. In the event that manufactured equipment can be ordered with, or internally set to, various standards, the equipment shall be configured as follows:
   1. Polarity for XLR style connector shall be: pin 2-high, pin 3-low, and pin 1-shield.
   2. Polarity for TRS style connector shall be: tip-high, ring-low, and sleeve-shield.

E. Spare wire runs of each group and type shall be pulled to each termination location. The number of spares shall be ten percent of those in actual use or one, whichever is greater.

F. Splicing of cables is not permitted between terminations of specified equipment.

G. Do not pull wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs without written approval from the Systems Designer; 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.

H. Provide wire pulling lubricants and pulling tensions in accordance with the wire and cable manufacturer's recommendations.

I. All wires shall be permanently identified at each wire end by marking with self-laminating adhesive labels fully covered with clear heat shrink tubing, and a chart kept of each wire's function. This applies to wire within a rack assembly as well as wire running in conduit.

J. Wire ends should be wrapped with heat shrink tubing. Each shield or drain wire should be covered with heat shrink to avoid unintentional connections.

K. Use Wago or Entrelec DIN rail mounted terminal blocks for all terminal block wiring connections. Do not exceed one wire per terminal connection point. Do not cut strands from conductors to fit lugs or terminals. Spare terminal blocks, equivalent to 10% of those in actual use, shall be provided.

L. Form, in an orderly manner, all conductors in enclosures and boxes, wire ways and wiring troughs, providing circuit and conductor identification. Tie using wraps of appropriate size and

type. Limit spacing between ties to six (6) inches and provide circuit and conductor identification at least once in each enclosure.

M. Provide service loops, minimum 6', at each termination so that plates, panels, patch bays, and equipment can be dismounted and placed on an adjacent horizontal work surface allowing for safe service and inspection without disconnection.

N. Maximum installed length of Category cables is 200'

O. Maximum installed length of Coaxial cable for HD-SDI, 3G-SDI, 6G-SDI, and 12G-SDI is 200'

P. Provide lengths of installed cables marked inside each termination back box using legible and permanent markings.

3.9 GROUNDING

A. Audio system wiring shall conform to the following procedures:
1. Audio equipment AC ground pins shall connect to AC isolated ground.
2. Audio equipment chassis shall connect to AC isolated ground or rack frames.
3. Audio rack frames shall connect to AC isolated ground bus in panelboard by means of #2 gauge (minimum) conductor.
4. Audio shields between AC powered pieces of equipment, where signal shield is tied to chassis ground, shall be directly connected to ground at the initiating end only. Capacitively terminate the receiving end with a 0.1μF capacitor.
5. Audio signal paths between AC powered pieces of equipment shall be connected using balanced lines and/or transformer isolation as required. No unbalanced signal paths may be connected to the patch bay.
6. Isolate all Systems wiring from racks, back boxes and conduit.
7. Isolate all Systems racks from conduit and other conductive surfaces. Use insulated bushings for conduit connections and a dielectric plinth between racks and conductive flooring materials.
8. AC isolated ground system shall be isolated from all other facility grounds except at the single point of connection at the AV isolation Transformer.
9. All metallic conduit, boxes and enclosures shall be grounded in accordance with the current National Electrical Code.

B. Metallic enclosures containing active equipment shall be grounded with due regard for the minimization of electrical noise. This may include the provision of grounding conductors separate from the 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. Assembly of racks on-site will not be permitted, without written approval from the Systems Designer (except for system wiring which must terminate directly to the patch bays via soldering, punch-down or other non-connectorized termination process).

B. Placement of equipment in equipment racks, as shown in the drawings, is for maximum operator convenience. Verify any changes in placement of the equipment with the Systems Designer before assembly.

C. Racks shall be installed plumb and square without twists in the frames 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 wires and cables used in assembling custom panels and equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted engineering practice.

G. Harnessed cables shall be combed straight, wrapped every six (6) to ten (10) inches, and attached to the structure as necessary. Each cable that breaks out from a harness for termination shall be provided with an ample service loop so that panels, patch bays, and equipment can be dismounted and placed on an adjacent horizontal work surface allowing for safe service and inspection without disconnecting.

H. Harnessed cables shall be formed in either a vertical or a horizontal relationship to equipment, controls, components or terminations.

I. Cable shields shall be connected to the isolated ground system with due regard for ground loops. (See Giddings reference book, Chapter 10)

J. All system components and related wiring shall be located with due regard for the minimization of induced electro-magnetic and electrostatic noise, for the minimization of wiring length, for proper ventilation, and to provide reasonable safety and convenience for the operator.

K. All rack mounted equipment, with front panel controls, shall be provided with security covers to avoid tampering with preset levels. If specific security covers are not included in the equipment list, the Contractor will provide the manufacturer's security cover for each specified device or a suitable alternate.

L. Every device shall be installed with regard for proper polarity. Absolute polarity shall be maintained through the entire Systems signal chain.

M. Any permanently mounted electronic device must be balanced. Contractor will provide balancing transformers for unbalanced equipment connections where necessary.

3.11 VERIFICATION TESTS

A. Test each point to point wire segment individually, and test any linkage of multiple point to point cables that form an end to end link.

B. Contractor must document all verification test requirements and results for submission (see 3.13.A below).

C. Confirm that each individual wire and cable run (whether in a rack or in conduit) is identified with a unique number. These numbers are affixed to both ends of each cable and are clearly visible. Provide a complete list of these numbers along with the termination location of each end of the wire run.

D. Verify all circuits and extensions for correct connection, continuity and polarity. Absolute polarity must be maintained between all points in the system.

E. Identify installed length of all copper and fiber cabling.

F. Confirm that all system outputs are free of spurious signals including oscillations and radio frequency signals. A wide band oscilloscope shall be used to verify this condition.

G. Confirm that the system is free of audible clicks, pops, and other noises when any operating control is activated, with or without input signal.

H. For all microphone lines, tie lines, return lines and effect loudspeaker lines, confirm:
1. Proper circuits appearing at each termination location
2. Proper circuits appearing at each jack bay position
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
7. Perform a sweep test to 0.5MHz

I. For RF Coaxial cabling confirm:
1. Receptacles output does not exceed +15dBmv (50-400MHz - +6 dBmv minimum, above 400MHz - +3dBmv minimum)
2. For each modulated video output, tap to meet +9dBmv (+/- 3dBmv)
3. Verify that all TV channels are visible and free of any interference or signal distortion
4. Frequency sweep test from 5MHz to 1000MHz.

J. For all other Coaxial cabling confirm:
1. Verify that the installed cable meets, at a minimum, the requirements set forth in SMPTE ST 2081 for 6G-SDI single-link and 12G-SDI dual-link.
2. Verify that TDR impedance is 75 +/-3 ohms
3. Frequency sweep test from 5MHz to 6GHz.

K. For Category Cabling:
1. Use Category 6A cable pair tester to verify compliance with TIA/EIA standards referenced above (including all current addendums)
2. Test each cable using the permanent link procedure for opens, shorts, reversals, cross twists and mis-wiring. Check NEXT, ELFEXT, Delay Skew, Return Loss, and Alien Crosstalk.
3. Report all mis-wiring or failures found and report retests as needed.
4. If any conductors report open or short, replace the entire wire and re-test.

L. For Fiber cabling:

1. Using appropriate test devices and proper factory terminated jumpers, measure all fiber optic line attenuations, end to end, as required by TIA/EIA-526-14A.
2. Optical budget may not exceed the cable performance by length plus splice and connector losses (0.03 dB for each fusion splice, 0.3dB for each mechanical splice, and/or 0.4 dB for each connector).
3. Overall attenuation must meet TIA/EIA-568B standards. Perform attenuation tests at 850nm and 1300nm.

M. Confirm that loudspeakers and mountings are free of buzzes and rattles when the loudspeaker is swept with sine wave tones over its rated bandwidth at one-half (1/2) its maximum rated power.

N. For all permanently mounted loudspeaker terminations, provide impedance measurement of each pair of loudspeaker lines with all loudspeakers connected and all amplifiers disconnected. These measurements shall be documented as editable tabular data listing impedance for each 1/3 octave band from 20 Hz to 20 kHz and shall be accurate to the nearest tenth of an Ohm.

O. For all intercom terminations, confirm proper operation by initiating and receiving audio communication and call light. For single lines connected to a matrix, test each line with each channel in the matrix. Verify that all channels are quiet and without spurious noise.

P. For all electronic devices mounted in racks and connected to patch bays, confirm:
1. Every input and output is balanced.
2. Proper polarity is maintained throughout the entire audio path.
3. Tip connection of each TRS jack is connected to the positive terminal of each corresponding input or output.

Q. For all devices requiring IP addressing:
1. IP addressing scheme must make use of subnets such that all devices, regardless on which network (Audio, Video, Control, or House) they reside, have a unique IP address to eliminate the possibility of duplicate IP addresses if networks are inadvertently cross-patched.
2. All devices must have static IP addresses.
3. Create a spreadsheet of all devices and their IP addresses, Subnet Masks, MAC Addresses, and other pertinent IP configuration information.
4. Coordinate all IP addressing schemes with the Owner.

R. If the Audio, Video, and Control network switches are dedicated to these systems and the systems do not rely on Owner furnished and configured network switches:
1. Configure network switches to operate properly and provide the proper network configurations to support the network devices and protocols used by those devices.
2. Configure, as needed, VLANS, IGMP, QOS, and other protocols requiring configuration to provide a fully functioning and robust network system.
3. With all networks configured and operating, and all network devices configured and operating, confirm that the networks are behaving as expected and as required.

S. Electrical Contractor, coordinating with the Systems Contractor must confirm that there are no shorts between the Neutral and Isolated Ground conductors, and between the isolated ground conductor and building ground for each AV Technical Power circuit. Electrical Contractor, coordinating with the Systems Contractor must confirm there are no Bootleg Grounds or Neutral-Ground Reversals on each AV Technical Power circuit.

T. The Contractor is responsible for the programming and configuration of all DSP systems and control systems necessary as specified in this project specification and AV large format drawings.
   1. Programming and configuration must be complete and ready prior to System Designer's arrival for verification of functionality and acceptance testing.
   2. Programming for the DSP systems must contain control pages to support normal operations, and to support Acceptance Testing and System Tuning operations, as described in this specification and the large format AV drawings.
   3. Programming for the Control Systems must include all master controller code and touch panel code and graphics, working together to provide the function as described in this specification and the large format AV drawings.

U. Test all Audio, Video, and Control system controls, including but not limited to mixing consoles, switchers, routers, touch panels, paging stations, volume controls, and source selectors for proper operation.

V. Test proper operation of any portable controls at each designated control location (Stage Manager's rack, for example).

3.12 INITIAL ADJUSTMENT

A. All initial adjustments must be documented and submitted as part of the Verification Test Reports (see 3.13).

B. Make all adjustments and modifications so that the system is operational and fully functional including but not limited to:
   1. Update all device software and firmware to the latest manufacturer's recommended release that allows for proper operation with ALL OTHER DEVICES in the systems.
   2. Make all adjustments and modifications for system gain structure per recommendations of major component manufacturers.
   3. Properly configure all EDID and HDCP settings to allow for proper function of all video systems.
   4. Install all programming for digital mixing consoles, DSP, Control and any other software based devices in the systems, and verify that audio and video signal passes as designed through these systems. Verify that control systems function as specified. Contractor to provide initial DSP and control system programming prior to acceptance testing, one full set of programming changes and adjustments, prior to handover to the Owner, and one additional set of changes and adjustments during the initial warranty period, as part of the base scope of work.
   5. Properly balance all 70 Volt loudspeaker zones to be consistent from zone to zone using amplifier settings and loudspeaker taps to adjust for differing loudspeakers or installation height. All 70 Volt loudspeakers within a given zone must not have a broadband SPL variation of greater than +/- 2dB.
   6. Properly adjust delay and equalization for all loudspeaker systems using SIM, SMAART or other similar dual FFT type measurement devices. All testing and adjustment shall be in accordance with all manufacturer recommendations and industry standard practice. Contact the Systems Designer for further system delay and equalization requirements.
   7. Capture traces showing magnitude and phase response for each loudspeaker or loudspeaker cluster before and after equalization and delay adjustments.

8. Capture traces showing magnitude and phase response for the systems operating as a whole from 3 locations in each major seating area. One of these areas should be the House Mix Position, if applicable.
9. Equalization and timing of the loudspeaker systems shall be further adjusted as required by the Systems Designer and Owner during Acceptance Testing.

3.13 VERIFICATION TEST REPORT

A. Submit written report detailing the results of Initial Adjustments and Verification Tests. Report to include, at minimum, the following:
   1. Copies of all relevant drawings, charts, test instrument data, and photographs.
      a. PDF copies of all available manufacturers' operation and service literature for each major system component.
      b. Copy of all programming files including, but not limited to, Audio DSP programming and Graphic User Interface (GUI) files, Control system Touch Panel GUI files and control system control programming files including un-compiled source codes.
      c. All other documentation and results of testing and initial settings as referenced in 3.11, and 3.12 above.
      d. Written certification that the installation conforms to the requirements stated herein, is complete in all respects, and is ready for inspection, Acceptance Testing, and tuning.
   2. Prepare and submit an InfoComm standard Commissioning Checklist for each system in this specification.
   3. Prepare and submit a training syllabus for Owner training (see section 3.15).

B. This report shall be completed and submitted to the Systems Designer for review a minimum of five (5) days prior to Acceptance Testing and final tuning.

3.14 ACCEPTANCE TESTING

A. Acceptance Testing shall be performed by the Systems Designer and Contractor during a period designated by the Architect. Contractor shall furnish a minimum of two (2) technicians or one technician per Systems Designer commissioning team, for the acceptance testing period, and one or more engineers fully capable of programming DSP and Control systems, and making any other engineering adjustments to equipment in the systems. Contact Systems Designer for number of commissioning teams that will be deployed. For Bid purposes assume there will be 1 commissioning team(s).

B. The minimum time required for Acceptance Testing is 2 working days, including 1 days of dedicated quiet time. Coordinate this time period so that free access, work lighting, and electrical power are available on the site.

C. Ensure that Systems areas are in a clean and orderly condition ready for acceptance testing.

D. Provide test equipment (meeting the following minimum specifications) on site, at all times during Acceptance Testing. Prior to Acceptance Testing, provide the Systems Designer with a listing of the specific equipment to be made available (**).
   1. Oscilloscope: 10MHz Bandwidth, Sensitivity – 1mV/cm

2. Digital Multi-meter: 1% Accuracy
3. Function Generator: 1MHz Bandwidth, Distortion < 1%
4. Real Time Analyzer: 1/3 Octave with microphone
5. SMAART Analysis package with V.8 software and a minimum of two matching test microphones (Earthworks M30 or better)
6. Pink Noise Source: 20 Hz – 20 kHz Bandwidth
7. Test mic tone calibrator
8. Impedance Sweep Meter: 20 Hz – 20 kHz Range, 1 Ohm – 50 kOhm
9. Polarity Checker: Mic, line, or loudspeaker level
10. Video Test Signal Generator(s): must provide all signals, resolutions, and output formats as needed to fully test the systems.

    ** Note: Systems Designers may choose to supply some of their own test equipment. Confirm specific requirements prior to commissioning.

E. Be prepared to verify the performance of any portion of the system by demonstration, listening tests and instrumented measurements.

F. Be prepared to facilitate the visual inspection of system components and wiring, including removal of termination panels for inspection of wiring termination and wire management practices.

G. Be prepared to demonstrate all software and control systems.

H. Be prepared to go through the commissioning checklist and verify all items as complete.

I. Make additional mechanical and electrical adjustments within the scope of the work and which are deemed necessary by the Systems Designer as a result of the Acceptance Tests. This may include realigning of loudspeaker systems, changes in system gain structures, grounding, filtering or interfaces.

J. Final acceptance will be contingent upon issuance by the Systems Designer of a letter of acceptance stating that the work has been completed and is in accordance with the contract documents.

K. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for Systems Designer's Acceptance Testing.

3.15 user training

A. Contractor will provide in-depth training in operation and regular maintenance of all systems and on all equipment included in the scope of work contained in this specification and the AV large format drawings.

B. Training to include (but is not limited to):
1. Detailed operation of mixing consoles, video switchers and routers, computer control systems and other essential system elements as relevant to their installation in this project.
2. Maintenance and repair of system equipment, including replacement procedures for user-replaceable parts.

3. Review of Operation and Maintenance Manual (See 3.16)

C. Contractor will provide a minimum of 2 training sessions of four hours each with times and dates to be approved by the Owner.

D. The first session shall take place in the presence of the Systems Designer and shall occur directly after the completion of Acceptance Testing. If the Systems Designer, Owner, and/or Architect judge any work to be deficient and/or not substantially complete at the time scheduled for training, the training will be postponed until the Systems Designer, Owner, and Architect judge the entire AV system conforms to this specification and the AV large format drawings.

E. Contractor will bear any costs incurred for additional Systems Designer's time and expenses due to failure to have the system functioning in accordance with specification requirements at the times scheduled for User Training.

3.16 SYSTEM DOCUMENTATION

A. Within thirty (30) days of the Acceptance Testing, prepare and submit a CD-ROM of the preliminary Operation and Maintenance manual for approval by the Systems Designer. Manual to include, at minimum, the following documents in PDF format:
1. Table of contents
2. Written Guarantee and service policy
3. Basic power on/off and operational procedure
4. Copies of all shop drawings which have been updated to include any changes made during the installation process
5. All available manufacturers' operation and service literature for each major system component
6. One line signal flow diagram with all cable runs and patch points identified by alpha-numeric character
7. Copy of the Verification Test report
8. Copy of conduit riser diagram
9. Copy of the final tuning settings as provided by the Systems Designer
10. Copy of the IP Addressing table
11. Copy of all uncompiled source codes and configuration files which have been updated to include any changes made during the installation process.

B. Systems Designer will review the above system documentation. Upon approval, Contractor shall prepare and submit to the Owner:
1. Five (5) copies of the final Operation and Maintenance manual on CD-ROM or DVD.
2. Two (2) hard copies of the final Operation and Maintenance manual printed and neatly bound

C. Provide framed or laminated copy of the as-built signal flow diagram for each theater to be mounted in each control room. This diagram shall have all cable runs and patch points identified by alpha-numeric character.

APPENDIX(ES) TO FOLLOW

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SECTION 274100 - APPENDIX A

PART 1 - AUDIO VIDEO SYSTEMS DESRIPTION

1.1 MULTI-PURPOSE ROOM 124

A. The program for the Multi-Purpose Room is envisioned to include lectures, live music performances, video presentation, and cultural events.

1. Audio –

a. Loudspeakers are provided for voice reinforcement, and to amplify audio from the program sources such as video and computer outputs. The speaker system will consist of column array speakers mounted on the screen wall for sourcing audio from video, as well as ceiling speakers to distribute audio from lecturers and other live sources throughout the divisible room.

b. Six channels of wireless microphones are provided. Six handheld and six lavalier microphones can be interchanged as required for different room functions. These transmitters are shared across the entire room system when divisible walls are retracted and are split across the rooms when dividing walls are in place.

c. Floor boxes are provided. Audio inputs for program audio from OFE and outside client sources such as Blu-Ray Players, Computer, DJ Equipment, or Audio Consoles. Infrastructure is provided to enable a DJ or small musical ensemble to setup a mix position at the rear of the room while locating portable speakers and other stage equipment at the front of the room without the need of running ad hoc cabling.

d. An RF Assistive Listening System is provided to meet mandatory minimum specification for the rated occupancy in the Multi-Purpose Room. This includes RF transmitters located in the room and portable universal ear speakers and receivers for amplifying the audio level for people requiring hearing assistance. Neck loop systems will be provided to amplify sound for people with hearing aids and cochlear implants with telecoils.

2. Video –

a. At the front of the room, a large electric roll-down projection screen is provided along with a projector. The projected image will be approximately 147”H x 236”W with a 16:10 aspect ratio. The projector will be capable of producing brightness in the 21,000-lumen range to provide good viewing with blackout shades on the glass windows on the north and south sides of the room to reduce ambient light in the room. The projector will be installed with a mount to be coordinated with the architect. The projection screen will have a wall switch at the AV rack as a backup and will also be controllable from the control touch panel. In the other sections of the divided room, 98” or 85” TV displays are located for use when the divisible walls are in place.

b. Inputs to the AV system will be provided at the floor box positions and AV Equipment Rack. Laptop inputs to the projection system will be provided at one wall termination panel near to the projection screen and one near to TV.

3. Recording – Audio and video recording capability is provided for archival purposes. There will be PTZ Cameras in each room section. Program audio and microphone inputs will be mixed and routed to the recording utility.

1.2 MEETING ROOM 126

A. The Meeting Room system is intended to accommodate Video Presentations and Video Conferencing functions.

1. Video – An 85" Display is located at one end of the Meeting Room. Input to display can be achieved at the Meeting Room table via an AV floor box. As well as BYOD devices, a room PC can be used to display meeting and presentation video on the display. A PTZ camera is provided above the display for video conferencing function.

2. Audio – Ceiling speakers are provided to distribute far-end and presentation audio. Ceiling microphone arrays are included to pickup speech from within the room to distribute to far-end meeting participants.

1.3 SEMINAR ROOM 127

A. The program for the Seminar Room is similar to that of Meeting Room 126, though with display sizing and speaker and ceiling mic quantities reduced to match the smaller room dimensions of the Seminar Room.

1.4 MEETING ROOMS 128 & 129

A. These meeting rooms are for small breakout meetings. All-in-one video bars are provided for use with in-room displays and BYOD devices such as laptops.

1.5 DIGITAL MEDIA ROOM 109

A. The Digital Media Room is to be used for basic video and audio content production.

1. Video – A professional quality video camera is provided along with a computer and AV Interface suited for video and audio capture and editing. A green screen assembly is provided as well.

2. Audio – A single channel of wireless microphone and a wired shotgun microphone are provided for audio recording. Studio monitors are provided for audio reference during mixing and editing.

1.6 TEEN AREA 108

A. A 75" TV display is provided with local input for use with BYOD gaming consoles.

1.7 MULTIPURPOSE PROGRAM ROOM 105

A. AV Systems for the Multipurpose Program Room closely reflect those of Meeting Room 126 and Seminar Room 127.

1.8 STORY AREA 102A

A. Similar to the Teen Area 108, a 75" TV display is provided with local input for use with BYOD devices.

1.9 DIGITAL SIGNAGE

A. A digital signage location is provided in the Main Lobby. The location consists of a 75” display and digital signage player.

1.10 CONTROL ROOM 104

A. A centralized Control Room will be included in the project. This Control Room will act as the head end for the various AV Systems and will accommodate the ability for control and archive from the Multi-Purpose, Seminar, Digital Media, and Meeting Rooms.

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SECTION 274100 APPENDIX B - MAJOR EQUIPMENT LIST

Contractor Furnished Contractor Installed = CFCI
Owner Furnished Contractor Installed = OFCI
Owner Furnished Owner Installed = OFOI
Owner Existing Equipment = OEEI

Manufacturer	Model	Name	QTY	Status/ Equipmen
MULTI PURPOSE 131				
Projections				
Draper	Paragon V w/ Wall Mount Bracket Kit	White Case, 16:10, 278" Diagonal (12'3" x 19"8"), 12" Drop, TecVision XT1600X White	1	CFCI
By Contractor	Custom	Projector Rigging	1	CFCI
By Contractor	Custom	Projection Screen Rigging	1	CFCI
Panasonic	PT-RZ21KU	Projector 3DLP Laser, WUXGA (1920 x 1200) 21,000 Lumen, no lens	1	CFCI
Panasonic	ET-D75LExx	TBD Lens for 3-chip DLP projectors	1	CFCI
Displays				
RP Visual Solutions	RPWM-32-KIT-XM	Wallmate 32 X ARM Flat, with back box	2	CFCI
TBD	TBD (NEC C981Q basis of design)	98" Display | UHD - 350 nit	1	CFCI
TBD	TBD (NEC V864Q-MPI basis of design)	85" or 86" Display | UHD - 350 nit	1	CFCI
Video				
Denon	DVD-500BDMKII	Blu-Ray/DVD Player w/RS232	1	CFCI
QSC	NV-32-H	Q-SYS Network Video I/O	4	CFCI
Zeevee	ZyPerUHD-WE	HDMI 2.0 and VGA Wallplate Encoder with IP streaming	2	CFCI
Zeevee	ZyPerUHD-D	HDMI 2.0 output Decoder.	2	CFCI
Signal Processing				
QSC	TSC-80w-G2-BK	Q-SYS 8.0" PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.	3	CFCI
QSC	SL-QUD-110-P	Q-SYS Core 110 UCI Deployment Software License, Perpetual.	1	CFCI
QSC	CORE 110f	Unified Core with 24 local audio I/O channels, 128x128 network I/O channels, dual LAN ports, POTS and VoIP telephony, 16x16 GPIO, 16 next-generation AEC processors, 1RU.	1	CFCI
QSC	SL-DAN-32-P	Q-SYS Software-based Dante 32x32 Channel License, Perpetual	1	CFCI
Equipment Rack				
Middle Atlantic	CBS-WRK-32	Caster Base for 32" Deep WRK Series	1	CFCI
Middle Atlantic	WRK-24SA-32LRD	24 RU WRK-SA Series 24-1/4" Wide Rack, 32" Deep w/o rear door	1	CFCI
Middle Atlantic	RM-KB-LCD17HD	Rack Mount Display / Keyboard / Trackpad	1	CFCI
Middle Atlantic	D#LK	Rack Drawer w/ Lock	1	CFCI
Middle Atlantic	PDLT-815RVA	Rack Power/Light	1	CFCI
Blackbox	JPMT700A	Patch Panel Cat 6A 1U 24 Port w/ FMT700 modules AR	2	CFCI
Audio Accessories	WEP-262EO-SH-JSK	Patch Bay - 2x26 2U Long Frame, EDAC 3-pin rear	1	CFCI
Networking				
QSC	NS-1124P	24-port network switch preconfigured for Q-SYS Audio, Video and Control with 12x PoE+ ports. With advanced QoS and IGMP to also support AES67 and Dante in same VLAN.	2	CFCI
Computers				
SuperLogics	SL-2U-AH410M-GD	2U Rack Mount PC	1	CFCI
Generic	Wireless Keyboard and Mouse (Windows & Mac)	Wireless Keyboard and Mouse	1	CFCI
QSC	I/O USB Bridge	Q-SYS PoE bridging endpoint for AV-to-USB Bridging. Delivers driverless usb 2.0 connection. Includes dual LAN connections.	1	CFCI
Terminations				
By Contractor	Custom	Terminations - Projector	1	CFCI
By Contractor	Custom	Terminations - Projection Screen	1	CFCI
By Contractor	Custom	Terminations - Display	1	CFCI
By Contractor	Custom	Terminations - Ceiling Speakers	8	CFCI
By Contractor	Custom	Terminations - Surface Mount Speakers	2	CFCI
By Contractor	Custom	Terminations - Camera	2	CFCI
By Contractor	Custom	Terminations - Floor Box	2	CFCI

Speakers				
QSC	AD-S162T	Surface Column Loudspeaker 2.75" (x16) - 70/100V tx with 8 ohm bypass, 160°H x selectable 15/30°V	2	CFCI
QSC	AD-C6T	Ceiling Loudspeaker 6.5" two-way, 70/100V tx with 16 ohm bypass -	4	CFCI
QSC	CX-Q 4K8	8ch 500W Network Amplifier	1	CFCI
Wireless Microphones				
Shure	ULXD4Q=-XXX	ULXD Quad Digital Wireless Receiver with internal power supply, 1/2 Wave Antenna and Rack Mounting Hardware (G50, H50, J50A, or V50, freq. bands)	1	CFCI
Shure	ULXD4D=-XXX	ULXD Dual Digital Wireless Receiver with internal power supply, 1/2 Wave Antenna and Rack Mounting Hardware (G50, H50, J50A, V50, or X52 freq. bands)	1	CFCI
Shure	ULXD1=-XXX	ULXD Digital Wireless Bodypack Transmitter with Miniature 4-Pin Connector (G50, H50, J50A, V50, or X52 freq. bands)	6	CFCI
Shure	ULXD2/B58=-XXX	ULXD Handheld Wireless Microphone Transmitter with BETA 58A® Microphone (G50, H50, J50A, V50, or X52 freq. bands)	6	CFCI
Shure	UA864US	Wall-Mounted Wideband Antenna	2	CFCI
Countryman	E6 Directional Earset Mic (Coordinate color with	Directional Earset Mic, Highest Gain, with Detachable 2mm Cable and TA4F Connector	6	CFCI
Atlas Audio	MS-12CE	Microphone Stand 34-62in	4	CFCI
Shure	SBC200-US	Dual Docking Charger with PS45US Power Supply	4	CFCI
Shure	SB900B	Shure Lithium-Ion Rechargeable Battery	8	CFCI
Cameras				
QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall	3	CFCI
QSC	PTZ-WMB1	Accessory Wall Mount Bracket for PTZ Camera	3	CFCI
Recording				
Denon	DN-900R	SD/USB Network Recorder with AES/EBU and Analog Input and Output w/ Dante	1	CFCI
AJA	Helo	H.264 SD Card Video Recorder & Streamer	1	CFCI
LaCie	STFR2000403	2TB USB 3.1 Gen 1 Type-C Rugged Secure Portable Hard Drive	1	CFCI
QSC	NV-32-H	Q-SYS Network Video I/O	1	CFCI
Assistive Listening				
Listen Technologies	LT-800-XXX-01	Stationary RF Transmitter (72 or 216 MHz)	1	CFCI
Listen Technologies	LR-4200-IR	Intelligent DSP IR Receiver	8	CFCI
Listen Technologies	LA-365	Replacement Rechargeable Li-ion Battery	8	CFCI
Listen Technologies	LPT-A207	Listen Breakaway Lanyard	8	CFCI
Listen Technologies	LA-380-01	Intelligent 12-Unit Charging/Carrying Case	1	CFCI
Listen Technologies	LA-430	Intelligent Earphone/Neck Loop Lanyard	4	CFCI
Listen Technologies	LA-402	Universal Stereo Headphones	8	CFCI
Cable				
Whirlwind	JHA-LCR-30F-30	Microphone Cables on Reel 30FT	1	CFCI
Whirlwind	ENC6ASE025	Cat6A EtherCON Cable 25'	8	CFCI
Audio Accessories	622A	Long Frame Patch Cable 2 foot Red	12	CFCI
Audio Accessories	PCH-X	Patch Cable Holder - Long Frame	1	CFCI
By Contractor	Shielded Cat6A - 2FT	Category Patch Cable 2FT	10	CFCI
MEETING ROOM 126				
Signal Processing				
QSC	NV-32-H (Core)	Q-SYS Network Video I/O	1	CFCI
QSC	NV-32-H	Q-SYS Network Video I/O	1	CFCI
QSC	SL-QUD-110-P	Q-SYS Core 110 UCI Deployment Software License, Perpetual.	1	CFCI
QSC	TSC-80w-G2-BK	Q-SYS 8.0” PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.	1	CFCI

Cameras				
QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall	1	CFCI
QSC	PTZ-WMB1	Accessory Wall Mount Bracket for PTZ Camera	1	CFCI
Computers				
Dell	OptiPlex 3080 Micro, i3-10105T, Windows 10, 8GB DDR4, M.2 256GB SSD	OptiPlex Micro	1	CFCI
Generic	Wireless Keyboard and Mouse (Windows & Mac)	Wireless Keyboard and Mouse	1	CFCI
Networking				
QSC	NS10-125++	8-Port Gigabit Ethernet PoE+ Switch	2	CFCI
Speakers				
SOUNDTUBE	IPD-CM62-BGM-WH	Ceiling Loudspeaker 6.5" coaxial, Dante enabled, self-powered PoE speaker	4	CFCI
Terminations				
By Contractor	Custom	Terminations - Ceiling Speakers	8	CFCI
By Contractor	Custom	Terminations - Camera	1	CFCI
By Contractor	Custom	Terminations - Display	1	CFCI
FSR	FL-500P-6-B	FL-500P Back Box - 6" Deep	1	CFCI
FSR	FL-500P-B-C U-Access	Cover With 1/2" Brass Squared Flange (Lift off door)	1	CFCI
By Contractor	Custom	Terminations - Ceiling Mic	2	CFCI
Displays				
TBD	TBD (NEC C981Q basis of design)	98" Display | UHD - 350 nit	1	CFCI
RP Visual Solutions	RPWM-32-KIT-XM	Wallmate 32 X ARM Flat, with back box	1	CFCI
Microphones				
Shure	MXA910	Linear Array Microphone	2	CFCI
SEMINAR ROOM 127				
Displays				
TBD	TBD (NEC V864Q-MPI basis of design)	85" or 86" Display | 24/7 - UHD - 500 nit	1	CFCI
RP Visual Solutions	RPWM-32-KIT-XM	Wallmate 32 X ARM Flat, with back box	1	CFCI
Cameras				
QSC	PTZ-12x72	Q-SYS PoE camera for AV-to-USB Bridging. 12x Optical Zoom 72° horizontal field of view. For small to medium conference rooms. Includes Lan, 3G-SDI and HDMI; includes a PTZ-WMB1 (Wall	1	CFCI
QSC	PTZ-WMB1	Accessory Wall Mount Bracket for PTZ Camera	1	CFCI
Computers				
Dell	OptiPlex 3080 Micro, i3-10105T, Windows 10, 8GB DDR4, M.2 256GB SSD	OptiPlex Micro	1	CFCI
Dell	KM5221W	Wireless Keyboard and Mouse	1	CFCI
Processing				
QSC	NV-32-H (Core)	Q-SYS Network Video I/O	1	CFCI
QSC	NV-32-H	Q-SYS Network Video I/O	1	CFCI
QSC	TSC-80w-G2-BK	Q-SYS 8.0" PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.	1	CFCI
QSC	SL-QUD-110-P	Q-SYS Core 110 UCI Deployment Software License, Perpetual.	1	CFCI
Speakers				
Soundtube	IPD-CM62-BGM-WH	Ceiling Loudspeaker 6.5" coaxial, Dante enabled, self-powered PoE speaker	2	CFCI
Networking				
QSC	NS10-720++	8-Port Gigabit Ethernet PoE+	1	CFCI
Microphones				
Shure	MXA910	Linear Array Microphone	1	CFCI

Terminations				
By Contractor	Custom	Terminations - Displays	1	CFCI
By Contractor	Custom	Terminations - Cameras	1	CFCI
By Contractor	Custom	Terminations - Speakers	6	CFCI
By Contractor	Custom	Terminations - Microphones	1	CFCI
FSR	FL-500P-6-B	FL-500P Back Box - 6" Deep	1	CFCI
MEETING ROOM 128 & 129 (Quantities listed are needed per each room)				
Displays				
TBD	TBD (NEC E558 basis of design)	55" Display | 4K UHD Commercial-grade display, 350 nit, w/ LAN control	1	CFCI
RP Visual Solutions	RPWM-16-KIT-XM	Wallmate 16 X ARM Flat, with back box	1	CFCI
Video Conferencing				
Logitech	Rally Bar Mini w/ Display Mount	All-in-one video bar for small rooms	1	CFCI
Terminations				
By Contractor	Custom	Terminations - Display	1	CFCI
By Contractor	Custom	Terminations - Wall Plate	1	CFCI
DIGITAL MEDIA ROOM 109				
Cameras				
Panasonic	AG-CX350	Professional Camera Recorder 4K/UHD	1	CFCI
Panasonic	AG-BRD50P	Battery Charger	1	CFCI
Panasonic	AG-VBR118G	Battery	1	CFCI
TBD	TBD (E-Image AT7402A, EH60, and Foldable Tripod Dolly with 3" casters basis of design)	Camera Pedestal Tripod w/ Fluid Head and Tripod Dolly Kit	1	CFCI
Panasonic	RP-SDZA128AK	SDXC cards	1	CFCI
PortaBrace	PB-AGCX350DKOR	Wheeled Hard Case with Divider Kit for Panasonic AG-CX350	1	CFCI
Computers				
Apple	Mac Pro	3.5GHz 8-core Intel Xeon, 32GB DDR4, Radeon Pro W5700X w/ 16GB GDDR6, 2TB SSD, Rack mounting rails, Magic Mouse, Magic Keyboard w/ Numeric Keypad, Accessory Kit, Final Cut Pro	1	CFCI
LG	27UP850-W or similar	27" IPS, 16:9, UHD HDR	1	CFCI
Blackmagic	UltraStudio 4K Mini	Ultrastudio	1	CFCI
Apple	AppleCare+	AppleCare+ for Mac Pro	1	CFCI
Cables				
By Contractor	Lot	Loose Cables (1/4" TRS to XLR Adapters, HDMI, etc.)	1	CFCI
Accessories				
By Contractor	Custom	Green Screen Kit (12' Wide Background Support System, Chroma Green 10 x 12' Muslin Background, 4 x Air-Cushioned Light Stands) $500 Allowance	1	CFCI
Audio/Video Work Station				
Yamaha	YAHS8CK	Studio Monitors with Controller, Speaker Stands, Iso Pads	1	OFCI
Omnirax	NOVAB	Compact Audio/Video Workdesk	1	OFCI
Furman	PLPROC	Furman Power Conditioner	1	OFCI
Native Instruments	25237	Kontrol A49	1	OFCI
AKAI	MPD226	USB/MIDI PAd Controller	1	OFCI
Native Instruments	27300	Komplete 13	1	OFCI
AVID	195737	Pro Tools Software - Perpetual License	1	OFCI
Auray	ERS16U	Steel Equipment Rack 16U	1	OFCI
AKG	3450H00050	HP12U 12-ch Headphone Amplifier w/ USB	1	OFCI
MOTU	8510	8PRE 16x12 USB Interface	1	OFCI
TEEN AREA & STORY AREA (Quantities listed are needed per each area)				
Displays				
TBD	TBD - Allow $5,000 each	75" Display | 24/7 - UHD - 500 nit	1	CFCI
RP Visual Solutions	RPWM-16-KIT-XM	Wallmate 16 X ARM Flat, with back box	1	CFCI

Terminations				
By Contractor	Custom	Terminations - Display	1	CFCI
By Contractor	Custom	Terminations - Wall Interface	1	CFCI
Crestron	HD-TX-101-C-1G-E-W-T	DM Lite – HDMI® over CATx Transmitter, Wall Plate, White	1	CFCI
Crestron	HD-RX-101-C-E	DM Lite – HDMI® over CATx Receiver, Surface Mount	1	CFCI
MULTIPURPOSE PROGRAM 105				
Displays				
TBD	TBD (NEC C981Q basis of design)	98" Display | UHD - 350 nit	1	CFCI
RP Visual Solutions	RPWM-32-KIT-XM	Wallmate 32 X ARM Flat, with back box	1	CFCI
Microphones				
Shure	MXA910	Linear Array Microphone	2	CFCI
Speakers				
Soundtube	IPD-CM62-BGM-WH	Ceiling Loudspeaker 6.5" coaxial, Dante enabled, self-powered PoE speaker	6	CFCI
Processing				
QSC	NV-32-H	Q-SYS Network Video I/O	1	CFCI
QSC	NV-32-H (Core)	Q-SYS Network Video I/O	1	CFCI
QSC	TSC-80w-G2-BK	Q-SYS 8.0” PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only.	1	CFCI
QSC	SL-QUD-110-P	Q-SYS Core 110 UCI Deployment Software License, Perpetual.	1	CFCI
Terminations				
FSR	FL-500P-4-B	FL-500P Back Box - 4" Deep	1	CFCI
FSR	FL-500P-B-C U-Access	Cover With 1/2" Brass Squared Flange (Lift off door)	1	CFCI
By Contractor	Custom	Terminations - Display	1	CFCI
By Contractor	Custom	Terminations - Microphone	2	CFCI
By Contractor	Custom	Terminations - Speakers	6	CFCI
Computers				
Dell	OptiPlex 3080 Micro, i3-10105T, Windows 10, 8GB DDR4, M.2 256GB SSD	OptiPlex Micro	1	CFCI
Networking				
QSC	NS10-125++	8-Port Gigabit Ethernet PoE+	1	CFCI
SYSTEM WIDE (Main Lobby)				
Digital Signage				
Brightsign	XT1144	Digital Signage Appliance - 4k, H.264/H.265, Dolby VIsion, HDR10, HDCP compliant, HTML5	1	CFCI
Displays				
LG	65" TV	65" TV	1	OFCI
RP Visual Solutions	RPWM-16-KIT-XM	Wallmate 16 X ARM Flat, with back box	1	CFCI
Terminations				
By Contractor	Custom	Terminations	1	CFCI
Control Room A104				
Apple	Mac Pro	Rack mount, 3.3GHz 12-core, 48GB RAM, 1TB SSD, AppleCare+	1	CFCI
Apple	Magic Keyboard with Keypad	Wireless Keyboard	1	CFCI
Apple	Magic Mouse	Wireless Mouse	1	CFCI
TBD	TBD	24" 16:9 4K IPS Monitor	3	CFCI
TBD	TBD	Video Record/Router	1	CFCI
QSC	TSC-116w-G2-BK	Q-SYS 11.6” PoE Touch Screen Controller for In-Wall Mounting. Includes 1 LAN Port and Aux Power input, available in black only	1	CFCI
NewTek	FG-002882-R001	TriCaster Mini Advanced HD-4 Bundle	1	CFCI
By Contractor	Custom	Lot HDMI, Video Adapters, as required	1	CFCI
QSC	NV-32-H	Q-SYS Network Video I/O	3	CFCI
Terminations				
By Contractor	Custom	Terminations - Control Room Rack	1	CFCI
Wireless Share				
Mersive	SP-8100-E1	Solstice Pod Gen3 Unlimited Enterprise w/ 1yr Solstice Subscription	9	CFCI