

DISTRICT TECHNOLOGY RENOVATIONS

Technology Request for Bid



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INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: DISTRICT TECHNOLOGY RENOVATIONS

- A. Mason Public Schools (Owner) is seeking bids for the purchase and installation of new low voltage cabling, classroom multimedia systems and associated equipment. Proposed systems shall be configured and installed to service Owner's classrooms across multiple instructional facilities, and as described herein.
- B. Project: DISTRICT TECHNOLOGY RENOVATIONS
- C. Owner: Mason Public Schools
201 W. Ash Street #2a
Mason, Michigan 48854
- D. Designer: Communications by Design, Inc.
- E. Sites of Work:
 - 1. Mason High School
1001 S. Barnes Street
Mason, Michigan 48854
 - 2. Mason Middle School
235 Temple Street
Mason, Michigan 48854

1.02 GENERAL DESCRIPTION OF PROJECT SEQUENCE

- A. Sequences and dates specified herein are for information only and indicate the plan and intent of the Owner. Actual dates shall be established based on final award of project.
- B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner as required to meet schedules.
- C. Schedule:
 - 1. Request for Bid Distributed: October 3, 2022 at 5:00pm
 - 2. Pre-Bid Meeting: October 12, 2022 at 10:00am
 - 3. Intent to Bids Due: October 13, 2022 by 5:00pm

4. Question and Clarification Deadline: October 14, 2022 by 5:00pm

5. Public Bids Due: October 27, 2022 at 1:00pm

1.03 TYPES OF BIDS

- A. Bids shall be submitted in total and with required detail for each item bid and as is required herein, and include all portions of the work identified for the individual bid package as specified herein. Bids shall be made on unaltered bid forms as included herein. Bidder shall fill in all blank spaces and the bid shall be signed by a legal officer or agent authorized to bind the bidder to a contract.

1.04 PRE-BID CONFERENCE

- A. A pre-bid conference will be held. A discussion of the project and review of bid documents will be followed by a site review and an opportunity to ask questions. Attendance is highly encouraged for all contractors interested in bidding on any components or portions of this project. Attendance at the pre-bid conference will be a factor considered during evaluation of bids.
- B. Time: October 12, 2022 at 10:00am
- C. Location: Mason Public Schools
Maple Room
201 W. Ash Street #2a
Mason, Michigan 48854
- D. Any drawings identified in the table of contents herein will be distributed and reviewed at this conference.
- E. Physical building inspections of sites of work will be provided for at this time.

1.05 TIME AND PLACE OF BID RECEPTION

- A. Physically sealed bids for the base bid work will be received at the district office and read aloud at a public opening. Bids arriving after the appointed time as determined by the Owner's representative conducting the public opening, shall be returned unopened. Bids will be accepted beginning forty-eight (48) hours prior to the appointed opening time provided they are in sealed packages and addressed as specified herein.
- B. Bid Receipt Deadline: October 27, 2022 at 1:00pm
- C. Bid Opening Location: Mason Public Schools
Maple Room
201 W. Ash Street #2a

D. Faxed or electronically delivered bids will not be accepted.

1.06 EXAMINATION AND PROCUREMENT OF DOCUMENTS

A. Specifications and any relevant Drawings may be obtained from the Technology Designer. Contractors may obtain copies by documented request to Communications by Design, Attn: Rebecca Szilagy. Requests may be made by:

1. Writing –4101 Sparks Drive, Grand Rapids, Michigan 49546

2. Email – rszilagy@cbdconsulting.com

1.07 BID SECURITY

A. Bid security equal to five percent (5%) of the total bid amount, must accompany each base bid in accordance with the Instruction to Bidders.

B. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.

1.08 PERFORMANCE BOND COVERAGE

A. Selected Contractor(s) will be required to provide a performance bond and payment bond in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion. Such bonds shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1.09 UNIVERSAL SERVICE FUND (USF) CONDITIONS

A. IDENTIFICATION NUMBER – the service provider's USF Service Provider Identification Number (SPIN) must be included in the Bid. Direct all questions regarding the USF requirements in this document to the Universal Service Administrative Company (USAC), Schools and Libraries Division (SLD) at (888) 203-8100.

B. FUNDING REQUESTS (FY23 E-rate) - The specified products and/or services are to be provided for FY23 (April 1, 2023-June 30, 2024) and qualify for universal service discounts under the FY23 universal service support mechanism, E-rate.

C. UNIVERSAL SERVICE DISCOUNTS – The service provider contract may be conditional upon the Owner receiving universal service discounts under the FY23 universal service support mechanism, E-rate. The Owner reserves the

unrestricted right to change the contract amount by adding to, and/or reducing the amount of services and/or products in order to meet budget requirements in the event the level of universal service discounts is changed. Any such adjustments to the contract amount will be taken prior to the start of the specific work being adjusted or eliminated on a given building and/or project.

- D. UNIVERSAL SERVICE DISCOUNT IMPLEMENTATION – The Owner reserves the unrestricted right to specify the filing option for the universal service discount for each product and/or service offered within the Bid: Billed Entity Applicant Reimbursement (BEAR) or Service Provider Invoice (SPI).
- E. ELIGIBLE PRODUCTS AND SERVICES – The USF eligible products and/or services identified on the USAC FY23 (2023-2024) Eligible Services List, which is incorporated herein by reference, must be identified separately from any and all “ineligible” products and/or services in the Bid. Bidder shall note eligibility of items on required Schedule of Values form(s).
- F. FUNDING AVAILABILITY – Owner may or may not elect to proceed with project in whole or, or in part based on multiple possible sources of funding. Approval of E-rate funding will not be the sole criteria for Owner approval to proceed with any/all/some implementation activity on or after April 1, 2023.

1.010 OWNER’S RIGHT TO REJECT BIDS

- A. The Owner reserves the right to reject any and/or all bids. The Owner reserves the right to accept a bid, or portion thereof by issuance of a valid purchase order within ninety (90) calendar days following the bid opening. No bids may be withdrawn during this time without the specific approval of the Owner.
- B. Withdrawal of any Bids after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

1.011 DEFINITIONS

- A. “Owner” is intended to mean Mason Public Schools, a general powers school district.
- B. For purposes of this project, the terms “Architect”, “Engineer” and “Designer” are used synonymously to refer to Communications by Design, Inc., a Michigan Corporation.
- C. The term “Bidder” refers to any organization properly and accurately submitting a complete “Intent to Bid Form” prior to the required time specified herein and subsequently properly submitting completed set of bid documents as specified herein.

- D. The term “Contractor” herein is a reference to the firm(s) eventually selected by the Owner to provide the intended system(s), or any portion thereof, and fulfill the terms of the contract.
- E. The term Contract is a reference to the collective set of documents, drawings, diagrams, Owner’s Purchase Order, Addenda and all other materials as provided for herein defining arrangement between Owner and Contractor.
- F. The term Addenda (or Addendum) are that portion of the Contract consisting of modifications, amendments, deletions or substitutions to the contract documents issued prior to the execution of the Contract.

END OF SECTION

SECTION 00 40 00
BID FORMS

Intent to Bid Form

Complete and submit the following form if you have interest or intend to submit a Bid for this project. Unaltered and completed forms must be received on or before October 13, 2022 by 5:00pm. Only bidders returning a completed "Intent to Bid Form" will be notified of required addenda.

Company Information

Name: _____

Address Line1: _____

Address Line2: _____

City, State and Zip Code _____

Primary Contact Information

Name: _____

Phone No.: _____

Fax. No.: _____

E-Mail Address: _____

Portions of the bid for which you will be responding:

☐

Section 27 10 00 – Low Voltage Cabling

☐

Section 27 41 16 – Multimedia Systems

Submit unaltered and completed form to:

Rebecca Szilagy

Communications by Design, Inc.

rszilagy@cbdconsulting.com

SEALED BID LABEL

Separate, or fold over, the label on the line below, and affix to the exterior of sealed container so information is clearly visible for Bid Submission. Ensure label is attached in a manner to prevent accidental removal or defacement. Label shall serve as sole identification for sealed bid at submission.

BID TO: Mason Public Schools
Attention: Mr. Kevin Jones
400 S. Cedar Street
Mason, Michigan 48854

BID FROM:

PROJECT: DISTRICT TECHNOLOGY RENOVATIONS
TECHNOLOGY BID #2749

INCLUDING Addendum No. _____ Dated _____
ADDENDA: Addendum No. _____ Dated _____

DUE: October 27, 2022 at 1:00pm

BID FORM

BID TO: Mason Public Schools
Attention: Mr. Kevin Jones
400 S. Cedar Street
Mason, Michigan 48854

BID FROM: _____

PROJECT: DISTRICT TECHNOLOGY RENOVATIONS
TECHNOLOGY BID #2749

The undersigned, having familiarized themselves with all local conditions affecting the cost of work, and having examined the site and all applicable Bidding Documents herein, and herein referenced, including, but not limited to, all addenda issued thereto, hereby propose to furnish all labor, material, equipment, applicable taxes and services required for proper completion of each of the following categories of this project for the sum of:

Bid Category _____ Title _____

Dollars (\$) _____).

Said amount written above constituting the Base Bid

Bid Category _____ Title _____

Dollars (\$) _____).

Said amount written above constituting the Base Bid

TAXES:

Bid sum includes all applicable taxes.

ALLOWANCES:

Base bid includes all applicable allowance cost(s) as set forth herein.

COST OF BONDS:

Bid sum includes cost of furnishing a Performance Bond and Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the bid.

ACKNOWLEDGEMENT OF ADDENDA:

The following addenda have been received, are hereby acknowledged, and their execution is included in both base bid and alternate bids herein.

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

ALTERNATES:

Based bid amount may be increased or decreased in accordance with each of the following alternate bids as may be selected, following procedures stated herein. Voluntary Alternates shown below are identified and described in detail on appropriate attachment(s) as referenced herein.

Voluntary Alternate A _____

Voluntary Alternate B _____

Voluntary Alternate C _____

Voluntary Alternate D _____

Voluntary Alternate E _____

PRINCIPAL SUBCONTRACTORS

As required herein, the following Subcontractors are proposed to be used for this project:

Legal Name: _____ Work Proposed _____

Legal Name: _____ Work Proposed _____

Legal Name: _____ Work Proposed _____

BID SECURITY:

Accompanying this Bid, as required herein, is a bid security in the form of Certified Check/Cashier's Check/Bidder's Bond in the amount of:

_____ Dollars (\$ _____), payable to the Owner, which it is agreed, shall be retained as liquidated damages, not as a penalty, by the Owner, if the undersigned fails to execute the Contract in conformity with the form of Contract incorporated and referenced herein and fails to furnish specified bonds within ten (10) days after date of issuance of a Letter of Intent to the undersigned.

If awarded the Contract, the undersigned agrees to commence work within ten (10) calendar days after date of issuance of a Purchase Order, which shall be considered as the notice to proceed, and agrees to complete the work in accordance with the schedule herein.

FAMILIAL DISCLOSURE:

Accompanying this Bid, as required herein, is a legally executed and notarized Michigan Familial Disclosure Statement.

EXCEPTIONS:

Bidder takes no exception to terms, conditions, specifications and/or any other requirements herein unless expressly noted, and specifically identified as provided for herein on unaltered Contract Exception form accompanying this Bid.

SIGNATORY AUTHORITY:

The undersigned certifies they are an authorized agent of the bidding entity, and legally able to bind the bidding entity to the terms, conditions and responsibilities of this, and all referenced bid documents. Furthermore, the undersigned acknowledges an understanding that non-compliance of this authority or any other bidding requirements may result in forfeiture of bid security, dismissal of consideration of bid submitted, and/or personal liability against the signatory.

AGREEMENT:

The undersigned agree(s) to provide the post-bid information required within ten (10) days after notification of a Letter of Intent and to execute an agreement for work covered by this Bid on the Owner's standard Purchase Order for which terms and conditions are expanded to include all Bidding Documents and subsequent addenda issued thereto.

In submitting this bid, it is understood that the Owner reserves the right to reject any or all bids. It is further agreed that this bid is binding for a period of Ninety (90) days from the opening thereof.

Respectfully submitted,

Date: _____

Firm Name: _____

By: _____

Signed: _____

Title: _____

Official Address: _____

Telephone Number: _____

Fax Number: _____

Primary Contact Email Address: _____

(If Corporation, affix Seal)

Michigan Familial Relationship Disclosure Statement

In accordance with Section 1267 of Michigan Revised School Code this sworn and notarized statement of an authorized representative, discloses any familial relationship between the owner and/or any employee of the Bidder, and any member of the project Owner's governing Board(s) or Superintendent(s).

If any conflict of interest is discovered subsequent to submission of bid, written disclosure shall be submitted to the project Owner within seven (7) days of discovery. The project Owner reserves the right to immediately terminate any contract with Bidder upon notification of a conflict of interest. Upon such termination, the project Owner shall compensate Bidder only for the value of any goods or services provided to the Owner prior to such termination as determined by Designer.

(Check only one Box Below)

☐ It is hereby acknowledged and certified by Bidder that no familial relationship exists between the owner or any employee of the Bidder and any member of the project Owner's governing Board(s) or Superintendent(s).

☐ A familial relationship exists between the owner or an employee of the Bidder and a member of the project Owner's governing Board(s) or Superintendent(s). The person(s) and the relationship(s) are as follows:

Bidder

Board or Superintendent

_____	_____
_____	_____
_____	_____
_____	_____

Bidder Authorized Representative:

Bidder: _____

Representative's Signature: _____

Print or Type Name: _____

Representative's Title: _____

Subscribed and sworn this _____ day of _____, 2022.

In the County of _____ State of _____

By _____
Notary Public Signature

Seal or Stamp:

My commission expires on: _____

IRAN LINKED BUSINESS AFFIDAVIT

All Bids shall be accompanied by a sworn statement disclosing any Iran Linked Business relationship that exists within the owners, including its officers, directors and employees.

The undersigned, owner or authorized officer of _____ (the bidder), pursuant to Michigan Public Act No. 517 of 2012, the "Iran Linked Business" requirement provided in the Mason Public Schools Proposals hereby represents and warrants that the bidder, including its officers, directors and employees, is not an "Iran Linked Business" within the meaning of the applicable Public Act, and that in the event bidder is awarded a contract as a result of this RFB, the bidder will not become an "Iran Linked Business" at any time during the course of performing under the contract. The bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the District investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on future Requests for Bids for three (3) years from the date that it is determined that the person has submitted the false certification.

There is not an "Iran Linked Business" that exists within the bidder and/or owner, officers, directors and employees.

Bidder

[Company Name]

[Signature]

[Title]

This instrument was acknowledged before me, a Notary Public,

in and for _____ County,

_____ on this ____ day of _____,
20__,

[Notary Public Signature]

My Commission expires: _____

Acting in the County of: _____

REFERENCES

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

CONTRACT EXCEPTIONS

Check one Box

☐ Bidder takes no exception to, and agrees to comply with all sections, terms, conditions and/or requirements of the Contract Documents.

☐ Bidder proposes the following exceptions to the Contract Documents:

<i>Paragraph Number</i>	<i>Explanation</i>
<hr/>	<hr/>
<hr/>	<hr/>
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NOTE:

Exception(s) to any bid sections, terms, conditions and/or requirements deemed excessive for any reason by the Owner and/or Designer may result in disqualification of Bid.

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: _____ Bid Division: 27 10 00

[illegible]

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: _____ Bid Division: 27 41 16

[illegible]

END OF SECTION

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 OWNERSHIP

- A. Bidders prepare and provide bids without any cost to the Owner and/or Designer. Once opened, bids become the sole property of the Owner. Bidders have no claim to, or ownership of bids opened. Bids become subject to all legal statutes including, if applicable, United States and Michigan Freedom of Information Acts and related laws.

1.02 COMPLIANCE

- A. This document establishes the primary system(s) design configuration. The Bidder's bid response shall include all services, supplies, components and equipment required to provide a complete turnkey system(s) which meets or exceeds all specifications for each given bid item being proposed.
- B. Owner prefers to enter into a contract with a single bidder for all materials for completion of this project, but shall consider combinations of portions of bids from various bidders. The Owner reserves the right to award portions of the project to multiple bidders who will be required to cooperate with one another in order to complete the work.
- C. By their response, Bidders agree to comply with all sections, terms, conditions and/or requirements of the contract documents except as expressly noted, and specifically identified by paragraph number on the unaltered Contract Exceptions Bid Form. Exceptions to any bid sections, terms, conditions and/or requirements deemed excessive by the Owner and/or Bid Coordinator may disqualify Bid.
- D. In compliance with the Freedom of Information Act (FOIA), the Owner shall make bid documents available for public review after issuance of purchase order to the successful bidder/s.
- E. In connection with the execution of this Contract, Contractor and any Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin.
- F. Negligence in preparation, improper preparation, errors in, or omissions from Bids shall not relieve Bidder from fulfillment of any and all obligations and requirements of the Contract Documents.

- G. All Bid documents and worksheets must be completed in detail and submitted together on time.
- H. All documents constituting the entire present agreement shall be construed in accordance with and governed by the laws of the State of Michigan.
- I. Designer shall have authority for interpretation of Contract Documents. In the event terms, provisions or any other portion of the Contract Documents is/are in dispute, Designer shall have full and final authority to interpret the Contract Documents, and such interpretation shall be final and binding.
- J. In the event of a conflict between any terms or conditions in any of the documents comprising the entire present Agreement, the terms and conditions set forth in this document shall take precedence.

1.03 NOTICE AND RESPONSE

- A. Upon notification of Bidder being considered as a finalist, the Bidder shall provide to the Owner and Designer, within 48 hours, a current “Dunn and Bradstreet Supplier Evaluation Report” and other documentation as may be required of finalists herein and as requested by Owner and/or Bid Coordinator.
- B. Bidder shall provide timely response to all requests from Designer and/or Owner regarding clarification and/or elaboration concerning, but not limited to its Bid as may be deemed relevant by the Owner and/or Designer.

1.04 PROTECTION AND SAFETY

- A. Contractor shall continuously maintain adequate protection of all Work from damage and shall protect the Owner’s property from injury or loss arising in connection with the execution of the Contract. Contractor shall make good any such damage, injury or loss, except such as may be directly caused by agents or employees of the Owner. The Contractor shall adequately protect adjacent property as required by law, by the Contract Documents, or as otherwise required, to cause no damage to them during the execution of the Contract. This requirement shall also apply to structures above and below ground as conditions of the site require.
- B. Contractor shall be solely responsible for, and have control over means, methods, techniques, sequences and procedures for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the contract. Contractor shall take all necessary precautions for the safety of employees and visitors on the site of the Project and shall comply with applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and

progress of the Work, all necessary safeguards for the protection of workers and the community.

- C. Contractor shall vigorously defend any and all suits that may be brought against the Owner by any person and/or entity, whether in the employ of the Contractor or not, for damage to property, and/or injury or death to persons alleged or claimed to have been caused by or through the performance of work.

1.05 DRAWINGS DIAGRAMS AND ILLUSTRATIONS

- A. Drawings, Diagrams and Illustrations are diagrammatic in nature and indicate general arrangement and nature of systems and work included.
- B. Floor plan drawings are provided to assist the contractor in preparing documentation and reports as required herein.

PART 2 - MATERIALS

2.01 VOLUNTARY ALTERNATES AND SUBSTITUTION OF SPECIFIED PRODUCTS

- A. This Request for Bid describes a particular implementation. All Bids must provide pricing on the “base bid” as described herein. Voluntary alternatives providing comparable functionality with significant cost reduction and/or performance enhancement may be proposed. Voluntary alternatives are encouraged, but must be identified as “Voluntary Alternates” and detailed on unaltered Bid Forms contained herein. Voluntary Alternates may be further detailed and/or explained in attachments to the unaltered Bid Forms contained herein. Exceptions to the Request for Bid specifications must be clearly noted and explained for each Voluntary Alternate proposed.
- B. No substitutions of specified products may be made without specific prior authorization by Designer and Owner. Individual bid divisions herein contain particular information related to acceptable manufacturer and product requirements.
- C. Trade-in, equipment/license exchanges or other return allowances may be provided as a voluntary alternate. Trade-in, exchange or other return equipment allowances shall not be included in base bid amount.

PART 3 - EXECUTION

3.01 EXAMINATION OF DOCUMENTS AND SITE

- A. Bidders shall carefully examine the Contract Documents and the construction site to obtain first-hand knowledge of existing conditions and requirements. No plea of ignorance of conditions that exist, or any other relevant matter

concerning work to be performed in the execution of work will be accepted as justification for failure to fulfill every detail of all requirements as described herein.

3.02 QUESTIONS, INTERPRETATIONS AND ADDENDA

- A. Any bidder finding discrepancies between Drawings, Specifications and/or Bid Documents, or be in doubt as to the exact meaning of any provision or detail shall notify the Designer at once, and before the deadline for Questions and Clarifications. The Designer may then, at their option, issue Addenda clarifying same. The Designer is not responsible for oral instructions, or Bidder's/Contractor's misinterpretations of Drawings, Specifications and/or Bid Documents.
- B. The Designer reserves the right to issue Addenda at any time up to thirty-six (36) hours prior to the scheduled bid opening. All such addenda shall become, upon issuance, an inseparable part of the Specification/Contract Documents. Each bidder shall incorporate within their bid all costs for items listed in any/all Addenda, and shall acknowledge receipt and identifying number of each Addendum on the Bid Form and on the outside of the sealed bid container.
- C. Addenda will be forwarded to each bidder who has received a copy of the Bidding Documents and has submitted "Intent to Bid Form".

3.03 BID SECURITY, BONDS AND INSURANCE

- A. Bid Security, Performance and Payment Bonds are required on this project.
 - 1. Bid security equal to five percent (5%) of the bid amount must accompany each bid in accordance with the Instruction to Bidders.
 - a. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.
- B. The selected Contractor will be required to provide a performance bond and a payment bond each in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion.
 - 1. The surety of the performance bond shall remain in effect until all acceptances and final contract close-out requirements herein have been executed by the Owner.
- C. Contractor shall provide, prior to beginning any work at the sites, certificate of insurance for delivery to Owner indicating all required insurance coverage is in force.

1. Workers' Compensation and Employer's Liability Insurance
 - a. Coverage A – Statutory
 - b. Coverage B - \$1,000,000 Per Accident
 2. Broad Form Comprehensive General Liability Insurance (including – Premises, Elevators, Contractor's Protective Liability, Contractual, Products & Completed Operations – including Broad Form Extensions).
 - a. Each Occurrence - \$1,000,000
 - b. General Aggregate - \$2,000,000
 - c. Products & Completed Operation Aggregate - \$2,000,000
 - d. Personal Injury & Advertising Injury - \$1,000,000
 - e. Fire Legal - \$100,000
 3. Sub-contractors Operations, Products – Completed Operations and Contractual Liabilities, plus such excess coverage as may be appropriate for the limits listed.
 4. Comprehensive Automobile Liability Insurance (owned, hired, and non-owned automobiles).
 - a. Bodily - \$1,000,000 each Person and \$1,000,000 each Occurrence
 - b. Property Damage - \$1,000,000
 5. Furnish Owner with Contingent Liability Insurance Policy with coverage and liability limits the same as for Public Liability Insurance specified herein. Designate on policy as assured, only the Owner.
 6. Furnish Owner with Contingent Property Damage Insurance Policy with coverage and liability limits the same as for Property Damage specified herein. Designate on policy as assured, only the Owner.
 7. Policies shall include notification clause requiring ninety (90) days written notice to Owner in the event of policy cancellation, expiration, non-renewal, coverage reduction or other material change.
 8. Contractor shall not commence work under the Contract until after all insurance required herein as been obtained and certificates for such are approved by Owner.
- D. All such bonds and/or insurance shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1. Insurance certificate(s) shall be signed by insurance agent licensed in the state of Michigan or a representative of the insurance company.

E. Contractor agrees to indemnify and hold harmless the Owner and Designer, including their agents and employees, from and against all claims, damages, losses and expenses, including, but not limited to, attorney fees arising out of, or resulting from the performance of the work to the fullest extent allowed by law on a comparison basis of fault.

3.04 MODIFICATION AND WITHDRAWAL

A. Bids may be withdrawn and/or changed any time prior to the deadline for submission of bids. Bids may not be withdrawn or changed thereafter and shall be deemed a firm offer continuing for ninety (90) calendar days. Bids received after the deadline for submission will be returned unopened at the Owner's discretion.

B. Withdrawal of any Bid after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

3.05 CODES, ORDINANCES, REGULATIONS AND RELATED

A. All labor and materials shall be furnished and installed in strict accordance with the latest applicable codes, ordinances and regulations of any governing body having jurisdiction over this project.

B. In the event the quality of labor and materials required by the Drawings and Specifications herein exceeds requirements of current applicable codes, ordinances and regulations, the Drawings and Specifications shall take precedence.

C. In the event the quality of labor and materials required by current applicable codes, ordinances and regulations having jurisdiction over this project exceeds that of the Drawings and Specifications herein, the applicable codes, ordinances and regulations shall take precedence.

D. The Contractor shall give all notices and comply with all codes, laws, ordinances, rules and regulations of any authority having jurisdiction, which bears on the performance of its work. This compliance includes, but is not limited to, the Michigan School Safety Initiative (PA129, PA130, PA131 and PA138) if applicable to work being performed.

E. The Contractor shall pay for all licenses, permits, taxes, and fees required for this project; and shall comply with all federal, state, local and Owner's codes, laws, ordinances, regulations and other requirements applicable to the work specified at no additional cost to the Owner. Contractor shall submit copies of all approved certificates and approvals to the Owner upon receipt.

3.06 SUB-CONTRACTOR AND MATERIAL SUPPLIER

- A. The successful Bidder shall submit to the Owner and Designer a complete list of all sub-contractors and all material suppliers proposed to engage on the work. Sub-contracts shall not be awarded until after they have been approved by the Designer and Owner.
- B. Finalist bidders may be required to submit additional details related to sub-contractors and suppliers within forty-eight (48) hours after the bid opening.
- C. Names of any principal sub-contractors must be listed on the Bid Form.
- D. All contracts made by the successful Bidder with Subcontractors shall be covered by the terms and conditions herein. The successful Bidder shall see to it that Subcontractors are fully informed in regard to these terms and conditions, and shall bind all subcontractors to the same terms and conditions. Failure to do so will absolve the Owner from any liability for additional cost due to subcontractor claims for additional cost, time or any claim(s) for additional cost by subcontractor(s).

3.07 BID RESPONSE FORMAT

- A. Bidder shall provide complete Bid copies in two formats as described herein.
 - 1. One (1) Hard copy format responses shall be in a bound tabulated format. Each response shall have tab indicators for each section.
 - 2. One (1) Electronic copy format responses shall be submitted on a USB Drive, readable by a standard Microsoft Windows 10 workstation. Electronic media shall contain separate folders to organize response documentation as described herein. Files submitted electronically shall be **Adobe Acrobat** "PDF" format (SCHEDULE OF VALUES is additionally required to be on the disk in the appropriate folder as a spreadsheet and as described herein).
- B. All Bid Response formats shall be clearly externally marked to include, but not be limited to:
 - 1. Bidder identification.
 - 2. Project Owner identification.
 - 3. Project name.
 - 4. Bid submission date.

- C. Bid Responses shall include an index containing copies/PDF of a complete index of documents comprising Bid Response. Responses shall include, but not be limited to the following tabbed/folder sections:
1. Section 1 – Forms, which shall contain copies/PDF files of all required and completed bid forms.
 - a. BID FORM
 - b. Michigan Familial Relationship Disclosure Statement
 - c. Iranian Linked Business Affidavit
 - d. REFERENCES
 - e. CONTRACT EXCEPTIONS
 - f. SCHEDULE(s) OF VALUES
 - g. BID BOND
 2. Section 2 – Overview, which shall contain copies/PDF files of cover letter and/or executive overview.
 3. Section 3 – Submittals, which shall contain copies/PDF files of all required and voluntary submittals.
 4. Section 4 – Appendices, which shall contain copies/PDF files of other reference materials Bidder wishes to, or is required to submit.

3.08 AWARD OF CONTRACT

- A. The material proposed to be used for the completion of work, and the competency, solvency and responsibility of bidders will receive due consideration before award of contract. In the reception of bids for this work, the Owner incurs no obligation to accept the lowest, or any bid submitted. The right to accept or reject any and all bids or portion thereof is reserved by the Owner. The Owner reserves the right to require testimonial, accounting or legal documents pertaining to the solvency of a Contractor, or any other decision factor the Owner deems appropriate, prior to award of contract.
- B. Owner reserves the right to select individual components from schedule of values independent of installation as may be determined in Owners best interest. Selected bidder may be required to install selected components provided by others.
- C. Issuance of a Purchase Order by Owner in response to a valid bid shall be a Notice to Proceed, and shall become part of, but not limited to, all terms,

conditions and requirements herein. Notice to Proceed shall have the full effect of contract award, and shall make all terms, conditions, requirements and responsibilities of Bidder binding upon issuance. Notice to Proceed, once issued, shall become an inseparable part of the contract documents herein, and constitute both Bidder and Owner's acceptance of contract.

3.09 TIME, SCHEDULES, PROJECT MANAGEMENT, MEETINGS AND PLANS

- A. Time is of the essence on this project. Award of contracts for this project will be contingent on the bidder's agreement to complete the work on or before the contract completion date stated herein.
- B. All Contractors will commence work in such a manner and at such a time as to expeditiously interface with the work of other Contractors, and will pursue the project diligently to completion. All Contractors will work in a cooperative manner with Owner and other Contractors.
- C. Contractor shall appoint an overall Project Manager acceptable to Owner, with skills and experience deemed appropriate by the Owner for the scope and size of the project. Project Manager shall be responsible for the scheduling of all Contractor resources and attending all project meetings. Upon notification of Bidder being considered a finalist, the Bidder shall submit professional resume of proposed Project Manager within forty-eight (48) hours.
 - 1. Project meetings shall be conducted at Owner's selected and identified location weekly and at Owner's and/or Designer's discretion.
 - 2. Within five (5) days of Notice to Proceed (issuance of a Purchase Order by the Owner), Contractor's Project Manager shall provide to the Owner a critical flow path in the form of a "Gantt Chart" (or equivalent) indicating the proposed sequence of events and approximate beginning and completion dates in accordance with, compliance to, and coordinated with requirements herein.
 - 3. Changes of the Project Manager during the project shall not be acceptable without prior written approval from the Owner.
 - 4. It is the responsibility of the Contractor's Project Manager to schedule work, work out issues, ensure that all required products and services are delivered according to schedule and attend to any other matters required by the Owner in the interest of professional and timely completion of the project.
 - 5. The appointed Project Manager, or a designee acceptable to the Owner, shall be in attendance of all project meetings throughout the term of the project. Failure to do so may be considered a material breach of contract.

6. After a ten (10) business day notice, the Owner reserves the right to request a new Project Manager, when it appears that, in the Owner's sole discretion, the Project Manager is not fulfilling the full responsibilities of the position. Failure by Contractor to provide adequate Project Manager meeting requirements of the Owner, may result in Contract termination.

3.10 CHANGES IN THE WORK

- A. No changes in work with the effect of either increasing or decreasing in the project value shall be made without specific and prior authorization by the Owner and Designer.
- B. Owner, without invalidating the contract and without notice to any surety, may at any time order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be authorized by a written Change Order approved by Owner and Contract Designer. Upon receipt of such an order Contractor shall promptly proceed with the work involved. All such work shall be executed under the conditions of the original Contract. Owner authorized change order(s) may be issued at any time prior to Contract close out.
- C. When so directed, Contractor shall promptly submit an itemized estimate and a unit price for performing or deleting such extra or changed work as may be contemplated. Any extensions or reductions of the contract time associated with extra or changed work shall be identified at the time Contractor submits such documentation.
- D. At the Owner's discretion, adjustments in the Contract Sum shall be determined by one or more of the following methods:
 1. By mutual acceptance of a lump sum cost, including overhead and profit, itemized and supported by sufficient substantiating data to permit evaluation.
 2. By unit prices stated in the Contract Documents including, but not limited to, Schedule of Values.
 3. By unit prices mutually agreed upon.

3.11 PAYMENT REQUESTS AND PAYMENTS

- A. Contractor's invoices shall be submitted monthly in correlation with the Project Schedule indicating percentage of work completed.
- B. All contract and change order invoices shall be sent directly to Contract Designer.

- C. A 10% retainage shall be held back on all payment requests, including, but not limited to hardware, software, change orders and services, until final completion and close out of the project or project phase as determined by Owner and Designer.
- D. Contractors are required to submit all invoices on approved AIA Payment Request Forms or other billing format pre-approved by Contract Designer. Each AIA Payment Request Form shall be accompanied by a properly completed, executed and notarized Waiver of Lien which shall be in a format and contain verbiage approved by Owner.
- E. The Contract Designer and Owner shall process payment requests on a monthly schedule and in accordance with their respective established processes and procedures. Payments will be made by the Owner based only on AIA Request Forms having been previously certified, audited and approved by Contract Designer and accompanied by acceptable Waiver of Lien.

END OF SECTION

SECTION 00 65 00
CONTRACT CLOSE OUT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide an orderly and efficient transfer of the completed work to Owner.
- B. Details affecting work of this Section includes, but is not limited to all other Sections herein and all related Contract Documents.
- C. Activities relative to Contract close-out are described in, but not limited to, this and other Sections of this document.

1.02 SUBSTANTIAL COMPLETION

- A. "Substantial Completion" shall be defined as:
 - 1. All responsibilities of Contractor for all provisions and requirements of all divisions and sections of complete Contract herein, and as amended, are properly and fully completed or properly, accurately and acceptably provisioned for.
 - 2. All systems, equipment, facilities, services, programming and/or components required by all divisions and sections of complete Contract are fully operational, acceptable and useful to the Owner for their intended purposes.
- B. Prior to requesting inspection by Designer to certify Substantial Completion, Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements and is ready for such inspection.

PART 2 - MATERIALS

2.01 NOT USED FOR THIS SECTION

PART 3 - EXECUTION

3.01 PROCEDURES

- A. Contractor shall submit a written request to Designer indicating they have achieved Substantial Completion of Work.
- B. Within a reasonable time after receipt of the request, Designer will inspect Work to determine status of completion.
- C. Should Designer determine the Work is not substantially complete:

1. Designer promptly will so notify Contractor, in writing giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 2. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-inspection.
 3. Designer will re-inspect the Work.
 4. Excessive re-inspections of Work may result in fees being assessed Contractor.
- D. Should Designer concur the Work is substantially complete:
1. Designer will prepare a letter of Substantial Completion.
 2. Designer will submit the letter to Owner and Contractor.
 3. Contract shall be deemed "Closed Out" for retainage purposes.
 4. Final Acceptance of the system shall be deemed complete.

END OF SECTION

SECTION 27 10 00
LOW VOLTAGE CABLING

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to structured cabling to support various types and styles of communications systems. Owner expects structured cable system shall be used to provide connectivity for items including, but not limited to, Phones, Computers, Printers, Cameras and video displays.
- B. Structured cable system shall be compliant with EIA/TIA 568B.
- C. The Contractor shall configure, supply, install, connect, test, document and train Owner representatives and warrant a fully operational and compliant communications transport system, complete and with full functionality as specified herein including, but not limited to:
 - 1. Cables
 - 2. Jacks
 - 3. Cable support hardware
 - 4. Communication distribution racks
 - 5. Cross connect blocks and devices
- D. Contractor shall coordinate their installation with other contractors, Architect, Construction Manager, Architect/Engineer and the Owner as is appropriate.

1.02 DRAWINGS

- A. Drawings show the location and general arrangement of equipment, systems and related items. They shall be followed as closely as elements of construction permit.
- B. Examine drawings of other trades and verify conditions of work sites. Arrange work accordingly.
- C. Deviations from drawings, with the exception of minor changes in routing and other such incidental changes not affecting functionality or serviceability of systems, shall not be made without written approval of Architect/Engineer.

1.03 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of fifteen (15) years. Any replacement, upgrade or fix, including labor for any non-conforming or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner.
- B. Manufacturer's warranty shall be provided for all components of the system.
 - 1. Any paperwork and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be provided and submitted for approval by the Contractor.
 - 2. Contractor shall submit all paperwork, apply for warranty or extended warranty certification, and provide a Certificate of Warranty or Extended Warranty as may be applicable from the manufacturer prior to project closeout.
- C. On site services provided under the warranty shall be performed by personnel or representatives of Contractor as herein defined and located within physical proximity to provide response levels deemed acceptable to Owner.
 - 1. Contractor shall provide response times for all malfunctioning equipment of two (2) business days or less.
 - 2. Response time shall be measured from the time Contractor is notified by Owner to the time work is begun to resolve the matter.

1.04 SUBMITTALS

- A. Submittals shall consist of technical cut sheets and information pamphlets on all components of the system to be installed. All cut sheets and submittals shall be distinctly marked to highlight the actual part number of the item being submitted for approval.
- B. Equipment or material installed for this project that does not have an approved submittal associated with it, shall be removed and replaced with acceptable equipment or material as defined by the Architect/Engineer. All replacement costs including, but not limited to material and labor, shall be the sole responsibility of the Contractor.
 - 1. The Owner and/or Architect/Engineer may notify Contractor of any offending situations under this provision allowing Contractor up to forty-eight (48) hours to correct the situation prior to taking other corrective action.
 - 2. The Owner reserves the right to replace unapproved materials and deduct the costs of doing so as defined herein from any amounts that may be due, or become due Contractor.

- C. Shop drawings and diagrams shall be submitted by Bidder for approval by Architect/Engineer with Bids.
 - 1. Shop drawings and diagrams shall show all data relating to structural, electrical, wiring, cross connect, interconnect, equipment arrangement/layout, and any other information deemed significant by the Architect/Engineer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings by Architect/Engineer.

1.05 REFERENCE STANDARDS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:
 - 1. ANSI/NFPA
 - 2. EIA/TIA Commercial and Administration Standards
 - 3. NECA
 - 4. BICSI
 - 5. UL
 - 6. MOSHA Safety Standards

1.06 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system. Contractor shall provide proof of manufacturer support by photocopy of certification and letter of support from major component manufacturers for this specific project. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install system and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed. Certification of such training shall promptly be provided if requested by Architect/Engineer.

- D. The Contractor shall have a proven track record in structured cable configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the installation of similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid as provided herein.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer(s) of major components of the structured cable system shall be a known and leading entities in the communications field, and shall have been designing, manufacturing and installing similar systems for a period of no less than four (4) years.
- B. Acceptable Manufacturers (In alphabetical order):
 - 1. AT&T / Systimax
 - 2. Belden
 - 3. Berk-Tek
 - 4. Corning/Siecor
 - 5. General Cable
 - 6. Hubbel
 - 7. Nordx-CDT
 - 8. Panduit
- C. System shall be built upon an open and standard platform, supporting industry standards. Systems that are deemed Proprietary in nature shall not be considered.
- D. All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
- E. All connectors and accessories not installed in conduit and installed above finished ceiling shall be plenum rated.

2.02 COPPER CABLE

- A. Station Cable shall meet or exceed:
 - 1. Four (4) pair Category 6 Unshielded Twisted Pair (UTP) cable.

2. Rated and certified for installation in plenum air return spaces as may be required.
 3. Twenty-three (24) AWG
 4. Compliant as per EIA/TIA-36 specifications
 5. Certified under UL's LAN Cable Certification Program
- B. All cables shall be terminated for T568B compliant connection.
- C. Coordinate cable color(s) with Owner requirements prior to installation.

2.03 CROSS CONNECT EQUIPMENT

- A. Cross Connect Equipment shall meet or exceed:
1. Patch Panel for UTP Category 6 Cable Termination.
 - a. Rack mounted Category 6 compliant printer circuit board technology, patch panel with T568B compliant terminations on front of panel and 110 type terminations on rear of panel.
 - b. Rack mounted patch panels shall be no larger than Forty-eight (48) ports each.
 2. Furnish and install smear resistant, mechanically imprinted polyester or similar material labels to identify each port of all patch panels (fiber optic and copper) in compliance with EIA/TIA 606 standards or Owner required scheme. Labels shall be permanently affixed to patch panels.

2.04 WIRING DEVICES

- A. All station cable shall terminate on modular jacks that meet or exceed:
1. Category 6 compliant
 2. 8 position T568B compliant modular female jack.
 3. Snap-in, high impact housing
 4. Field verify, and coordinate insert color to match Owner requirements.
 5. Field verify and coordinate plates and/or outlet frame colors and materials to coordinate with electrical devices and Owner requirements.
 6. Where station cable is to terminate above finished ceiling or behind a finished wall for cameras, speakers, or other special station devices,

modular jack may be surface mounted in appropriate high strength, impact resistant plastic enclosure.

7. Furnish and install matching coordinating blank cover plates for all unused communications outlets indicated on drawings.
8. Mount flush plates so all four edges are in continuous contact with finished surfaces.
9. Furnish and install smear resistant, mechanically imprinted polyester or similar material labels to identify each port of all patch panels (fiber optic and copper) in compliance with EIA/TIA 606 standards or Owner required scheme. Labels shall be permanently affixed to patch panels.

2.05 OWNER STANDARDS

- A. Contractor shall provide connectors in a color to match the Owner's existing standards.
- B. Contractor shall provide cover plates and any associated keystone inserts as may be required matching Owner's existing standards.
 1. Stainless Steel cover plates.
 2. Grey keystone inserts.
- C. Contractor shall provide connector identification and labels on all terminations matching Owner's existing standard. Field verify all label conditions per site prior to final installation.

2.06 PROJECT CABLE CONFIGURATIONS

- A. Contractor shall provide data outlets in locations identified on Appendix B and as specified herein.
- B. Wall Data Outlet
 1. Contractor shall provide data outlets including, but not limited to:
 - a. UTP station cable(s) terminated on compliant patch panel in nearest IDF and wire devices in a single box location.
 - b. Wire device(s) shall be installed in standard keystone insert with six (6) positions. All unused positions shall be blanked.
 - c. Stainless steel faceplate compliant with Owner standards shall be provided.

- d. Where new project cable is co-located with existing category cabling, Contractor shall move to new faceplate and transcribe labeling.
2. Outlet shall be provided at each location indicated on drawings, noting the number of station cables to be terminated.

C. Above Ceiling Outlet

1. Contractor shall provide above ceiling outlets including, but not limited to:
 - a. UTP station cable(s) terminated on compliant patch panel in nearest IDF and wire device with a single surface mounted biscuit jack.
 - b. Device location shall be as indicated on drawings and above finished ceiling/surface, but accessible for station connection.
 - c. Surface mount device box shall be bright in color and/or contain a permanently attached brightly colored reflective identification label to facilitate visual location of connection point behind finished surfaces.
2. Outlet shall be provided at each location indicated on drawings, noting the number of station cables to be terminated.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Architect/Engineer verifying equipment and material locations as well as mounting and placement requirements prior to commencement of other installation activities.
- B. Contractor shall insure all submittals and shop drawings have been provided to, and approval has been obtained from Architect/Engineer prior to commencement of any final installation activities.

3.02 INSTALLATION

- A. Contractor shall be familiar with the environment where work shall be done as specified herein.
- B. Work Areas shall be cleaned at the end of each day. All debris shall be cleared, removed and disposed of in an approved container for the site. All equipment and tools shall be removed from common areas and stored in approved, secure storage locations. Any work that may impede the general use of the space and cannot be removed shall be flagged and cordoned off by the Contractor prior to their departure.

- C. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- D. The Contractor shall furnish, set in place, and install all equipment necessary for a fully compliant and operational system as specified herein. The installation process includes, but is not limited to the following:
 - 1. Cables installed in a professional manner to prevent tangling and congestion and to facilitate installation or removal of cables in the future.
 - 2. Cables installed without kinks (any bend with a radius less than manufacturer defined minimum).
 - 3. All cable free of abrading or penetrating of cable jacketing.
 - 4. In suspended ceiling where cable trays or conduit are not available, Contractor shall support wiring with “D – rings”, beam clamps or other approved cable support devices at appropriate distances (6 ft. minimum).
 - 5. All information outlets shall be labeled according to the Owner’s cable identification scheme. Labels shall be completed using pre-printed labels. Handwritten labels are not acceptable.
 - 6. The Contractor shall label all cables, jacks, patch panel positions, faceplates and cross connects.
 - 7. In-line cable splicing shall not be permitted.
 - 8. Contractor shall provide 10’ minimum service loop above accessible ceiling for each terminated cable in pole access for modular furniture to accommodate future changes.
 - 9. Length of each individual run of horizontal cable from the MDF/IDF to the information outlet shall not exceed 90 meters (295 ft.).
 - 10. IDF(s) and MDF locations have been identified in the drawings. Contractor shall calculate distances to insure the adherence to the EIA/TIA 568 distance limitations. Contractor shall notify Architect/Engineer of cable length exceptions prior to installation in writing and request direction.
 - 11. Bend radius of fiber optic cable shall be no less than 20 times the cable’s outside diameter during installation, and no less than 10 times the cable’s diameter when installed.
 - 12. All copper data cabling shall terminate on Category 6 compliant connectors. Approximately 10 ft. of Category 6 and/or fiber cabling shall

be coiled and stored at each cable distribution center in order to accommodate future change.

13. Wiring not installed in conduit shall not be routed within 18 inches of light fixture ballasts or within 36 inches of motors or transformers.
14. Coordinate cable colors with Owner requirements prior to installation.
15. Contractor shall include any sleeves where wall penetrations are needed. Sleeves shall be a minimum of 2" diameter, and sized for cable being installed with a maximum fill rate of 25%. All installed sleeves shall be fully fire stopped with compliant fire stop material following cable installation.
16. Assemble, install, configure and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
17. Work shall be performed to meet local codes and industry standards, including, but not limited to:
 - a. Grounding and Bonding.

E. Sites of Work:

1. Mason High School
1001 S. Barnes Street
Mason, Michigan 48854
2. Mason Middle School
235 Temple Street
Mason, Michigan 48854

- F. It shall be the responsibility of the Contractor to repair or replace any damage done to the structure or finishes in the building by the Contractor. If in the course of work, Contractor damages, marks or misplaces any surfaces or access plates/panels the Contractor shall repair and/or replace the surface, plate or panel to the original condition.
1. Final determination as to the damage condition and/or repair/replacement fitness of any surface, plate or panel shall be the sole responsibility of the Designer.
 2. The building and work area shall be returned to its original condition prior to final sign off of the project.

3.03 DOCUMENTATION

- A. Contractor shall be responsible for providing thorough, timely documentation. Documentation shall include, but not be limited to both printed and electronic copies of:

- 1. CAD as-built drawings of each building.
- 2. Copper station cable test results.

3.04 TESTING

- A. End to end testing of UTP copper Category 6 cables shall be conducted at 350 Mhz to meet or exceed reference standards. 100% of all pairs shall be tested. Documentation of test results shall be provided including, but not limited to the following parameters:

- 1. Attenuation.
- 2. Near End Cross Talk (NEXT).
- 3. Signal to noise ratio.
- 4. continuity
- 5. Pair integrity
- 6. EMI interference.
- 7. Any cable that does not meet EIA/TIA 568 specifications shall be repaired or replaced at the Contractor's expense.
- 8. Cable length.

3.05 TRAINING

- A. Not Used.

3.06 SCHEDULE, MEETINGS AND PLANS

- A. Schedule

- 1. Post bid Interviews: Week of October 31, 2022
- 2. Contractor Chosen: Week of November 14, 2022
- 3. Work Commences: March 1, 2023
- 4. Substantial Completion of Project: June 1, 2023
- 5. Project Close-out: August 1, 2023

- B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner, documented herein, required by Architect/Engineer, Architect and/or Construction Manager and as required to meet schedule.
- C. Contractor shall attend all construction progress meetings as may be required by Construction Manager and Owner. Such meetings shall aid in coordination and scheduling for field work and be held at the convenience of the Construction Manager.

SECTION 27 41 16
MULTIMEDIA SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to new classroom multimedia infrastructure and instructional equipment for Mason Public Schools.
- B. Contractors shall propose Systems and/or components to be deployed using standard procedures and technology components and as specified herein. The system components shall be installed and connected to the owner's existing physical infrastructure and as specified herein.
- C. Contractor shall advise, coordinate and work cooperatively with Owner representatives or owner's designee related to any configuration changes required and/or proposed for Owner's existing physical infrastructure.
- D. Contractor shall work collaboratively with Owner and Designer. Work shall include but not be limited to installation of supplied equipment, removal of existing equipment and full operational capacity of system as specified herein.
- E. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system and/or component connection to the system complete and with full functionality as specified herein.
- F. Contractor shall provide all transportation and delivery services in a timely manner to individual work location(s) at each site of work in preparation for installation activity.
- G. Contractor shall coordinate their installation with other contractors, Designer and the Owner as is appropriate.

1.02 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of warranty. Any replacement, upgrade or fix, including labor for any non-conforming or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner.
- B. Manufacturer's warranty shall be provided for all components of the system.

1. Any documents and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be provided and submitted for approval by the Contractor.
 2. Contractor shall submit all documents, apply for warranty or extended warranty certification, and provide a Certificate of Warranty or Extended Warranty as may be applicable from the manufacturer prior to project closeout.
 3. Standard manufacturer warranty duration and terms shall be identified for each component with bid as well as additional fee required for warranty duration election of each of the following terms:
 - a. Three (3) year parts and labor warranty.
- C. On site services provided under the warranty shall be performed by personnel or representatives of manufacturer of individual components and/or appropriately trained and certified Contractor representatives as herein defined and located within physical proximity to provide response levels deemed acceptable to Owner.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
1. Twenty-four (24) hours or less for matters that render twenty percent (20%) or more of the system unable to maintain normal functionality.
 2. Two (2) business days for matters not meeting the above criteria.
 3. Response time shall be measured from the time Contractor is notified by Owner to the time work is begun to resolve the matter.
- E. Bidder shall provide current annual maintenance contract pricing, terms and conditions for recommended maintenance programs for all equipment following the specified and included warranty periods as a Voluntary Alternate. This information will be considered by Owner and Designer as part of the bid evaluation process.
- F. System Warranty shall commence on date of substantial completion as certified by Designer and provided for herein. Delivery to work site of materials, physical removal from packaging, issuance of Contractor documents including, but not limited to invoices and/or packing slips, or any event or documentation, not specifically provided for herein, shall have no effect on Warranty or System Acceptance by Owner and/or Designer.
- G. Voluntary alternate shall be provided for five (5) year parts and labor warranty.

1.03 SUBMITTALS

- A. Submittals shall consist of, but not be limited to, technical cut sheets and detailed information pamphlets on all components of the system to be installed. All cut sheets and submittals shall be distinctly marked to highlight the actual part number of the item being submitted for approval with Bid Proposals.
- B. Shop drawings, data sheets and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
 - 1. Shop drawings, data sheets and diagrams shall show all data relating to structural, electrical, wiring, cross connect, interconnect, equipment arrangement/layout, and any other information deemed significant by the Designer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings, data sheets and diagrams by Designer.
- C. Contractor shall provide proof of manufacturer support by photocopy of certification and letter of support from major component manufacturers for this specific project with Bid Proposals.
- D. Equipment or material installed for this project that do not have an approved submittal associated with it, will be removed and replaced with acceptable equipment or material as defined by the Designer. All replacement costs including, but not limited to material and labor, shall be the sole responsibility of the Contractor.
 - 1. The Owner and/or Designer may notify Contractor of any offending situations under this provision allowing Contractor up to forty-eight (48) hours to correct the situation prior to taking other corrective action.
 - 2. The Owner reserves the right to replace unapproved materials and deduct the costs of doing so as defined herein from any amounts that may be due, or become due Contractor.
- E. The Contractor shall submit within ten (10) calendar days after the Notice to Proceed, a schedule that reflects the sequence of activities of the contractor's approach to the execution of and completion of the work. The schedule shall be broken into work areas to provide for a clear identification of the planned progress of the work. Included in the schedule will be a list of tasks with list of deliverables and the percentage of work completed. This schedule shall coincide with progress payments applications dates and projected amounts. All durations shown will be in working days. Applications that generate Microsoft Project compatible files shall be management tools of choice. The timeframe described in the Contractor's Schedule shall represent the Contractor's plan for organizing, directing, managing, controlling, staffing and

executing the work required by the Contract Documents. The district will rely on such schedules to coordinate and otherwise plan the work of the District, other separate contractors, or the District's routine daily work.

1.04 REFERENCE SPECIFICATIONS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:
 - 1. EIA/TIA Commercial and Administration Standards
 - 2. NEC
 - 3. IEEE 802
 - 4. IETF RFCs
 - 5. FCC – All Applicable Rules and Regulations
 - 6. UL
 - 7. MIOSHA Safety Standards

1.05 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system and/or components as required herein. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install specified equipment and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods and as required herein.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed.
- D. The Contractor shall have a proven track record in comparable system supply, configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the supply and/or installation of similar systems completed by the Contractor in the prior two (2) years with the sealed Bid Proposal as provided herein.

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers

- A. Acceptable manufacturers have been provided to comply with a standard for individual components associated with the specified system. Indicated components include particular models and makes currently installed and/or preferred by Owner.
 - B. Any system bid shall be based only on acceptable manufacturer's components.
- 2.02 Supply most current version of all products provided.
- A. Manufacturer shall have five (5) years of experience and history manufacturing similar products to those specified.
 - B. Proposed components shall have been field tested and proven in actual use.
 - C. Prior and/or old versions of products, unless specifically approved and documented by Designer and/or Owner shall not be acceptable.
 - D. In cases where a newer version of hardware or software is available at the time of installation, Contractor shall request clarification from Designer on which version is to be used.
- 2.03 Furnish only new, first-class quality materials and equipment.
- 2.04 All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
- 2.05 All connectors and accessories not installed in conduit and installed above finished ceiling shall be plenum rated.
- 2.06 SURFACE METAL RACEWAY
- A. Surface Metal Raceway shall be installed in each identified classroom to facilitate connection of audio-visual cables to teacher connections. Please refer to Appendix C for quantities and locations.
 - B. Acceptable Manufacturer:
 - 1. WIREMOLD by Legrand
 - a. 4000 Series – Ivory
 - 2. Or equal
 - C. Provide manufacturer's data sheets and descriptive literature for each product to be used including:
 - 1. Preparation instructions and recommendations

2. Installation methods

- D. Raceway shall be installed on, or adjacent to the teaching wall as identified by Owner, at a point farthest from the adjacent corridor.
 - 1. Raceway shall be installed in close proximity (not more than two [2] feet away) to existing electrical outlet.
- E. Raceway shall include necessary mechanical separator to allow electrical cabling to be installed by Others.
- F. Raceway shall include all necessary manufacturer recommended adapters, inserts and accessories for a fully complete raceway system.
- G. Raceway shall be carefully cut into suspended ceiling tiles and structure to provide a professional and clean installation.
- H. Appropriate nylon or rubber bushings and/or cable guards shall be installed on all raw metal edges that media may be in contact with.
- I. Raceway shall terminate on color matched extra deep double gang box for data and AV connections.
- J. Raceway shall be mounted to match the height of existing power receptacles in the room (generally 16" AFF).
- K. Where depth is not adequate for the intended use, box extensions shall be added prior to installation of cabling and faceplate.
- L. Raceway installation shall strictly comply with manufacture's installation instructions and recommendations and approved shop drawings.
- M. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.
- N. Raceway systems shall be mechanically continuous and connected to all electrical outlets, boxes, device mounting brackets, and cabinets, in accordance with manufacturer's installation sheets.
- O. Metal raceway shall be electrically continuous and bonded in accordance with the National Electric Code for proper grounding.
- P. Raceway shall be supported at intervals not exceeding 5 feet or in accordance with manufacturer's installation sheets.
- Q. Contractor shall provide accessories as required for a complete installation, including insulated bushings and inserts where required by manufacturer.

- R. Close unused raceway openings using manufacturer's recommended accessories.
- S. Color shall be standard neutral color to minimize visual impact in spaces. Coordinate final color of raceway with Owner prior to any final installation activity.

2.07 AUDIO SPEAKERS – IN CEILING

- A. New audio speakers shall be provided in locations and quantities identified in Appendix C – Equipment Schedule and as specified herein.
- B. Acceptable Manufacturer:
 - 1. LIGHTSPEED
 - 2. Or equal
- C. Where classroom speakers are to be installed in drop ceilings, they shall be near flush mount and cleanly cut into available tiles for optimal and uniform audio fill of the relevant classroom space. Speakers shall meet or exceed the following minimum standard requirements:
 - 1. 6.5” driver; 1” horn per speaker
 - 2. Frequency response: 75 Hz – 20 kHz
 - 3. Impedance of 8 Ohms
 - 4. Power handling of 60 watts (8 Ohms)
 - 5. Speakers shall be mounted in fully enclosed, acoustically appropriate, metallic back boxes and fully supported by appropriate tile bridges.
- D. Where flush mounting is not possible or practical, Contractor shall install surface mounted speakers meeting or exceeding all requirements above.
- E. Where specific speaker location is in question, obtain Owner approval prior to any final installation activity.
- F. All speakers shall include attractive finished white grill.
- G. All speaker wire shall be 16 AWG high quality cable.
- H. Speakers shall be connected in two sets for right and left stereo channels.
- I. All speaker cable shall be terminated on Male Speakon connector(s) at teacher station wall plate specified herein.

- J. All speaker cable shall be protected in existing or Contractor provided raceway.

2.08 MULTIMEDIA INFRASTRUCTURE CABLE

- A. All cable shall be factory manufactured with terminations and connector assemblies fully attached and integral to the cable to industry published quality standards and meet performance requirements specified herein.
- B. Infrastructure cable to connect projector to a teacher station wall plate shall be provided.
- C. Acceptable Cable:
 - 1. HD Base-T Digital Video Cable shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - a. Cable shall meet or exceed Shielded Category 6 certification.
 - b. Cable shall be constructed of solid 23 AWG conductors.
 - c. If pre-terminated shielded cable is used, a shielded passthrough connection at the wall plate is required.
 - 2. HD Base-T Digital Video Cable 2 (where applicable) shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - a. Cable shall meet or exceed Shielded Category 6 certification.
 - b. Cable shall be constructed of solid 23 AWG conductors.
 - c. If pre-terminated shielded cable is used, a shielded passthrough connection at the wall plate is required.
 - 3. USB extension cable shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - a. Cable shall meet or exceed Category 6 certification
 - b. NOTE: Only installed in rooms with Short Throw Interactive Projectors as defined in Appendix C.
- D. Wall plate provided shall be constructed of commercial grade stainless steel.
 - 1. Wall plate shall contain connection points for all specified cables
 - 2. Additional Two (2) data outlet locations for data cabling.

3. In locations where supplied equipment will not fit into rough-in locations, Contractor shall supply and install extra deep metallic double gang box. Wiremold V2444-2 or Equal.
 4. Unpopulated data connections shall all have blank covers installed.
 5. Existing or new terminated category cabling should be securely locked into new plate.
 - a. Data cabling labeling will be carefully transcribed on new faceplate with mechanically printed label.
- E. All wall plate connectors shall provide female metal screw terminals for securing connecting cables where connectors do not have inherent locking mechanisms. Plate shall contain the following connectors:
1. HD-Base-T Digital Video (Category 6 STP)
 2. HD-Base-T Digital Video (Category 6 STP) – where applicable
 3. USB Extension Cable (Category 6 UTP) – where applicable
 - a. NOTE: Only installed in rooms with Short Throw Interactive Projectors as defined in Appendix C
 4. Audio Speaker (L/R) with Speakon Male for connection to speakers shall be co-located on this same wall plate.
- F. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector location.
- G. Cable shall terminate in the following connector gender:
1. HD-Base-T Digital Video (Category 6 STP)
 - a. Terminate into an active HD-Base-T receiver and include an HDMI Type A 19 pin plug connector to display device.
 - b. Terminate in a 568-compliant type female jack located on the face plate.
 2. HD-Base-T Digital Video 2 (Category 6 STP) - where applicable
 - a. Terminate into an active HD-Base-T receiver and include an HDMI Type A 19 pin plug connector to display device.
 - b. Terminate in a 568-compliant type female jack located on the face plate.

3. USB Extension Cable (Category 6 UTP) – where applicable
 - a. Terminate into an active USB extension equipment.
 - b. Terminate in a 568-compliant type female jack located on the face plate.
 4. NOTE: Audio Speaker (L/R) cable shall terminate on specified speakers and as indicated herein.
- H. HD-Base-T Digital Video Cable shall be constructed using 23 AWG solid conductors and of a high-quality construction method for minimal loss characteristics, to maintain quality high-resolution video image and include support for 1080p video resolution for the installed distance plus a fifteen (15) foot extension for device attachment.

2.09 MULTIMEDIA CONNECTION CABLE BUNDLES

- A. Fully assembled infrastructure cable bundles for each classroom indicated to receive a projector shall be provided for final connection to components and classroom plate by others.
- B. Acceptable Manufacturer
 1. Cable shall be of commercial first-class quality manufacture.
- C. All Cable shall be fifteen (15) feet in length and terminate in the following connector genders:
 1. HD-Base-T Shielded Category 6 patch cable (M/M).
 2. HD-Base-T Shielded Category 6 patch cable 2 (M/M). – where applicable
 3. Classroom Multimedia Workstation USB Category 6 Patch Cable (M/M). – where applicable
 - a. NOTE: Only installed in rooms with Short Throw Interactive Projectors as defined in Appendix C
 4. Audio Speaker (L/R) with Speakon Female
 - a. to bare cable for connection to screw terminals on amplifier.
 5. Classroom Phone Black Category 6 Patch Cable (M/M).
 6. Wireless Presentation System Black Category 6 Patch Cable (M/M).
- D. A single F6 Woven Split Braid Sleeving to contain and protect all associated cable secure with Velcro strips.

1. Velcro strips shall be trimmed and flush with sleeving material.
2. Velcro strips shall be loose enough for cable movement.
3. Coordinate all color selections with Owner and Designer.
4. Braided sleeving should be cut and sealed cleanly using a hot knife or similar tool.
5. Coordinate power cable relationship into connection bundle with Owner and Designer.
6. Contractor shall supply power cord extension and surge suppressed power strip to be installed at the teacher input location. Power Strip shall contain six (6) grounded AC power connectors.
 - a. Tripp-Lite TLP615 or equal
 - b. Power cord should be sufficient length to support device attachment with 15' cable bundle and be neatly placed at teacher input location.

2.10 CEILING MOUNTED PROJECTOR

- A. Standard video projectors shall be provided and installed in each location as indicated in Appendix C.
- B. Acceptable Manufacturer:
 1. EPSON
 - a. PowerLite L250F
- C. Projectors shall meet or exceed the following minimum output, port availability and other standards:
 1. 4500 ANSI Lumens
 2. 1080p resolution
 3. Two (2) HDMI Inputs
- D. In the event of a power failure, system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- E. All other features currently a part of the manufacturer's latest commercial release.

2.11 PROJECTOR CEILING PLATES AND MOUNTING BRACKETS

- A. Projector Ceiling Plates and Projector Mounting Brackets shall be provided and installed in each location as indicated in Appendix C.
- B. Acceptable Manufacturers:
 - 1. CHIEF
 - 2. PEERLESS
 - a. PRG-455
- C. All projector mounts shall be firmly and securely mounted to finished ceiling, or other surfaces as required and/or specified herein to maximize coverage and minimize tampering potential.
- D. Mounts shall be located in coordination with display boards and/or screens and projectors by others to provide a minimum of 96% coverage of the horizontal viewing area of installed display boards and/or screens with no optical distortion.
- E. Projector mounts shall be complete and safely accommodate particular and specific mounting conditions for standard projectors.
- F. All work shall conform to manufacturers best practices recommendations.
- G. Where standard mounting in drop ceilings is not possible or acceptable to Owner, provide alternative and compliant mounting hardware and installation consistent with other specified materials.
- H. Equipment shall be installed using manufacturer best practices.
- I. Contractor shall supply and install new projector downpipes in each location as necessary.

2.12 EXISTING PROJECTOR CEILING PLATES AND MOUNTING BRACKETS

- A. It is anticipated to reuse existing Peerless CMJ455 projector ceiling plates when possible for all existing long throw projector locations. Contractor shall be responsible for moving, remounting and securing with appropriate safety wires as necessary for a fully compliant installation.

2.13 SHORT THROW TOUCH INTERACTIVE VIDEO PROJECTORS

- A. Short Throw Touch Interactive Video Projectors and accompanying projector specific mounts shall be provided and installed in locations as indicated in Appendix C and as specified herein.
- B. Acceptable Manufacturer (In alphabetical order):

1. EPSON
 - a. Brightlink 725wi
2. All features currently a part of the manufacturer's latest commercial release shall be included
3. Contractor shall provide USB 2.0 Extension Equipment to support connection to USB Extension Cable (Category 6 UTP). Equipment should include all necessary parts to provide a fully functional and compliant system.
4. Interactive projector shall include appropriate touch module
5. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - a. Patch cables shall not exceed fifteen (15) feet in length.
6. Material and labor to cross connect projectors in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - a. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - b. Coordinate all work with Owner, Designer and other Contractors prior to installation.
 - c. Grommets or brush style stainless steel face plate shall be provided at projector location to cleanly transition from wall or ceiling to projector location. Contractor shall neatly bundle all cables in split braid tech wrap to projector.

2.14 PROJECTION SCREENS – 6'

- A. Projection Screens shall be provided and installed in locations as indicated in Appendix C.
- B. Acceptable Manufacturers (in alphabetical order):
 1. DALITE
 - a. Model B
 2. DRAPER
- C. Projection Screens shall meet or exceed the following minimum standards:

1. Viewing surface of 72" in width.
2. Controlled screen return (CSR).
3. Matte white viewing surface with black masking borders.
4. Constructed of flame retardant and mildew resistant fabric.
5. Neutral color painted 21-gauge steel case.
6. 4' pull cord securely fastened to bottom of screen.
7. Screens shall be wall mounted at locations indicated by Owner with approved permanent wall L-brackets capable of supporting screen and reasonably expected forces in classroom environment.
8. In locations where wall mounted is not acceptable, coordinate ceiling mounted screens with Owner and Designer.

2.15 PROJECTION SCREENS – 8'

B. Projection Screens shall be provided and installed in locations as indicated in Appendix C.

D. Acceptable Manufacturers (in alphabetical order):

1. DALITE
 - a. Model B
2. DRAPER

E. Projection Screens shall meet or exceed the following minimum standards:

1. Viewing surface of 96" in width.
2. Controlled screen return (CSR).
3. Matte white viewing surface with black masking borders.
4. Constructed of flame retardant and mildew resistant fabric.
5. Neutral color painted 21-gauge steel case.
6. 4' pull cord securely fastened to bottom of screen.
7. Screens shall be wall mounted at locations indicated by Owner with approved permanent wall L-brackets capable of supporting screen and reasonably expected forces in classroom environment.

8. In locations where wall mounted is not acceptable, coordinate ceiling mounted screens with Owner and Designer.

2.16 PROJECTION SCREENS – 10’

C. Projection Screens shall be provided and installed in locations as indicated in Appendix C.

F. Acceptable Manufacturers (in alphabetical order):

1. DALITE

- a. Model C

2. DRAPER

G. Projection Screens shall meet or exceed the following minimum standards:

1. Viewing surface of 120” in width.
2. Controlled screen return (CSR).
3. Matte white viewing surface with black masking borders.
4. Constructed of flame retardant and mildew resistant fabric.
5. Neutral color painted 21-gauge steel case.
6. 4’ pull cord securely fastened to bottom of screen.
7. Screens shall be wall mounted at locations indicated by Owner with approved permanent wall L-brackets capable of supporting screen and reasonably expected forces in classroom environment.
8. In locations where wall mounted is not acceptable, coordinate ceiling mounted screens with Owner and Designer.

2.17 VOICE AMPLIFICATION

A. Voice Amplification Systems shall be provided and installed in locations as indicated in Appendix C.

1. An additional five (5) spare microphones shall be provided. Owner intends to use spare microphones as replacement units in the event of loss or breakage.

B. Acceptable Manufacturers

1. LIGHTSPEED

- a. 975
- 2. Major components of Voice Amplification System shall be installed in/on teacher desk provided by others.
- C. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. 20 Watts per channel.
 - 3. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 - 4. Two (2) Lightspeed volume control Flexmikes
- D. Contractor shall provide one (1) shielded cable for connectivity from audio output of video switcher to amplifier to support a fully functional and compliant system.
- E. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- F. All other features currently a part of the manufacturer’s latest commercial release.

2.10 DOCUMENT CAMERAS

- A. Document Cameras shall be provided and installed in locations as indicated in Appendix C.
- B. Acceptable Manufacturers
 - 1. Hovercam
 - a. Solo 8 Plus
- C. Document cameras shall include full functionality of the following feature sets and/or standards in workstation software and in conjunction with proposed devices, and shall provide for all management, configuration and control features and/or standards from a workstation administrative interface:
 - 1. Software Control shall include, but not be limited to:
 - a. Zoom.
 - b. Focus.

- c. Brightness.
 - d. White Balance.
 - e. Video capture.
- D. Document camera software shall be installed by Owner on standard classroom workstations provided by Owner.
- E. Document cameras shall meet or exceed the following minimum standards:
 - 1. 4224x3156 Image Resolution (13MP)
 - 2. 8x Digital Zoom.
 - 3. 10x Mechanical Zoom.
 - 4. Maximum tabletop camera capture field of 11" x 17".
 - 5. USB 3.0 port connection to computer workstation to provide, but not be limited to the following.
 - a. Image "snapshot" capture.
 - b. Video capture.
 - c. Device control.
 - d. 25 frames per second video capture rate.
 - e. SD card slot.
 - f. Integrated microphone
 - g. LED illumination lamp.
 - h. 4K Video Resolution @ 30FPS
 - i. Auto focus adjustment with manual override.
 - j. Auto white balance.
 - k. Auto brightness adjustment with manual override.
- F. In the event of a power failure, system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- G. All other features currently a part of the manufacturer's latest commercial release.

2.11 VIDEO SWITCHER – Type 1

- A. Video Switchers shall be provided and installed in locations and quantities as indicated in Appendix C.
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. ATLONA
 - a. AT-OME-ST31A
- C. Classroom 3x1 video switch shall meet to exceed all of the following requirements:
 - 1. One (1) USB C Input
 - 2. Two (2) HDMI inputs
 - a. One (1) Eight (8) foot HDMI cable for teacher PC connection.
 - b. One (1) Eight (8) foot HDMI cable for connection to wireless presentation system.
 - 3. 4K/UHD capability @ 60Hz – 1080p downscaling
 - 4. Include appropriate HDBaseT receiver to be mounted at projector location
 - 5. One HD-BaseT Output for connection at wall plate.
 - 6. One mirrored HDMI output
 - 7. Audio de-embedding shall be provided and located at the desktop unit.
 - 8. Stereo audio line level output
 - 9. Front panel source select with visual indication.
 - 10. Local power with power supply
- D. All other features currently a part of the manufacturer's latest commercial release.
- E. Owner desires a single unit for elegant placement in classrooms. If multiple physical components are deployed for a more cost-effective configuration as an alternate. Contractor shall include all component interconnecting cables, adapters, housings, power strips, and mounting hardware to provide an installation that conforms to the Owner's desire for elegant placement and classroom deployment as part of the base bid.

2.12 VIDEO SWITCHER – Type 2

- A. Video Switchers shall be provided and installed in locations and quantities as indicated in Appendix C.
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. ATLONA
 - a. AT-OME-MS42
- C. Classroom 3x2 matrix video switch shall meet to exceed all of the following requirements:
 - 1. One (1) USB C Input
 - 2. Two (2) HDMI inputs
 - a. One (1) Eight (8) foot HDMI cable for teacher PC connection.
 - b. One (1) Eight (8) foot HDMI cable for connection to wireless presentation system.
 - 3. 4K/UHD capability @ 60Hz – 1080p downscaling
 - 4. Include appropriate HDBaseT receivers to be mounted at projector locations
 - 5. Discreet secondary output shall include appropriate HDBaseT transmit and receive pair
 - 6. One HD-BaseT Output for connection at wall plate.
 - 7. One discreet HDMI output for connection to HDBaseT transmit and receive pair
 - 8. Audio de-embedding shall be provided and located at the desktop unit.
 - 9. Stereo audio line level output
 - 10. Front panel source select with visual indication.
 - 11. Local power with power supply
- D. All other features currently a part of the manufacturer's latest commercial release.
- E. Owner desires a single unit for elegant placement in classrooms. If multiple physical components are deployed for a more cost-effective configuration as

an alternate. Contractor shall include all component interconnecting cables, adapters, housings, power strips, and mounting hardware to provide an installation that conforms to the Owner's desire for elegant placement and classroom deployment as part of the base bid.

2.13 WIRELESS PRESENTATION SYSTEM

A. Wireless Presentation Systems shall be provided and installed in locations as indicated in Appendix C.

B. Acceptable Manufacturers (in alphabetical order):

1. KRAMER

- a. VIA GO2

2. HDMI output with support for up to 4K30Hz video streaming

3. Gigabit LAN and dual-band 802.11ac Wireless connectivity

4. 4GB Memory

5. 32GB Storage

6. 3.5mm Audio Output

7. All other features currently a part of the manufacturer's latest commercial release.

C. Cables and Accessories

1. 3' HDMI cable for connectivity to switcher

2. All necessary mounting brackets and connectors to securely mount at teacher input location.

3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.

- a. Patch cables shall not exceed fifteen (15) feet in length.

4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.

- a. Cable lengths shall be appropriate for connections made, and not include excessive cable.

- b. Coordinate all work with Owner, Designer and other contractors prior to installation.
 - 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
 - 6. Contractor shall connect and make fully functional all Wireless Presentation Systems to existing on premise Kramer Site Management Software.
- 2.14 SHORT THROW PROJECTOR OVER THE BOARD WHITEBOARD AND MOUNT
- A. Short throw projector over the board whiteboard and mount shall be provided and installed in locations as indicated in Appendix C.
 - B. Acceptable Manufacturers (in alphabetical order):
 - 1. DIVERSIBOARD
 - a. Diversiboard XL
 - C. 100” diagonal
 - D. Contractor shall include all necessary over the board mount equipment for stationary mounting of provided projection board.
 - E. Contractor shall include necessary universal projector mounting plate for mounting of supplied interactive short throw projectors.
- 2.15 STANDARD MARKERBOARD
- A. Standard Markerboards shall be provided and installed in locations as indicated in Appendix C. Appendix C includes markerboard size
 - B. Acceptable Manufacturers (in alphabetical order):
 - 1. CIGJAN
 - 2. Or Equal.
 - C. In addition to the width identified in Appendix C, provided Standard Markerboard shall be 5” in height.
 - D. No integral marker tray shall be provided; Contractor shall provide magnetic marker trays only.

- E. No tack strip across top of markerboard shall be provided.
- F. Porcelain enamel dry erase surface
- G. Magnetic
- H. Standard Marker Boards shall be installed flat for interactive short throw projection surface. Contractor shall install Standard Markerboards using manufacturer best practices.

2.16 SPECIAL CONDITION LOCATIONS

A. SPECIAL CONFIGURATION A

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Middle School Gymnasium
2. One (1) Rack System(s) shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. Middle Atlantic
 - A. DWR-12-26PD
 2. Or Equal.
 - b. Wall Mount
 - c. 12U
 - d. Plexiglas Locking Door
 - e. Forward rackrail
 - f. UL Load Capacity 200 lbs
 - g. 26" usable depth
 - h. 21" usable height
 - i. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal).
3. Two (2) Voice Amplification System(s) shall be provided and installed
 - a. Acceptable Manufacturer(s)

1. SHURE – QLXD4
 2. Or Equal.
- b. Handheld and Lavalier microphone combo
 - c. Contractor shall supply charging station for Voice Amplification System(s).
 - d. Contractor shall supply and install any necessary external antennas and cabling to enable clear and reliable audio signal coverage for entire gymnasium.
 - e. Contractor shall supply all mounting hardware to securely mount equipment into Contractor supplied rack.
 - f. Contractor shall supply 3U drawer to store microphone in Contractor supplied rack.
4. Nine (9) Speaker(s) in three (3) zones shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. BIAMP/COMMUNITY
 2. ELECTROVOICE
 3. HARMON/JBL PRO
 4. QSC
 5. Or Equal
 - b. Passive 2-way full range speaker
 - c. 12” Low Frequency Driver, 2.5-inch Voice Coil
 - d. 1.75” High Frequency Driver
 - e. 300W AES, 1200W peak
 - f. 8 ohms
 - g. 94 dB sensitivity
 - h. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz

- i. Contractor shall safely and securely mount speakers to gymnasium ceiling structure using manufacturer recommended and industry best practices.
 - j. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
 - k. Speakers shall be white in color.
5. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO
 - 3. SYMETRIX
 - 4. QSC
 - 5. Or Equal.
 - b. System shall be populated with necessary accessories for 8 line-level output audio channels.
 - c. System shall be populated with necessary accessories for 8 line-level input audio channels.
 - d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - e. Contractor shall supply all necessary labor to configure Mixer/DSP.
 - f. Contractor shall integrate DSP with provided Crestron touchscreen and control system
 - g. System shall be capable of providing digital signal processing and equalization for three (3) discreet zones. Contractor shall supply all necessary labor to configure Mixer/DSP system for even audio reproduction throughout the gymnasium.
 - h. Contractor shall supply 7" touchscreen for audio DSP control in supplied rack. Touchscreen shall be enabled for discreet control of all audio sources as specified herein.
 - i. Contractor shall provide all system programming and operation software for a fully functional and operational system. All

programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.

- j. Contractor shall supply all cables and accessories for a fully functional system.
6. One (1) Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - A. ALC-1604D
 - 2. HARMAN/JBL PRO
 - 3. POWERSOFT
 - 4. QSC
 - 5. Or Equal.
 - b. Four (4) input channels
 - c. Four (4) output channels – Hi-Z or Lo-Z
 - d. Input sensitivity @ 8 Ohms – 26 dB Gain – 4.91 Vrms
 - e. 1250W maximum output per channel at 8 Ohms.
 - f. S/N (20 Hz – 20kHz @ 8 Ohms) > 110 dB
7. One (1) CD/Bluetooth Player shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. DENON
 - A. DN300Z
 - 2. Or Equal.
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - c. Contractor shall provide all audio cables and accessories to integrate CD/Bluetooth player with provided DSP/Mixer system.

8. One (1) Remote input location(s) shall be provided and installed.
 - a. Remote input location shall provide XLR and 3.5mm connectivity in identified locations.
 - b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
 - c. Contractor shall integrate XLR and 3.5mm connection into provided DSP/Mixer system.

B. SPECIAL CONFIGURATION B

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Cafeteria – High School
2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 1. EPSON
 - A. L630U
 - b. 6,300 Lumens
 - c. Projector shall be installed and positioned for the projected image to completely fill Contractor provided powered rollup screen.
 - d. Projector shall be securely installed and affixed to mounting system and downpipe that is structurally attached to finished ceiling. Contractor shall supply appropriate mount and downpipe to securely and safely extend projector to optimal location for projection onto Contractor provided screen.
 - e. Provided white projector downpipe shall allow routing of projector cabling internally.
 - f. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.
 - g. Contractor shall supply appropriate 4K60 4:4:4 decoder device to integrate with provided control system.
 - h. Projector shall be manually controlled with supplied projector remote.

3. One (1) Divided Metallic Raceway shall be provided and installed at identified input location.
 - a. Raceway shall include mounting location and accessories to mount screen control switch at 48" AFF and AV input location.
 - b. Raceway shall meet all other requirements identified in section 2.06.
4. One (1) Multimedia Input Location(s) shall be provided.
 - a. Acceptable Manufacturer(s)
 1. CRESTRON
 - A. HD-TX-101-C-1G-E-B-T
 - b. 4K60 signal
 - c. Contractor shall supply correct DM-Lite receiver at projector location.
 - d. Contractor shall supply appropriate stainless-steel faceplate to integrate transmitter into supplied metallic raceway.
5. One (1) Touch Screen(s) shall be provided
 - a. Acceptable Manufacturer(s)
 1. CRESTRON
 - A. TSW-770-B-S
 2. QSC
6. One (1) Powered Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 1. DA-LITE
 - A. Tensioned Cosmopolitan Electrol
 2. DRAPER
 - b. Powered Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 78" x 139" – Wide (16:9) Format - Cafeteria M101 – High School
 - d. White case

- e. Surface mount
 - f. Matte white screen surface
 - g. Low voltage control RS-232 capable
 - h. Contractor shall supply low voltage control screen switch to be mounted in provided raceway. Contractor shall supply all parts, labor and accessories for a fully functional system.
7. One (1) Rack System(s) shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. Middle Atlantic
 - A. DWR-12-26PD
 - 2. Or Equal.
 - b. Wall Mount
 - c. 12U
 - d. Plexiglas Locking Door
 - e. Forward rackrail
 - f. UL Load Capacity 200 lbs
 - g. 26" usable depth
 - h. 21" usable height
 - i. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal).
8. One (1) Wireless Presentation System shall be provided and installed.
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. KRAMER
 - A. VIA GO2
 - 2. HDMI output with support for up to 4K30Hz video streaming
 - 3. Gigabit LAN and dual-band 802.11ac Wireless connectivity

4. 4GB Memory
 5. 32GB Storage
 6. 3.5mm Audio Output
 7. All other features currently a part of the manufacturer's latest commercial release.
- b. Cables and Accessories
1. 3' HDMI cable for connectivity to switcher
 2. All necessary mounting brackets and connectors to securely mount at teacher input location.
 3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - A. Patch cables shall not exceed fifteen (15) feet in length.
 4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - A. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - B. Coordinate all work with Owner, Designer and other contractors prior to installation.
 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
9. Two (2) Voice Amplification System(s) shall be provided and installed
- a. Acceptable Manufacturer(s)
 1. SHURE – QLXD4
 2. Or Equal.
 - b. Handheld and Lavalier microphone combo

- c. Contractor shall supply and install any necessary external antennas and cabling to enable clear and reliable audio signal coverage for entire gymnasium.
- d. Contractor shall supply all mounting hardware to securely mount equipment into Contractor supplied rack.
- e. Contractor shall supply 3U drawer to store microphone in Contractor supplied rack.

10. Sixteen (16) Speakers shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. Harman/JBL Pro
 - A. JBL CONTROL 18C/T
 - 2. Or Equal
- b. Passive 2-way full range speaker
- c. 8" Low Frequency Driver, 1-inch Voice Coil
- d. 180W peak
- e. 8 ohms
- f. 94 dB sensitivity
- g. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
- h. Contractor shall safely and securely mount speakers to cafeteria ceiling structure using manufacturer recommended and industry best practices.
- i. Contractor shall include any necessary backbox and speaker protection for a fully functional and compliant system where applicable.
- j. Contractor shall supply and install properly sized speaker cabling to support supplied speakers.
- k. Speakers shall be white in color.

11. One (1) Mixer shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY

2. HARMAN/JBL PRO

A. CSM 28

3. QSC

4. Or Equal.

- b. System shall be populated with necessary accessories for 8 line-level input audio channels.
- c. System shall be populated with necessary accessories for 2 line-level output audio channels.
- d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
- e. Contractor shall supply all necessary labor to configure Mixer.
- f. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
- g. Contractor shall supply all cables and accessories for a fully functional system.

12. One (1) Amplification System shall be provided and installed

a. Acceptable Manufacturer(s)

1. Harman/JBL Pro

A. CSA2300Z

2. Or Equal

- b. Two (2) input channels
- c. Two (2) output channels
- d. 300W maximum output per channel
- e. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB

13. One (1) CD/Bluetooth Player shall be provided and installed

a. Acceptable Manufacturer(s)

1. DENON
 - A. DN300Z
 2. Or Equal.
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - c. Contractor shall provide all audio cables and accessories to integrate CD/Bluetooth player with provided DSP/Mixer system.
14. One (1) Remote input location(s) shall be provided and installed.
- a. Remote input location shall provide XLR and 3.5mm connectivity in identified locations.
 - b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
 - c. Contractor shall integrate XLR and 3.5mm connection into provided DSP/Mixer system.

C. SPECIAL CONFIGURATION C

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. High School Band Room
 - b. High School Choir Room
 - c. Middle School Band Room
 - d. Middle School Choir Room
2. One (1) Manual Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 1. DA-LITE
 - A. Model C with CSR
 2. DRAPER
 - b. Manual Rollup Projection Screen shall meet or exceed the following minimum requirements:

- c. 65" x 116" – 133" Diagonal
 - d. White case
 - e. Controlled screen return
 - f. Matte white screen surface
 - g. Contractor shall supply all necessary mounting materials and labor for safe and fully functional installation.
3. One (1) Projector
- a. Acceptable Manufacturer(s)
 - 1. EPSON
 - A. L630U
 - b. 6,300 Lumens
 - c. Projector shall be securely installed and affixed to mounting system and downpipe that is structurally attached to finished ceiling. Contractor shall supply appropriate mount and downpipe to securely and safely extend projector to optimal location for projection onto Contractor provided screen.
 - d. Provided white projector downpipe shall allow routing of projector cabling internally.
 - e. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.
 - f. Contractor shall supply and install audio cable to connect projector audio output to supplied DSP/Mixer system installed in provided rack.
4. One (1) Wireless Presentation System shall be provided and installed.
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. KRAMER
 - A. VIA GO2
 - 2. HDMI output with support for up to 4K30Hz video streaming
 - 3. Gigabit LAN and dual-band 802.11ac Wireless connectivity

4. 4GB Memory
 5. 32GB Storage
 6. 3.5mm Audio Output
 7. All other features currently a part of the manufacturer's latest commercial release.
- b. Cables and Accessories
1. 3' HDMI cable for connectivity to switcher
 2. All necessary mounting brackets and connectors to securely mount at teacher input location.
 3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - A. Patch cables shall not exceed fifteen (15) feet in length.
 4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - A. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - B. Coordinate all work with Owner, Designer and other contractors prior to installation.
 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
5. One (1) Voice Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 1. LIGHTSPEED
 - A. 975 ACCESS LINK
 - b. Major components of the Voice Amplification System shall be carefully installed at rack location.

- c. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 - A. Two (2) Lightspeed volume control Flexmikes
 - d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at rack location to support a fully functional and compliant system.
 - e. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
 - f. All other features currently a part of the manufacturer’s latest commercial release.
 - g. Voice Amplification Systems shall be neatly and securely mounted at Contractor provided rack. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from Lightspeed device to provided DSP/Mixer.
6. One (1) Document Camera shall be provided and installed.
- a. Acceptable Manufacturers
 - 1. Hovercam
 - A. Solo 8 Plus
 - b. Document cameras shall include full functionality of the following feature sets and/or standards in workstation software and in conjunction with proposed devices, and shall provide for all management, configuration and control features and/or standards from a workstation administrative interface:
 - 1. Software Control shall include, but not be limited to:
 - A. Zoom.
 - B. Focus.
 - C. Brightness.

- D. White Balance.
 - E. Video capture.
- c. Document camera software shall be installed by Owner on standard classroom workstations provided by Owner.
- d. Document cameras shall meet or exceed the following minimum standards:
 - 1. 4224x3156 Image Resolution (13MP)
 - 2. 8x Digital Zoom.
 - 3. 10x Mechanical Zoom.
 - 4. Maximum tabletop camera capture field of 11" x 17".
 - 5. USB 3.0 port connection to computer workstation to provide, but not be limited to the following.
 - A. Image "snapshot" capture.
 - B. Video capture.
 - C. Device control.
 - D. 25 frames per second video capture rate.
 - E. SD card slot.
 - F. Integrated microphone
 - G. LED illumination lamp.
 - H. 4K Video Resolution @ 30FPS
 - I. Auto focus adjustment with manual override.
 - J. Auto white balance.
 - K. Auto brightness adjustment with manual override.
- e. In the event of a power failure, system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- f. All other features currently a part of the manufacturer's latest commercial release.

7. One (1) Multi-media Infrastructure Cable and Faceplate
 - a. All cable shall be factory manufactured with terminations and connector assemblies fully attached and integral to the cable to industry published quality standards and meet performance requirements specified herein.
 - b. Infrastructure cable to connect projector to a wall plate shall be provided.
 - c. Acceptable Cable:
 1. HD Base-T Digital Video Cable shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - A. Cable shall meet or exceed Shielded Category 6a certification.
 - B. Cable shall be constructed of solid 23 AWG conductors.
 - C. Wall plate provided shall be constructed of commercial grade stainless steel.
 2. Wall plate shall contain connection points for all specified cables
 3. Two (2) data outlet locations.
 4. Unpopulated data connections shall all have blank covers installed.
 5. Any existing terminated category cabling should be securely locked into new plate and any existing labeling shall be transferred.
 - d. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector location.
 - e. Cable shall terminate in the following connector gender:
 1. HD-Base-T Digital Video (Category 6a STP)
 - A. Terminate into an active HD-Base-T receiver and include an HDMI Type A 19 pin plug connector to display device.
 - B. Terminate in a 568-compliant type female jack located on the face plate.
8. One (1) Video Switcher shall be provided and installed.

- a. Acceptable Manufacturers (in alphabetical order):
 1. ATLONA
 - A. AT-OME-ST31A
- b. Classroom 3x1 video switch shall meet to exceed all of the following requirements:
 1. One (1) USB C Input
 2. Two (2) HDMI inputs
 - A. One (1) Eight (8) foot HDMI cable for teacher PC connection.
 - B. One (1) Eight (8) foot HDMI cable for connection to wireless presentation system.
 3. 4K/UHD capability @ 60Hz – 1080p downscaling
 4. Include appropriate HDBaseT receiver to be mounted at projector location
 5. One HD-BaseT Output for connection at wall plate.
 6. One mirrored HDMI output
 7. Audio de-embedding shall be provided and located at the desktop unit.
 8. Stereo audio line level output
 9. Front panel source select with visual indication.
 10. Local power with power supply
- c. All other features currently a part of the manufacturer's latest commercial release.
- d. Owner desires a single unit for elegant placement in classrooms. If multiple physical components are deployed for a more cost-effective configuration as an alternate. Contractor shall include all component interconnecting cables, adapters, housings, power strips, and mounting hardware to provide an installation that conforms to the Owner's desire for elegant placement and classroom deployment as part of the base bid.

9. One (1) Divided Metallic Raceway shall be provided and installed at identified input location.
 - a. Raceway shall meet all other requirements identified in section 2.06.
10. One (1) Metallic Raceway shall be provided to provide a pathway for rack audio system equipment.
 - a. Raceway shall meet all other requirements identified in section 2.06.
11. One (1) Rack System(s) shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. Middle Atlantic
 - A. DWR-12-26PD
 2. Or Equal.
 - b. Wall Mount
 - c. 12U
 - d. Plexiglas Locking Door
 - e. Forward rackrail
 - f. UL Load Capacity 200 lbs
 - g. 26" usable depth
 - h. 21" usable height
 - i. Contractor to supply 15A eight (8) outlet power sequencer/PDU (Furman M-8S or equal).
12. One (1) Stereo Recording Microphone shall be provided and installed.
 - a. Shure
 1. VP88
 - b. Microphone will be suspended in above conductor location for recording of choir and band performances for fast playback.
Contractor to include all necessary cables and accessories to connect microphone back to provided DSP for recording.
13. One (1) Mixer/DSP shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO
 - 3. POWERSOFT
 - 4. QSC
 - 5. SYMETRIX
 - A. PRISM 8x8
 - 6. Or Equal.
 - b. System shall be populated with necessary accessories for 8 line-level output audio channels.
 - c. System shall be populated with necessary accessories for 8 line-level input audio channels.
 - d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - e. Contractor shall supply all necessary labor to configure Mixer/DSP.
 - f. System shall be capable of providing digital signal processing and equalization for band and choir room. Contractor shall supply all necessary labor to configure Mixer/DSP system for even audio reproduction throughout the space.
 - g. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
 - h. Contractor shall supply all cables and accessories for a fully functional system.
14. One (1) Solid State Recording Device shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. TASCAM
 - A. SS-R250N

- 2. Or Equal.
 - b. Ability to record to SD Card or USB media
 - c. Balanced analog I/O
 - d. Ethernet network connectivity, device shall have the ability to start and stop recording from an Apple mobile device and/or desktop computer. Contractor shall fully configure device on network and collaborate with staff to make functional remote recording and playback capability.
 - e. Contractor shall supply all necessary cabling and accessories to connect Solid State Recording Device to provided DSP/Mixer.
15. One (1) Multimedia Processor shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A. RMC4
 - 2. QSC
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in provided AV rack.
 - c. Contractor shall provide all control, communication, and audio cables to connect input and output ports to all Contractor provided materials.
 - d. Contractor shall program Multimedia processor to integrate with Contractor provided DSP/Mixer. Contractor shall supply all necessary cabling and programming to fully enable integration with control system.
 - e. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
16. One (1) Tabletop Touch Screen(s) shall be provided
- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A. TS-770-B-S

2. QSC
 - b. Touch Screen(s) shall be provided to control system operations.
 1. Connect to DSP/Mixer system to provide discreet input and output control provided with system.
 2. Provide all necessary cabling, mounts and accessories to securely mount touch screen at teacher desktop location.
 3. Control touch screen shall be provided in locations specified herein that shall provide the following functions but not limited to.
 - A. Audio Level Increase (for each input)
 - B. Audio Level Decrease (for each output)
 - C. Audio Mute (master and for each input/output)
 - c. Contractor shall provide all control, communication, audio patch cables, transmitters and receivers to connect input and output ports to all Contractor and Owner provided materials in the space.
17. One (1) Amplification System shall be provided and installed
- a. Acceptable Manufacturer(s)
 1. BIAMP/COMMUNITY
 2. HARMAN/JBL PRO
 3. POWERSOFT
 4. QSC
 - A. GX5
 5. Or Equal.
 - b. Two (2) input channels
 - c. Two (2) output channels
 - d. Input sensitivity @ 8 Ohms – 26 dB Gain – 5.03 Vrms
 - e. 500W maximum output per channel at 8 Ohms
 - f. S/N (20 Hz – 20kHz @ 8 Ohms) > 100 dB

18. Two (2) Speakers shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - A. Pro V2-28B
 - 2. ELECTROVOICE
 - 3. HARMON/JBL PRO
 - 4. QSC
 - 5. Or Equal
- b. Passive 2-way full range speaker
- c. Dual 8" Low Frequency Driver
- d. 1" High Frequency Driver
- e. 300W AES, 1200W peak
- f. 8 ohms
- g. 98 dB sensitivity
- h. 90x60 beamwidth
- i. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
- j. Contractor shall safely and securely mount speakers to choir and band room wall using manufacturer recommended and industry best practices.
- k. Contractor shall include appropriate mounting yoke.
- l. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.

19. One (1) Remote input location(s) shall be provided and installed.

- a. Remote input location shall provide XLR connectivity in identified locations.
- b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.

- c. Contractor shall integrate XLR connection into provided DSP/Mixer system.

D. SPECIAL CONFIGURATION D

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Middle School Media Center
2. Two (2) LED Monitor(s)
 - a. Acceptable Manufacturer(s)
 1. SAMSUNG
 - A. QB85R
 2. LG
 - b. LED Monitor shall meet or exceed the following minimum requirements:
 1. 85" diagonal
 2. Brightness 350 cd/m
 3. Rated for 16/7 run-time
 4. 8ms refresh rate
 5. 3840 x 2160 resolution (4K UHD)
 6. 16:9 aspect ratio
 7. Two (2) HDMI input ports
 8. RS232C In/out
 - c. Contractor shall supply and install appropriate mounts for supplied LED monitors, one (1) tilt mount Peerless ST660P or Chief equivalent shall be provided. See drawings for location.
 - d. All monitors shall be controlled through supplied audio-visual switcher system (on and off)
3. One (1) Wireless Presentation System shall be provided and installed.
 - a. Acceptable Manufacturers (in alphabetical order):

1. KRAMER
 - A. VIA GO2
 2. HDMI output with support for up to 4K30Hz video streaming
 3. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 4. 4GB Memory
 5. 32GB Storage
 6. 3.5mm Audio Output
 7. All other features currently a part of the manufacturer's latest commercial release.
- b. Cables and Accessories
1. 3' HDMI cable for connectivity to switcher
 2. All necessary mounting brackets and connectors to securely mount at teacher input location.
 3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - A. Patch cables shall not exceed fifteen (15) feet in length.
 4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - A. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - B. Coordinate all work with Owner, Designer and other contractors prior to installation.
 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
4. One (1) Voice Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)

1. LIGHTSPEED

A. 975

- b. Major components of the Voice Amplification System shall be carefully installed at rack location.
- c. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.

A. Two (2) Lightspeed volume control Flexmikes

- d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at rack location to support a fully functional and compliant system.
- e. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- f. All other features currently a part of the manufacturer’s latest commercial release.

5. Six (6) Audio Speakers shall be provided.

a. Acceptable Manufacturer:

1. LIGHTSPEED

2. Or equal.

- b. Speakers shall meet or exceed the following minimum standard requirements:
 - 1. 6” driver; 1” horn per speaker
 - 2. Frequency response: 40 Hz – 20 kHz
 - 3. Impedance of 8 Ohms
 - 4. Power handling of 30 watts

5. Speakers shall be mounted in fully enclosed, acoustically appropriate, metallic back boxes and fully supported by appropriate tile bridges.
 - c. Where flush mounting is not possible or practical, Contractor shall install surface mounted speakers meeting or exceeding all requirements above.
 - d. Where specific speaker location is in question, obtain Owner approval prior to any final installation activity.
 - e. All speakers shall include attractive finished white grill.
 - f. All speaker wire shall be 16 AWG high quality plenum rated cable.
 - g. All speaker cable shall be terminated at amplification system mounted at or near projectors.
6. One (1) Document Camera shall be provided and installed.
 - a. Acceptable Manufacturers
 1. Hovercam
 - A. Solo 8 Plus
 - b. Document cameras shall include full functionality of the following feature sets and/or standards in workstation software and in conjunction with proposed devices, and shall provide for all management, configuration and control features and/or standards from a workstation administrative interface:
 1. Software Control shall include, but not be limited to:
 - A. Zoom.
 - B. Focus.
 - C. Brightness.
 - D. White Balance.
 - E. Video capture.
 - c. Document camera software shall be installed by Owner on standard classroom workstations provided by Owner.
 - d. Document cameras shall meet or exceed the following minimum standards:

1. 4224x3156 Image Resolution (13MP)
2. 8x Digital Zoom.
3. 10x Mechanical Zoom.
4. Maximum tabletop camera capture field of 11" x 17".
5. USB 3.0 port connection to computer workstation to provide, but not be limited to the following.
 - A. Image "snapshot" capture.
 - B. Video capture.
 - C. Device control.
 - D. 25 frames per second video capture rate.
 - E. SD card slot.
 - F. Integrated microphone
 - G. LED illumination lamp.
 - H. 4K Video Resolution @ 30FPS
 - I. Auto focus adjustment with manual override.
 - J. Auto white balance.
 - K. Auto brightness adjustment with manual override.
- e. In the event of a power failure, system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- f. All other features currently a part of the manufacturer's latest commercial release.
7. One (1) Multi-media Infrastructure Cable and Faceplate
 - a. All cable shall be factory manufactured with terminations and connector assemblies fully attached and integral to the cable to industry published quality standards and meet performance requirements specified herein.
 - b. Infrastructure cable to connect projector to a wall plate shall be provided.

- c. Acceptable Cable:
 - 1. HD Base-T Digital Video Cable 1 shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - A. Cable shall meet or exceed Shielded Category 6a certification.
 - B. Cable shall be constructed of solid 23 AWG conductors.
 - C. Wall plate provided shall be constructed of commercial grade stainless steel.
 - 2. HD Base-T Digital Video Cable 2 shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - A. Cable shall meet or exceed Shielded Category 6a certification.
 - B. Cable shall be constructed of solid 23 AWG conductors.
 - C. Wall plate provided shall be constructed of commercial grade stainless steel.
 - 3. Wall plate shall contain connection points for all specified cables
 - 4. Two (2) data outlet locations.
 - 5. Unpopulated data connections shall all have blank covers installed.
 - 6. Any existing terminated category cabling should be securely locked into new plate and any existing labeling shall be transferred.
- d. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector location.
- e. Cable shall terminate in the following connector gender:
 - 1. HD-Base-T Digital Video 1 (Category 6a STP)
 - A. Terminate into an active HD-Base-T receiver and include an HDMI Type A 19 pin plug connector to display device.
 - B. Terminate in a 568-compliant type female jack located on the face plate.

2. HD-Base-T Digital Video 2 (Category 6a STP)
 - A. Terminate into an active HD-Base-T receiver and include an HDMI Type A 19 pin plug connector to display device.
 - B. Terminate in a 568-compliant type female jack located on the face plate.
8. Multimedia Infrastructure Cable Bundle shall be supplied as specified.
 - a. Fully assembled infrastructure cable bundles for each classroom indicated to receive a projector shall be provided for final connection to components and classroom plate by others.
 - b. Acceptable Manufacturer
 1. Cable shall be of commercial first-class quality manufacture.
 - c. All Cable shall be fifteen (15) feet in length and terminate in the following connector genders:
 1. HD-Base-T Shielded Category 6 patch cable 1 (M/M).
 2. HD-Base-T Shielded Category 6 patch cable 2 (M/M).
 3. Audio Speaker (L/R) with Speakon Female
 - A. to bare cable for connection to screw terminals on amplifier.
 4. Classroom Phone Black Category 6 Patch Cable (M/M).
 5. Wireless Presentation System Black Category 6 Patch Cable (M/M).
 - d. A single F6 Woven Split Braid Sleeving to contain and protect all associated cable secure with Velcro strips.
 1. Velcro strips shall be trimmed and flush with sleeving material.
 2. Velcro strips shall be loose enough for cable movement.
 3. Coordinate all color selections with Owner and Designer.
 4. Braided sleeving should be cut and sealed cleanly using a hot knife or similar tool.
 5. Coordinate power cable relationship into connection bundle with Owner and Designer.

6. Contractor shall supply appropriate metallic over the carpet raceway to extend data and AV cabling to circulation desk Legrand OFRBC-8 or equal.
7. Contractor shall supply power cord extension and surge suppressed power strip to be installed at the teacher input location. Power Strip shall contain six (6) grounded AC power connectors.
 - A. Tripp-Lite TLP615 or equal
 - B. Power cord should be sufficient length to support device attachment with 15' cable bundle and be neatly placed at teacher input location.
9. One (1) Classroom 3x2 matrix video switch shall be provided and installed.
 - a. Acceptable Manufacturers (in alphabetical order):
 1. ATLONA
 - A. AT-OME-MS42
 - b. One (1) USB C Input
 - c. Two (2) HDMI inputs
 1. One (1) Eight (8) foot HDMI cable for teacher PC connection.
 2. One (1) Eight (8) foot HDMI cable for connection to wireless presentation system.
 - d. 4K/UHD capability @ 60Hz – 1080p downscaling
 - e. Include appropriate HDBaseT receivers to be mounted at monitor locations
 - f. Discreet secondary output shall include appropriate HDBaseT transmit and receive pair
 - g. One HD-BaseT Output for connection at wall plate.
 - h. One discreet HDMI output for connection to HDBaseT transmit and receive pair
 - i. Audio de-embedding shall be provided and located at the desktop unit.
 - j. Stereo audio line level output

- k. Front panel source select with visual indication.
- l. Local power with power supply
- 10. Contractor shall integrate monitors with matrix switcher to automatically power on and off units. Contractors shall supply all cabling, labor and accessories for a fully functional system.
- 11. All other features currently a part of the manufacturer's latest commercial release.

E. SPECIAL CONFIGURATION E

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. High School Media Center
- 2. One (1) Mixer Amplifier shall be provided and installed.
 - a. Acceptable Manufacturers (in alphabetical order):
 - 1. JBL PRO
 - A. CSMA 1120
 - b. Four (4) inputs
 - c. One (1) output
 - d. 120 Watts
 - e. Fanless
 - f. Priority muting
 - g. Mixer Amplifier unit shall be installed at circulation desk
 - h. Contractor shall extend existing audio output of monitor to new mixer amplifier. Contractor shall supply necessary shielded cabling to extend audio output to circulation desk. Contractor shall supply all necessary cables, accessories and labor for a fully functional system.
- 3. Sixteen (16) Recessed Speakers shall be provided and installed
 - a. Acceptable Manufacturer(s)
 - 1. CRESTRON

A. SAROS IC6T-W-T-EACH

2. Or Equal

- b. Passive 2-way full range speaker
 - c. 6.5" Low Frequency Driver, .98-inch Voice Coil
 - d. 8 ohms
 - e. 90.5 dB sensitivity
 - f. 50Hz-20kHz +/- 3dB
 - g. Speakers shall be placed in locations throughout media center for even distribution of sound, final speaker locations to be reviewed by Owner and/or Designer.
 - h. Contractor shall include any necessary backbox and speaker protection for a fully functional and compliant system where applicable.
 - i. Contractor shall supply and install properly sized speaker cabling to support supplied speakers.
 - j. Speakers shall be white in color.
4. One (1) Voice Amplification System shall be provided and installed.

a. Acceptable Manufacturer(s)

1. LIGHTSPEED

A. 975 ACCESS LINK

- b. Major components of the Voice Amplification System shall be carefully installed at rack location.
- c. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.

A. Two (2) Lightspeed volume control Flexmikes

- d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at rack location to support a fully functional and compliant system.
- e. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- f. All other features currently a part of the manufacturer’s latest commercial release.
- g. Voice Amplification Systems shall be neatly and securely mounted at circulation desk. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from Lightspeed device to provided Mixer Amplifier.

F. SPECIAL CONFIGURATION F

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Middle School Cafeteria
- 2. One (1) Manual Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 - 1. DA-LITE
 - A. Model C with CSR
 - 2. DRAPER
 - b. Manual Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 78 x 139” – 159” Diagonal
 - d. White case
 - e. Controlled screen return
 - f. Matte white screen surface
 - g. Contractor shall supply all necessary mounting materials and labor for safe and fully functional installation.
- 3. One (1) Projector

- a. Acceptable Manufacturer(s)
 - 1. EPSON
 - A. L630U
 - b. 6,300 Lumens
 - c. Projector shall be securely installed and affixed to mounting system and downpipe that is structurally attached to finished ceiling. Contractor shall supply appropriate mount and downpipe to securely and safely extend projector to optimal location for projection onto Contractor provided screen.
 - d. Provided white projector downpipe shall allow routing of projector cabling internally.
 - e. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.
 - f. Contractor shall supply and install audio cable to connect projector audio output to existing amplification/mixer system.
 - g. Contractor shall integrate provided projector with Owner provided video matrix system.
4. One (1) Wireless Presentation System shall be provided and installed.
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. KRAMER
 - A. VIA GO2
 - 2. HDMI output with support for up to 4K30Hz video streaming
 - 3. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 - 4. 4GB Memory
 - 5. 32GB Storage
 - 6. 3.5mm Audio Output
 - 7. All other features currently a part of the manufacturer's latest commercial release.

- b. Cables and Accessories
 - 1. 3' HDMI cable for connectivity to switcher
 - 2. All necessary mounting brackets and connectors to securely mount at teacher input location.
 - 3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - A. Patch cables shall not exceed fifteen (15) feet in length.
 - 4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - A. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - B. Coordinate all work with Owner, Designer and other contractors prior to installation.
 - 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
 - 6. Contractor shall integrate provided Wireless presentation device with existing matrix switcher.
- 5. One (1) Voice Amplification System shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 - 1. LIGHTSPEED
 - A. 975 ACCESS LINK
 - b. Major components of the Voice Amplification System shall be carefully installed at rack location.
 - c. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.

2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 - A. Two (2) Lightspeed volume control Flexmikes
 - d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at rack location to support a fully functional and compliant system.
 - e. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
 - f. All other features currently a part of the manufacturer’s latest commercial release.
 - g. Voice Amplification Systems shall be neatly and securely mounted at Contractor provided rack. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from Lightspeed device to provided DSP/Mixer.
6. One (1) Document Camera shall be provided and installed.
 - a. Acceptable Manufacturers
 1. Hovercam
 - A. Solo 8 Plus
 - b. Document cameras shall include full functionality of the following feature sets and/or standards in workstation software and in conjunction with proposed devices, and shall provide for all management, configuration and control features and/or standards from a workstation administrative interface:
 1. Software Control shall include, but not be limited to:
 - A. Zoom.
 - B. Focus.
 - C. Brightness.
 - D. White Balance.
 - E. Video capture.
 - c. Document camera software shall be installed by Owner on standard classroom workstations provided by Owner.

- d. Document cameras shall meet or exceed the following minimum standards:
 - 1. 4224x3156 Image Resolution (13MP)
 - 2. 8x Digital Zoom.
 - 3. 10x Mechanical Zoom.
 - 4. Maximum tabletop camera capture field of 11" x 17".
 - 5. USB 3.0 port connection to computer workstation to provide, but not be limited to the following.
 - A. Image "snapshot" capture.
 - B. Video capture.
 - C. Device control.
 - D. 25 frames per second video capture rate.
 - E. SD card slot.
 - F. Integrated microphone
 - G. LED illumination lamp.
 - H. 4K Video Resolution @ 30FPS
 - I. Auto focus adjustment with manual override.
 - J. Auto white balance.
 - K. Auto brightness adjustment with manual override.
- e. In the event of a power failure, system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- f. All other features currently a part of the manufacturer's latest commercial release.

2.17 ALLOWANCES

- A. Contractor shall include allowances for equipment and/or other contract service reimbursements as required below in base bid lump sum amount(s). Equipment and/or contract services shall be provided and sourced at Owner's discretion and convenience with full cooperation by Contractor and paid for

from successful bidder's contract in the amount(s) provided for herein. Any allowance amount proving to be excessive for the intended equipment and/or contract services shall be credited to the Owner against contract payment requests.

1. Allowance shall be made in the amount of \$10,000.00 for Owner directed infrastructure upgrades.
2. Allowance shall be made in the amount of \$50,000.00 for Owner directed electrical upgrades for provided equipment.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer, Construction Manager and Owner verifying equipment and material locations as well as mounting and placement requirements prior to commencement of other installation activities.
- B. Contractor shall ensure all submittals and have been provided to, and approval has been obtained from Designer and Owner prior to commencement of any final installation activities. Submittals shall include, but not be limited to:
 1. Shop drawings, data sheets and system diagrams including specific cable connectors and types proposed to be installed.
 2. Asset tag format, composition, attachment method and location on each serialized component being provided.
 3. Firmware configuration template to be used for each component provided.
 4. Written installation, coordination and test procedure to be followed by installing technicians and engineers.
 5. Final documentation template.

3.02 INSTALLATION

- A. Contractor shall be familiar with the environment where work will be done as specified herein and make every reasonable effort to minimize interference with Owner's or other contractor's activities.
 1. Appendices depicting general ceiling conditions for areas of buildings are included herein. Contractors shall field verify specific room conditions.
- B. Work Areas shall be cleaned at the end of each day. All debris shall be cleared, removed and disposed of off premise. All equipment and tools shall

be removed from common areas and stored in approved, secure storage locations.

1. Owner shall not be responsible for disposal or transportation of any packaging materials or other waste items.
2. Owner's waste containers including site dumpsters shall not be used for material disposal.

C. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.

D. Removal & Storage of Existing Equipment

1. Contractor shall carefully remove existing equipment including but not limited to all connecting cables, accessory items, and transport them to location indicated by Owner for Owner disposition.

E. The Contractor shall furnish, set in place, and install all equipment necessary for a fully compliant and operational system as specified herein. The installation process includes, but is not limited to the following:

1. Inventory receipt of all components and equipment.
2. Storage of all equipment and components until such time those items are installed according to the specifications.
3. Transport equipment to the Owner's installation location(s).
4. Assemble, install, configure and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
5. Collect all information necessary to accurately program all system devices to the Owner's intended use and need.
6. Label with asset tags and other markings provided by Owner all system devices as may be appropriate and required by Owner and Designer.
7. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment. Work shall conform to "best practices" observed by industry professional installers and as required by Owner and Designer.
8. Work shall include careful coordination and cooperation with others to insure a timely, cost effective and proper installation for Owner's intended

application. Such efforts shall include, but not be limited to, coordinating and cooperating with other contractors, Owner, Designer and Engineer.

9. Where cables are to be routed through or on a finished wall, standard connectors must be used at the wall location to terminate call cables. All wall plates shall be stainless steel. Plastic or nylon plates shall not be acceptable. Cables routed out of a wall box on a finished wall without proper standard connection termination shall not be acceptable.
10. All cables shall be proper and adequately supported using hooks or rings no more than eight feet (8') apart. Cables supported by structural steel, ceiling grid or hanger wires will not be acceptable. All cable routing shall be neat and orderly.
11. All cable connecting components mounted in/on Technology Cart, shall have adequate cable slack to provide for full system inspection and or service without the removal (intentional or inadvertent) of connecting cables, including items that will be placed on the keyboard tray of equipment carts.
12. Label all cable connections for intuitive user access and as directed by Owner and Designer.
13. Work may include extending cables from installed equipment, and as required and/or specified herein, to Owner identified connection outlets.
 - a. Work includes supply, connection and testing of any such cables.
 - b. Cables for some devices may be routed in air plenum spaces, above finished ceilings, or in other ways require special care and suitable tools to complete. Where air plenum status is in question and/or may change, plenum rated cable shall be used.
14. DEMOLITION
 - a. Contractor shall be responsible for removal and disposal of all abandoned audio-visual cabling, including all connectors, faceplates and connecting cables.
 - b. If faceplates are completely removed, a color matched blank plate shall be put in its place. Faceplates that remain must have proper color matched blanks installed for a finished professional installation.
 - c. Contractors shall remove all existing in-classroom abandoned AV cabling including all VGA, audio cabling, cable tv, speakers, shelving, mounting brackets, screens and accessories shall be completely removed and disposed of by Contractor.

- d. Contractor shall remove any remaining CRT mounts from ceiling locations and install Owner supplied ceiling tile.
- e. Contractor shall remove and transport all classroom technology components to technology office for Owner review. All unwanted components shall be disposed of by Contractor.
- f. Contractors shall remove and dispose of all excess materials and packaging as directed by Owner.
- g. Contractor shall supply and install any necessary stainless steel blank plates to cover any abandoned openings.

15. PROJECTION SYSTEMS (CEILING MOUNT AND SHORT THROW)

- a. Install, configure, and test approved firmware configuration template including, but not limited to:
 - 1. Power on Image.
 - 2. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
 - 3. Default port selection.
 - 4. Audio pass-through while projector is in off position.
- b. Neatly configure all cables as directed by Owner.
- c. Attach projector to projector mounting bracket.
- d. Connect AC power using cord provided to projector.
- e. Align projector with screen to fill entire usable area.
- f. Set keystone adjustment(s) as required.
- g. Zoom and focus projector as required.
- h. Secure all adjustment points.
- i. Remove and dispose of all abandoned existing screens, brackets, excess materials, and packaging as directed by Owner.

16. PROJECTOR CEILING PLATES AND MOUNTING BRACKETS

- a. Install projector ceiling plate in ceiling grid. Securely mount steel tie wires to building structure and attach to ceiling plate at a minimum of four mounting points.

- b. Projector downpipes and mounting brackets shall be securely attached to new ceiling plates ensuring a tight threaded connection.

17. MULTIMEDIA INFRASTRUCTURE CABLE

- a. Multimedia infrastructure cable shall be installed in a manner that adheres to industry standards. Cables shall be supported by appropriate cable supports at a minimum of 8' intervals. Cables shall not be placed upon ceiling tiles or ran with high voltage AC power.

18. AUDIO SPEAKERS

- a. Where classroom speakers are to be installed in drop ceilings, they shall be near flush mount and cleanly cut into available tiles for optimal and uniform audio fill of the relevant classroom space. Where flush mounting is not possible or practical, Contractor shall install surface mounted speakers meeting or exceeding all requirements above.
- b. Speaker cable shall be installed in a manner that adheres to industry standards. Cables shall be supported by appropriate cable supports at a minimum of 5' intervals. Cables shall not be placed upon ceiling tiles or ran with high voltage AC power.
- c. Speakers shall be free of any hum or buzzing noises.
- d. Speakers shall be mounted in fully enclosed, acoustically appropriate, metallic back boxes and fully supported by appropriate tile bridges.
- e. Connect output of projector to input of amplifier and connect audio speakers to amplified output.

19. DOCUMENT CAMERAS

- a. Connect AC power to outlet provided by others.
- b. Connect to document camera input location.
- c. Fully cooperate and coordinate with others for classroom workstation software installation. Installation will be performed by Owner.

20. PROJECTOR SCREENS

- a. Mount and test screens.
- b. Ensure proper CSR calibration.
- c. Coordinate installation location as to not obstruct any clock displays, emergency signal equipment, speakers, or other devices that are in use.

21. SWITCHER (BOTH TYPE 1 AND 2)

- a. Connect all video input and output device cables.
- b. Secure mounting location at teacher input location with mounting screws or Velcro pads to eliminate voluntary movement.
- c. Secure mounting location at video projector for receiver.
- d. Neatly route all cabling and secure slack.
- e. Load Owner approved software program template.

22. VOICE AMPLIFICATION SYSTEM

- a. Connect all audio input and output device cables.
- b. Secure mounting location at teacher input location with mounting screws or Velcro pads to eliminate involuntary equipment movement.
- c. Neatly route all cabling and secure slack.
- d. Adjust balance levels for standard configuration.
 - 1. Neatly route all cabling and secure slack.

23. WIRELESS PRESENTATION SYSTEM

- a. Connect all video input and output device cables.
- b. Secure mounting location at teacher desk with Velcro or rubber feet eliminate involuntary equipment movement. If mounting brackets are necessary Contractor shall supply all parts and accessories for a fully functional installation.
- c. Neatly route all cabling and secure slack.
- d. Contractor shall be responsible for connecting presentation system to existing network.
- e. Contractor shall be responsible for fully configuring network connectivity and enabling the device for management using manufacturer recommended settings.
- f. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.

- g. Load Owner approved software program template.
- F. It shall be the responsibility of the Contractor to repair or replace any damage done to the structure of finishes in the building by the Contractor. If in the course of work, Contractor damages, marks or misplaces any surfaces or access plates/panels the Contractor shall repair and/or replace the surface, plate or panel to the original condition.
 - 1. Repairs shall include, but not be limited to patching and painting.
 - 2. Final determination as to the damage condition and/or repair/replacement fitness of any surface, plate or panel shall be the sole responsibility of the Designer.
 - 3. The building and work area shall be returned to its original condition prior to final sign off of the project.
- G. Following installation and system “turn-up”, but prior to final acceptance of the system, Contractor shall conduct follow-up interviews with Owner identified administrators and staff to review system functionality, suitability and confirm feature and program fitness for Owner applications.
 - 1. Follow-up interviews shall be fully documented by Contractor and submitted to Owner for approval.
- H. All cable and device labels shall match existing standard.
 - 1. Sites of Work:
 - a. Mason High School
1001 S. Barnes Street
Mason, Michigan 48854
 - b. Mason Middle School
235 Temple Street
Mason, Michigan 48854

3.03 TESTING

- A. In an effort to ensure a smooth “turn-up” of the new system Contractor shall submit to a thorough testing process as defined herein prior to cut-over.
- B. Prior to requesting testing by Designer, the Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements, meets the owner’s specific application requirements and is ready for functionality and integrity testing.

C. Testing Procedures

1. Prior to system “turn-up”, Contractor shall submit a written request and proposed test plan to Designer indicating they have completed full and final configuration of the system, and are ready to have system integrity and functionality tested.
2. Within reasonable time after receipt of request, Designer will accept or revise the proposed test plan, provide a test schedule and coordinate testing date(s) with Owner and Contractor.
3. Should Designer determine the Work is not acceptably configured or not of adequate integrity:
 - a. Designer promptly will so notify Contractor, giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 - b. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-testing.
 - c. Designer will schedule re-test of the Work.
 - d. Excessive re-testing of Work may result in fees being assessed Contractor.
4. Should Designer and Owner concur the Work is configured properly and system integrity is as required:
 - a. Designer will review Contractors detailed “turn-up” plan, and upon finding it acceptable issue a memorandum of Testing Completion to Owner and Contractor after which system “turn-up” can proceed.

3.04 DOCUMENTATION

- A. Contractor shall, throughout the completion of the project, provide Owner a file storage system that shall include all necessary equipment, including if reasonably required, file drawers, folders, dividers, etcetera, to contain all as-built drawings, owner’s manuals of all equipment installed, warranty and maintenance information and other information the Contractor, Designer and/or Owner deem necessary. Documentation shall also be provided in a digital format in file formats and on media as specified by Owner and/or Designer.
- B. Contractor shall be responsible for providing thorough, timely documentation on all hardware, software. Documentation shall include, but not be limited to:
 1. Equipment description.

2. Equipment make.
3. Model number.
4. Software release.
5. Date installed.
6. Manufacturer's warranty.
7. Maintenance contract terms.
8. Verification of maintenance contract engagement.
9. Telephone numbers for service and support.
10. Detailed technical support and service procedure instructions.
11. All product (hardware and software) manuals and manufacturer supplied documentation, including, but not limited to owner manuals, system administrator manuals and configuration guides. Where number of duplicate copies for particular manual or documentation item could be reasonably considered excessive, Contractor shall request direction from Owner and Designer.
12. Photocopy of original invoice listing make and model for all components and equipment from individual manufacturer(s), distribution source(s), or authorized agent(s) to establish manufacturer warranty start date for potential use after end of contract warranty provisions.
13. CAD or Visio as built drawings/diagrams for each building.
14. System Configuration Report.
15. Complete inventory of installed hardware and system software including, but not be limited to, model numbers, IP address, Ethernet MAC address, serial numbers, physical installation location and software options.

3.05 TRAINING

- A. No training shall be conducted prior to training outline and/or syllabus being approved by Owner, Instructional or overview activities conducted without prior content approval with not be deemed contract training, and Contractor shall remain responsible for delivery of approved training.
- B. Contractor shall provide training for the Owner designated system administrator(s). Owner shall designate up to four (4) administrators to be trained. Training shall be a minimum of one (1), two (2) hour sessions in length, at the convenience of the Owner personnel, and of sufficient duration

to satisfactorily complete training on all system administration functions including, but not limited to:

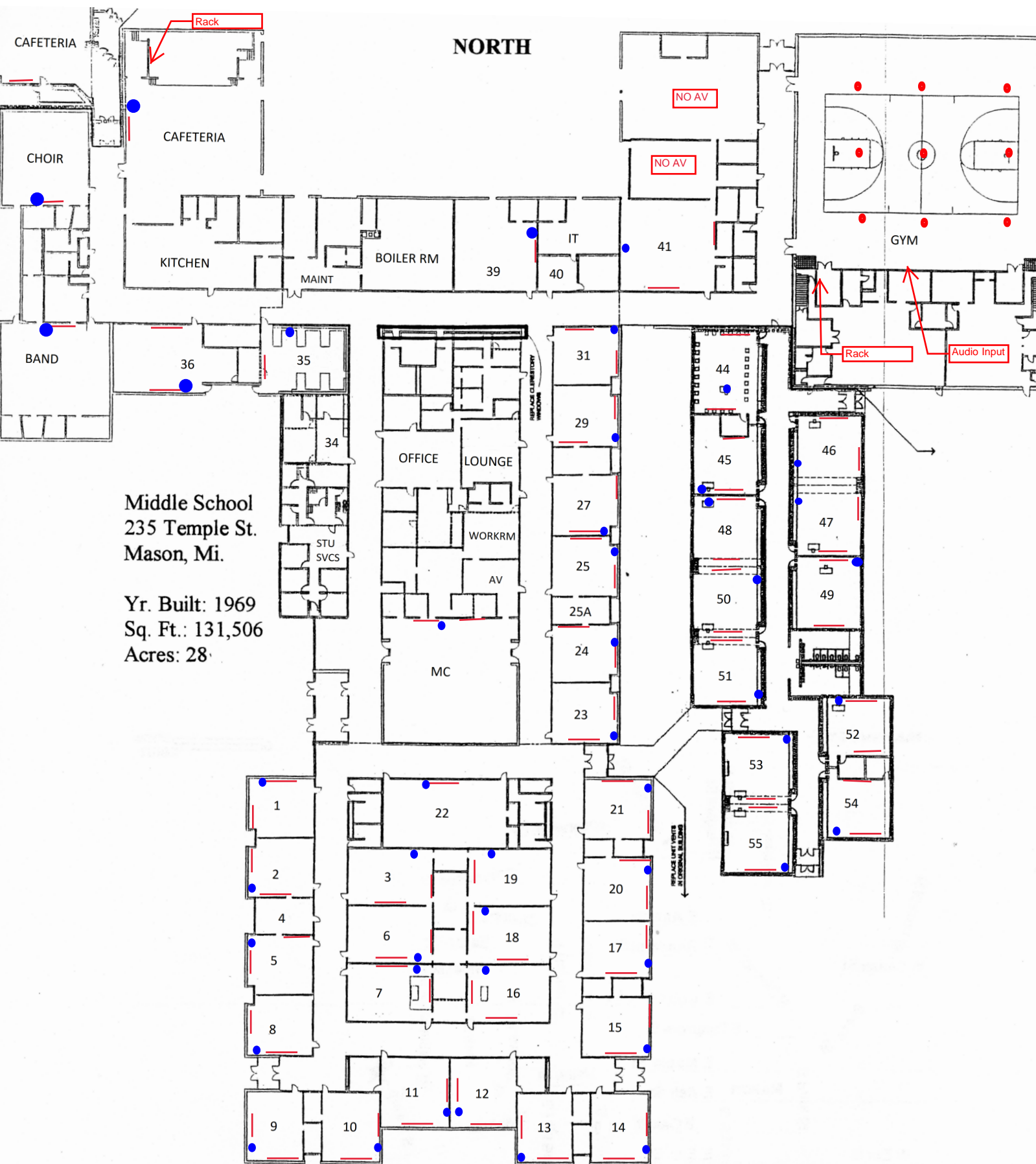
1. Basic trouble shooting of the installed system and components including diagnostic and problem resolution actions.
 2. System back-up and restore functions and procedures for all system parameters and configurations.
 3. Device additions, moves and changes as well as reconfiguration.
 4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to and system configuration changes.
- C. Contractor shall provide end user training for classroom instructors district wide via the development of video training segments to be posted on an internal website for distribution. Training shall be available prior to substantial completion. End user video training segments shall include, but not limited to the following:
1. System power up and power down.
 2. Source selection.
 3. Volume control.
 4. Voice amplification use.
 5. Document camera operation.
 6. System care and classroom maintenance best practices.
 7. Equipment cart relocation and adjustments.
 8. Screen operation and care.
 9. Problem reporting.
- D. "First day" training support shall be provided for all buildings (district wide) during a day agreed upon by the Owner. This training support shall provide users with assistance in problem diagnostics and "first day" operations of installed equipment. Adequate numbers of qualified support trainers shall be deployed to provide users with thirty (30) minute or less response on all support training requests. Owner will designate the appropriate day for this training to take place.

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Post bid Interviews: Week of October 31, 2022
 2. Contractor Chosen: Week of November 14, 2022
 3. Work Commences: March 1, 2023
 4. Substantial Completion of Project: June 1, 2023
 5. Project Close-out: August 1, 2023
- B. Planned sequence of operations shall be established by the Contractor within the guidelines established by the Owner, as required herein and as required to meet schedules.
- C. All work shall be coordinated with Owner's construction manager on site.
- D. Project progress meetings shall be held, but not limited to, weekly at a site and time identified as convenient for Owner and as required herein. Meetings will be attended as required herein.

END OF SECTION



Middle School
235 Temple St.
Mason, Mi.

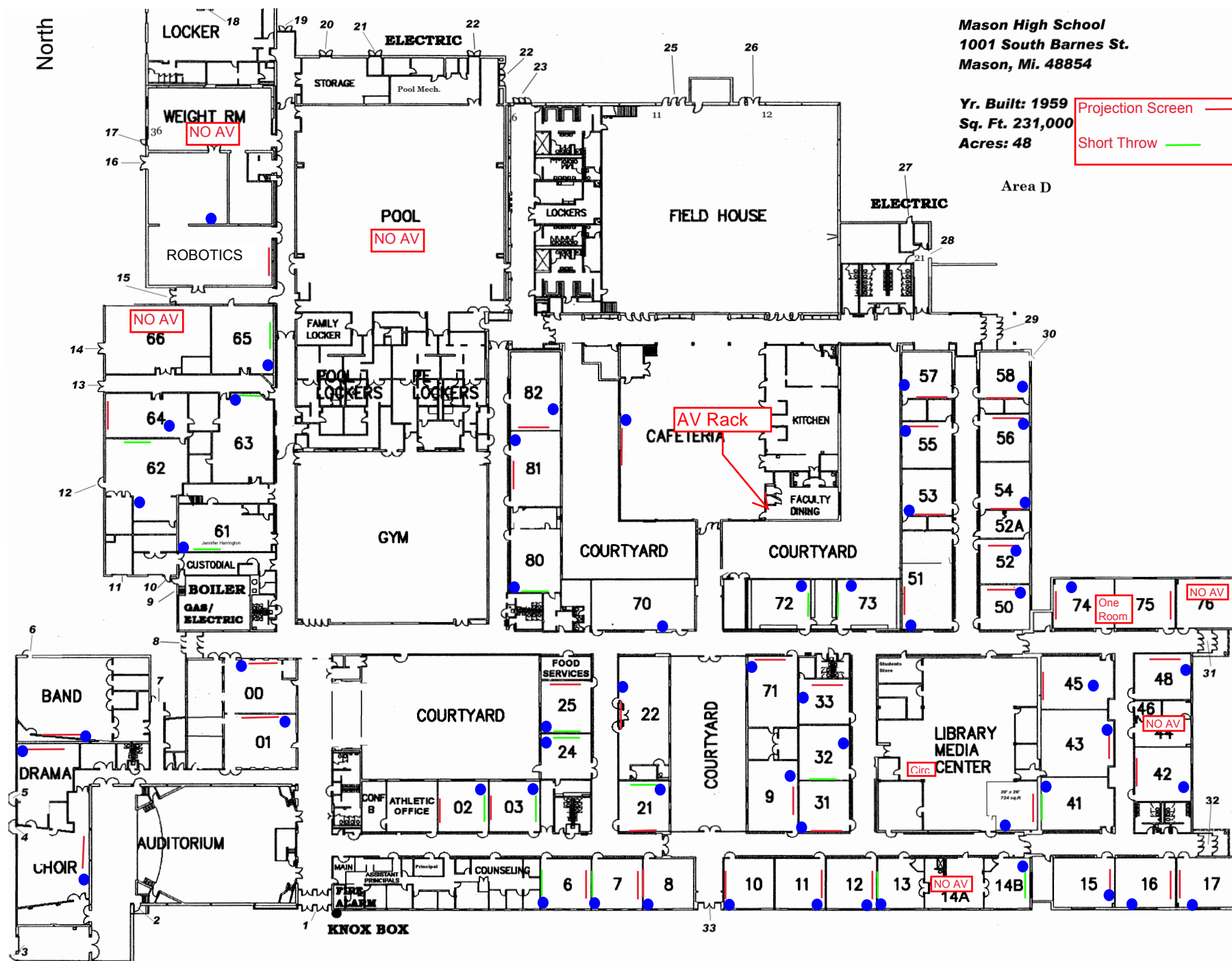
Yr. Built: 1969
Sq. Ft.: 131,506
Acres: 28

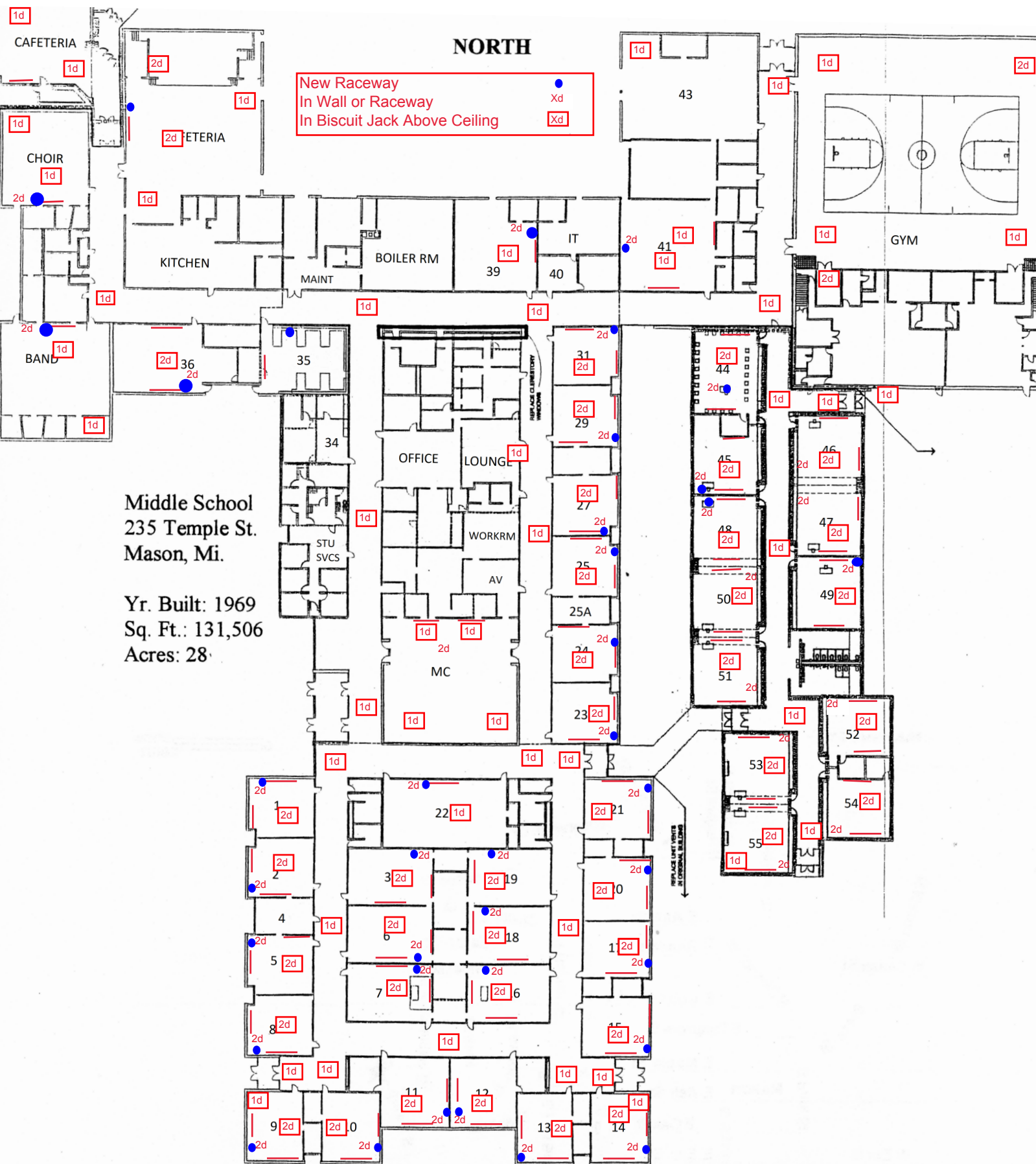
Mason High School
1001 South Barnes St.
Mason, Mi. 48854

Yr. Built: 1959
Sq. Ft. 231,000
Acres: 48

Projection Screen —

Short Throw —





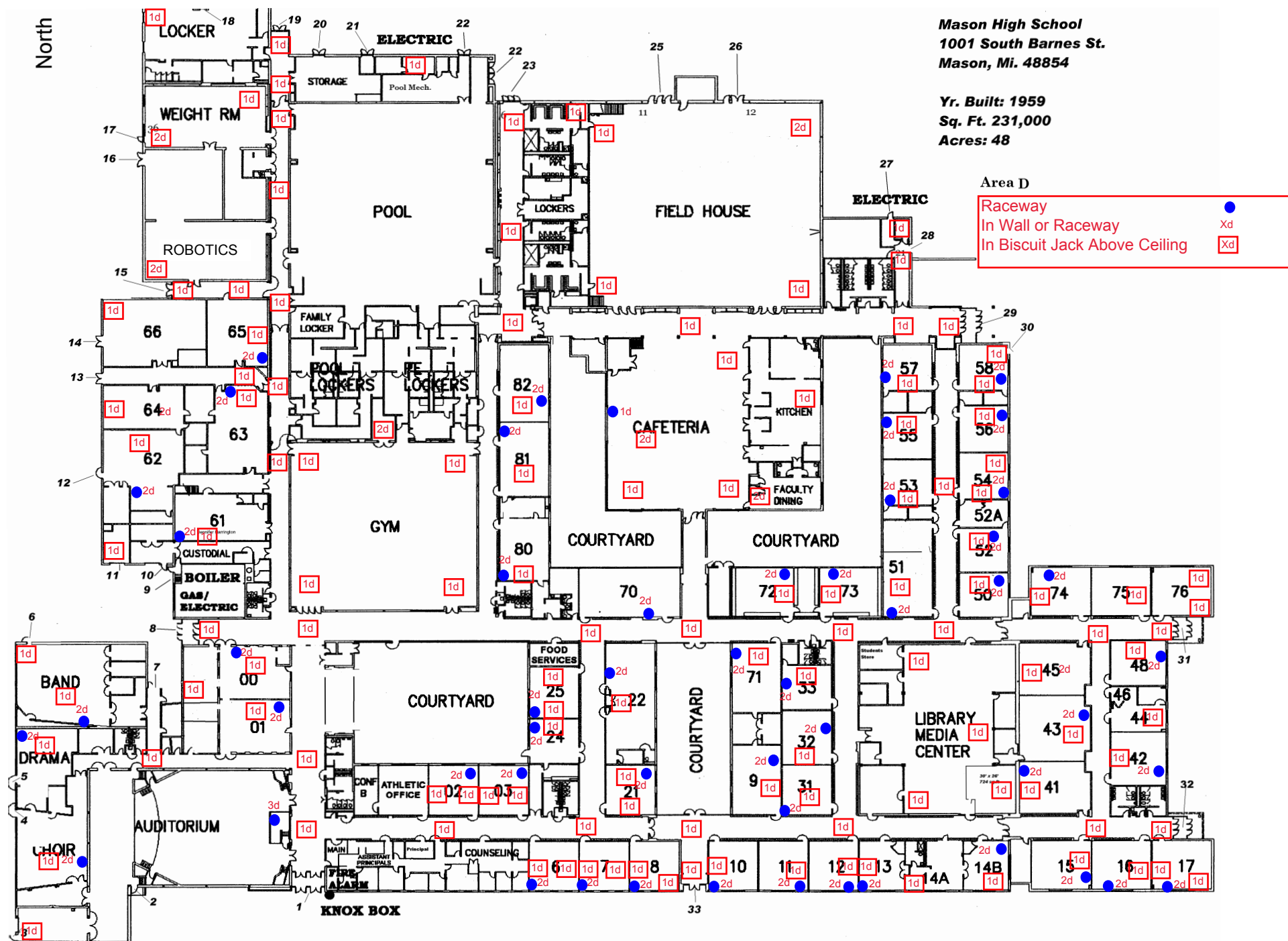
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Mason High School
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Yr. Built: 1959
Sq. Ft. 231,000
Acres: 48

Raceway
In Wall or Raceway
In Biscuit Jack Above Ceiling



Appendix C - AV Equipment List - Mason High School

Room	Short Throw Projector	Ceiling Mounted Projector	8' Screen	Switcher - Type 1 - One Output	Switcher - Type 2 - Matrix	Wireless Presentation	Document Camera	Voice Amplification	Speakers	Raceway	Over the Board Mount	Standard Markerboard	Notes for bid document
Band	0	0	0	0	0	0	0	0	0	1	0		Special configuration C - See section 2.16
Drama	0	1	1	1	0	1	1	1	6	1	0		
Choir	0	0	0	0	0	0	0	0	0	1	0		Special configuration C - See section 2.16
00 - Art	0	1	1	1	0	1	1	1	6	1	0		
01 - Art	0	1	1	1	0	1	1	1	6	1	0		
2 - Math	1	1	1	0	1	1	1	1	4	1	1		
3 - Math	1	1	1	0	1	1	1	1	4	1	1		
6 - Math	1	1	1	0	1	1	1	1	4	1	1		
7 - Math	1	1	1	0	1	1	1	1	4	1	1		
8	0	1	1	1	0	1	1	1	4	1	0		
9 - Spanish	0	1	1	1	0	1	1	1	4	1	0		
10	0	1	1	1	0	1	1	1	4	1	0		
11	0	1	1	1	0	1	1	1	4	1	0		
12	0	1	1	1	0	1	1	1	4	1	0		
13 - Spec Ed	1	0	0	1	0	1	1	1	4	1	1		
14 - Spec Ed (14B on Map - NO AV in 14A)	1	0	0	1	0	1	1	1	4	1	1		
15	0	1	1	1	0	1	1	1	4	1	0		
16	0	1	1	1	0	1	1	1	4	1	0		
17	0	1	1	1	0	1	1	1	4	1	0		
21 - Math	1	1	1	0	1	1	1	1	4	1	0	16"	
22	0	1	1	1	0	1	1	1	4	1	0		
24 - Spec Ed	1	0	0	1	0	1	1	1	4	1	0	16"	
25 - Math	1	1	1	0	1	1	1	1	4	1	0	16"	
31	0	1	1	1	0	1	1	1	4	1	0		
32 SPED	1	0	1	1	0	1	1	1	4	1	1		
33	0	1	1	1	0	1	1	1	4	1	0		
Media Center (LAB Only)	0	1	1	1	0	1	1	1	4	0	0		
Media Center Main Area	0	0	0	0	0	0	0	0	0	0	0		Special configuration E - See section 2.16
41 - Math	1	1	1	0	1	1	1	1	4	1	0	16"	
42	0	1	1	1	0	1	1	1	4	1	0		
43	0	1	1	1	0	1	1	1	4	1	0		
44	0	0	0	0	0	0	0	0	0	0	0		
45 - C. Lab	0	1	1	1	0	1	1	1	4	0	0		
48	0	1	1	1	0	1	1	1	4	1	0		
50	0	1	1	1	0	1	1	1	4	1	0		
51	0	1	1	1	0	1	1	1	4	1	0		
52	0	1	1	1	0	1	1	1	4	1	0		
53	0	1	1	1	0	1	1	1	4	1	0		
54	0	1	1	1	0	1	1	1	4	1	0		
55	0	1	1	1	0	1	1	1	4	1	0		
56	0	1	1	1	0	1	1	1	4	1	0		
57	0	1	1	1	0	1	1	1	4	1	0		
58	0	1	1	1	0	1	1	1	4	1	0		
61 Science	1	0	0	1	0	1	1	1	6	1	0	12"	
62 Science	1	0	0	1	0	1	1	1	6	1	0	16"	
63 Science	1	0	0	1	0	1	1	1	6	1	0	12"	
64 Drafting	0	1	1	1	0	1	1	1	4	0	0		
65 Science	1	0	0	1	0	1	1	1	4	1	0	12"	
66 - Wood Shop	0	0	0	0	0	0	0	0	0	0	0		
70 - Science	1	0	0	1	0	1	1	1	4	1	0	12"	
71 - Science	1	0	0	1	0	1	1	1	4	1	0	12"	
72 - Science	1	0	0	1	0	1	1	1	4	1	0	12"	
73 - Science	1	0	0	1	0	1	1	1	4	1	1		
74 and 75	0	2	2	0	1	1	1	1	6	1	0		

Appendix C - AV Equipment List - Mason High School

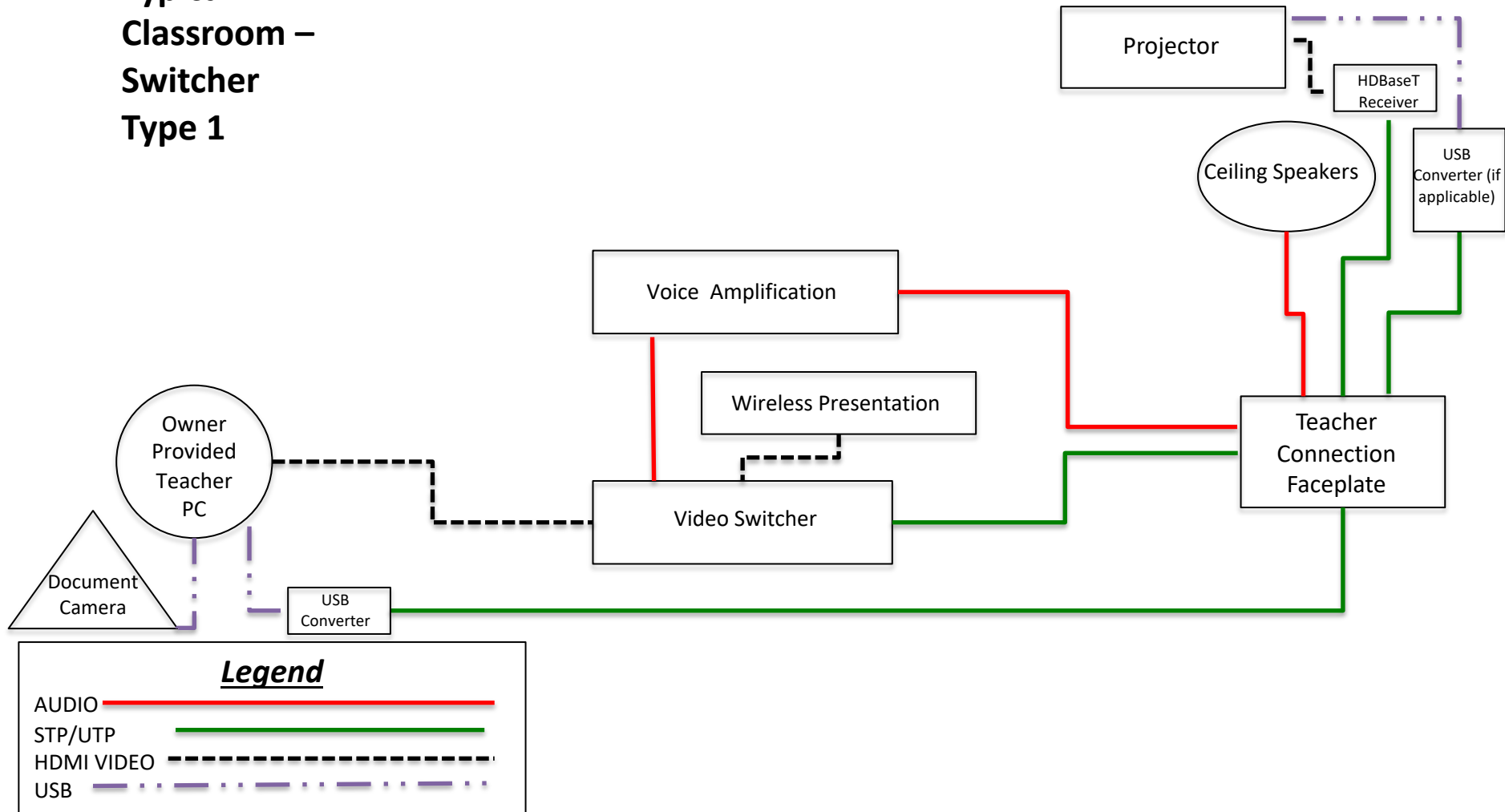
Room	Short Throw Projector	Ceiling Mounted Projector	8' Screen	Switcher - Type 1 - One Output	Switcher - Type 2 - Matrix	Wireless Presentation	Document Camera	Voice Amplification	Speakers	Raceway	Over the Board Mount	Standard Markerboard	Notes for bid document
76	0	0	0	0	0	0	0	0	0	0	0		
80 - Science	1	0	0	1	0	1	1	1	4	1	0	12"	
81	0	1	1	1	0	1	1	1	4	1	0		
82	0	1	1	1	0	1	1	1	4	1	0		
Cafeteria	0	0	0	0	0	0	0	0	0	0	0		Special configuration B - See section 2.16
Robotics	0	0	0	0	0	0	0	0	0	0	0		Special configuration F - See section 2.16
Weight Room	0	0	0	0	0	0	0	0	0	0	0		
Gym	0	0	0	0	0	0	0	0	0	0	0		
Total	20	40	41	44	8	52	52	52	222	51	8		

Appendix C - AV Equipment List - Mason Middle School

Room	Ceiling Mounted Projector	Projector Ceiling Plate and Mounting Bracket	10' Screen	8' Screen	6' Screen	Switcher - Type 1 - One Output	Switcher - Type 2 - Matrix	Wireless Presentation	Document Camera	Voice Amplification	Speakers	Raceway	Notes to include in bid document
1	2	1	0	2	0	0	1	1	1	1	4	1	
2	2	1	0	2	0	0	1	1	1	1	4	1	
3	2	1	0	1	1	0	1	1	1	1	4	1	
5	2	1	0	2	0	0	1	1	1	1	4	1	
6	2	1	0	2	1	0	1	1	1	1	4	1	
7	2	1	0	2	0	0	1	1	1	1	4	0	
8	2	1	0	2	0	0	1	1	1	1	4	1	
9	2	1	0	2	0	0	1	1	1	1	4	1	
10	2	1	0	2	0	0	1	1	1	1	4	1	
11	2	1	0	2	0	0	1	1	1	1	4	1	
12	2	1	0	2	0	0	1	1	1	1	4	1	
13	2	1	0	2	0	0	1	1	1	1	4	1	
14	2	1	0	2	0	0	1	1	1	1	4	1	
15	2	1	0	2	0	0	1	1	1	1	0	1	
16	2	1	0	2	0	0	1	1	1	1	4	1	
17	2	1	0	2	0	0	1	1	1	1	4	1	
18	2	1	0	2	1	0	1	1	1	1	4	1	
19	2	1	0	2	1	0	1	1	1	1	4	1	
20	2	1	0	2	0	0	1	1	1	1	4	1	
21	2	1	0	2	0	0	1	1	1	1	4	1	
22 - LGI	1	0	0	0	0	1	0	1	1	1	6	1	
23	2	1	0	2	0	0	1	1	1	1	4	1	
24	2	1	0	2	0	0	1	1	1	1	4	1	
25	2	1	0	2	0	0	1	1	1	1	4	1	
27	2	1	0	2	0	0	1	1	1	1	4	1	
29	2	1	0	2	0	0	1	1	1	1	4	1	
31	2	1	0	2	0	0	1	1	1	1	4	1	
35	1	1	0	1	0	1	0	1	1	1	6	1	
36	2	1	0	2	0	0	1	1	1	1	4	1	
Band	0	0	0	0	0	0	0	0	0	0	0	0	Special configuration C - See section 2.16
Choir	0	0	0	0	0	0	0	0	0	0	0	0	Special configuration C - See section 2.16
Cafeteria	0	0	0	0	0	0	0	0	0	0	0	0	Special configuration F - See section 2.16
39 - Art	1	0	1	0	0	1	0	1	1	1	6	1	
41 - Wood Lab	2	1	0	1	0	0	1	1	1	1	6	0	
43 - Wood	0	0	0	0	0	0	0	0	0	0	0	0	
44	2	1	0	2	0	0	1	1	1	1	6	0	
45	2	1	0	2	0	0	1	1	1	1	4	1	
46	2	1	0	2	0	0	1	1	1	1	4	0	
47	2	1	0	2	0	0	1	1	1	1	4	0	
48	2	1	0	2	0	0	1	1	1	1	4	0	
49	2	1	0	2	0	0	1	1	1	1	4	1	
50	2	1	0	2	0	0	1	1	1	1	4	0	
51	2	1	0	2	0	0	1	1	1	1	4	0	
52	2	1	0	2	0	0	1	1	1	1	4	0	
53	2	1	0	2	0	0	1	1	1	1	4	0	
54	2	1	0	2	0	0	1	1	1	1	4	0	
55	2	1	0	2	0	0	1	1	1	1	4	0	
Gym	0	0	0	0	0	0	0	0	0	0	0	0	Special configuration A - See section 2.16
Media Center	0	0	0	0	0	0	0	0	0	0	0	0	Special configuration D - See section 2.16
Total	83	41	1	79	4	3	40	43	43	43	178	31	

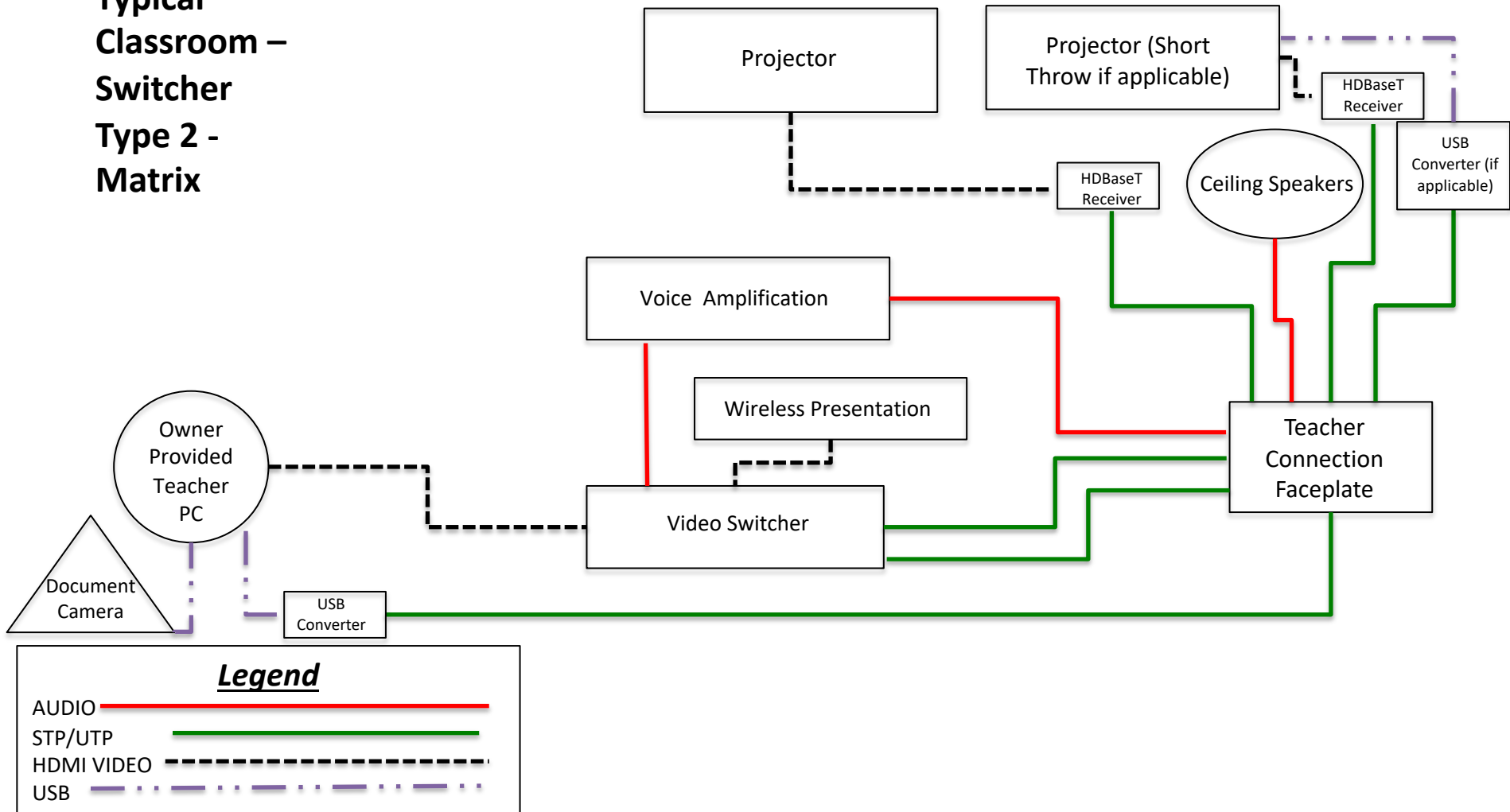
Typical Classroom – Switcher Type 1

Appendix D - Connection Line Diagram



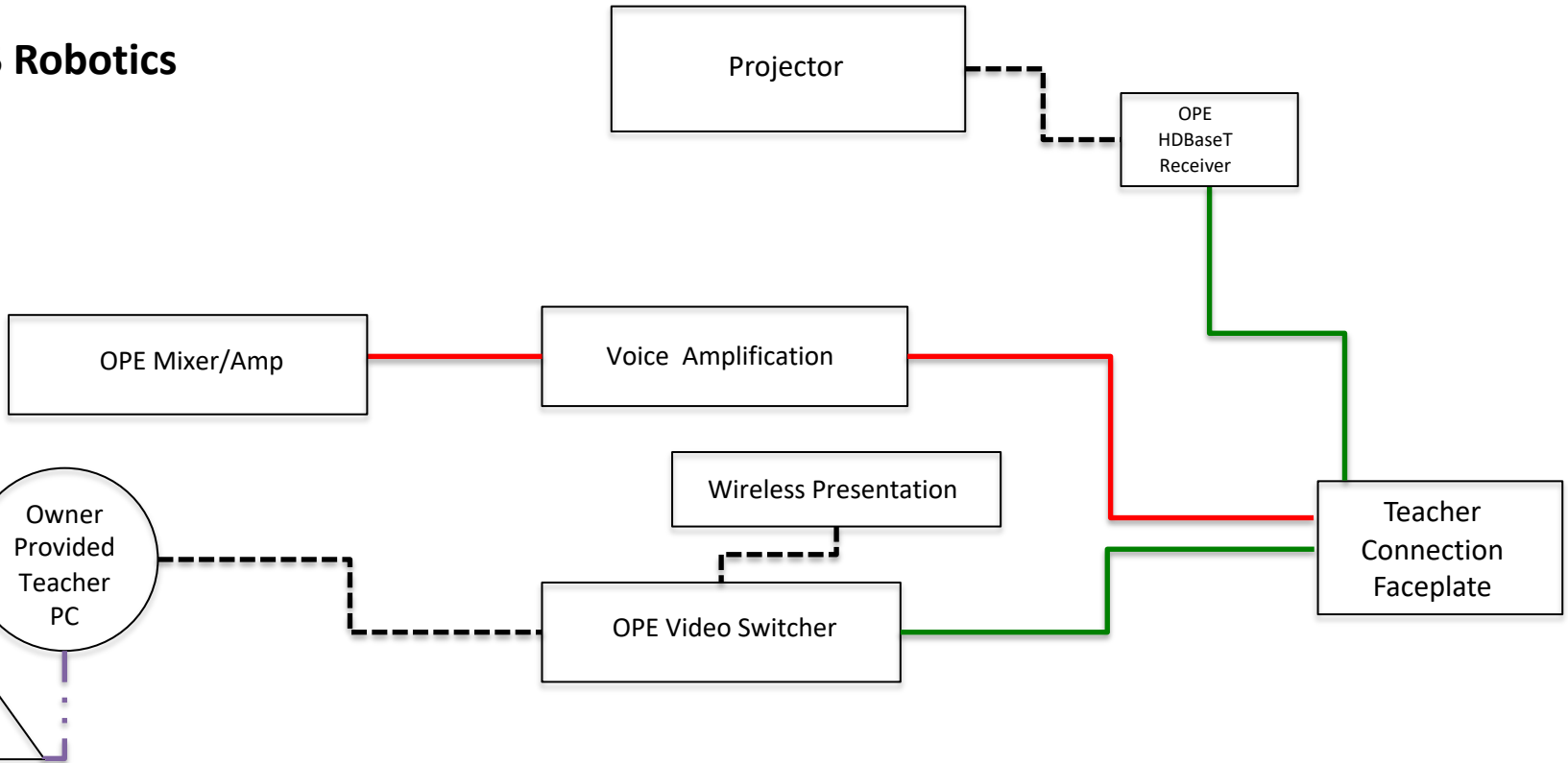
Typical Classroom – Switcher Type 2 - Matrix

Appendix D - Connection Line Diagram



Appendix D - Connection Line Diagram

HS Robotics

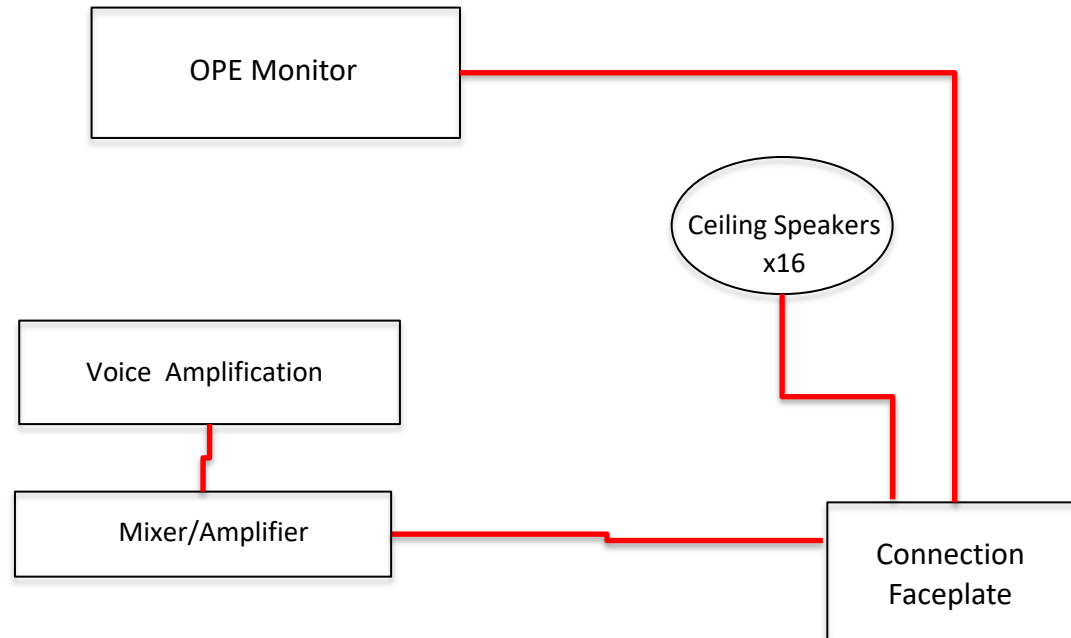


Legend

AUDIO ——— (Solid Red Line)
STP/UTP ——— (Solid Green Line)
HDMI VIDEO - - - - - (Dashed Black Line)
USB - (Dash-Dot Purple Line)

Appendix D - Connection Line Diagram

HS Media Center

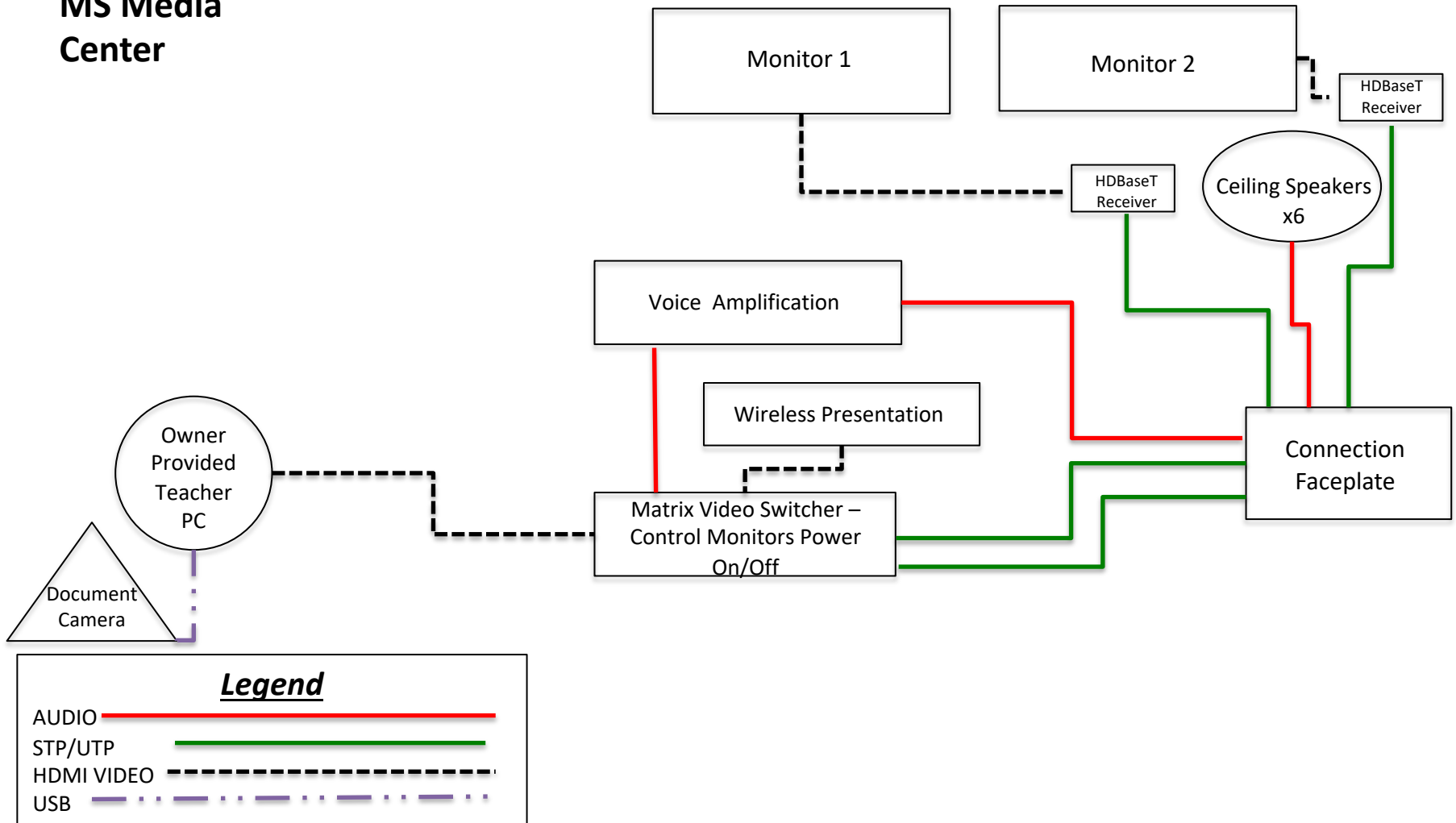


Legend

AUDIO ——— (Red solid line)
STP/UTP ——— (Green solid line)
HDMI VIDEO - - - - - (Black dashed line)
USB - (Purple dotted line)

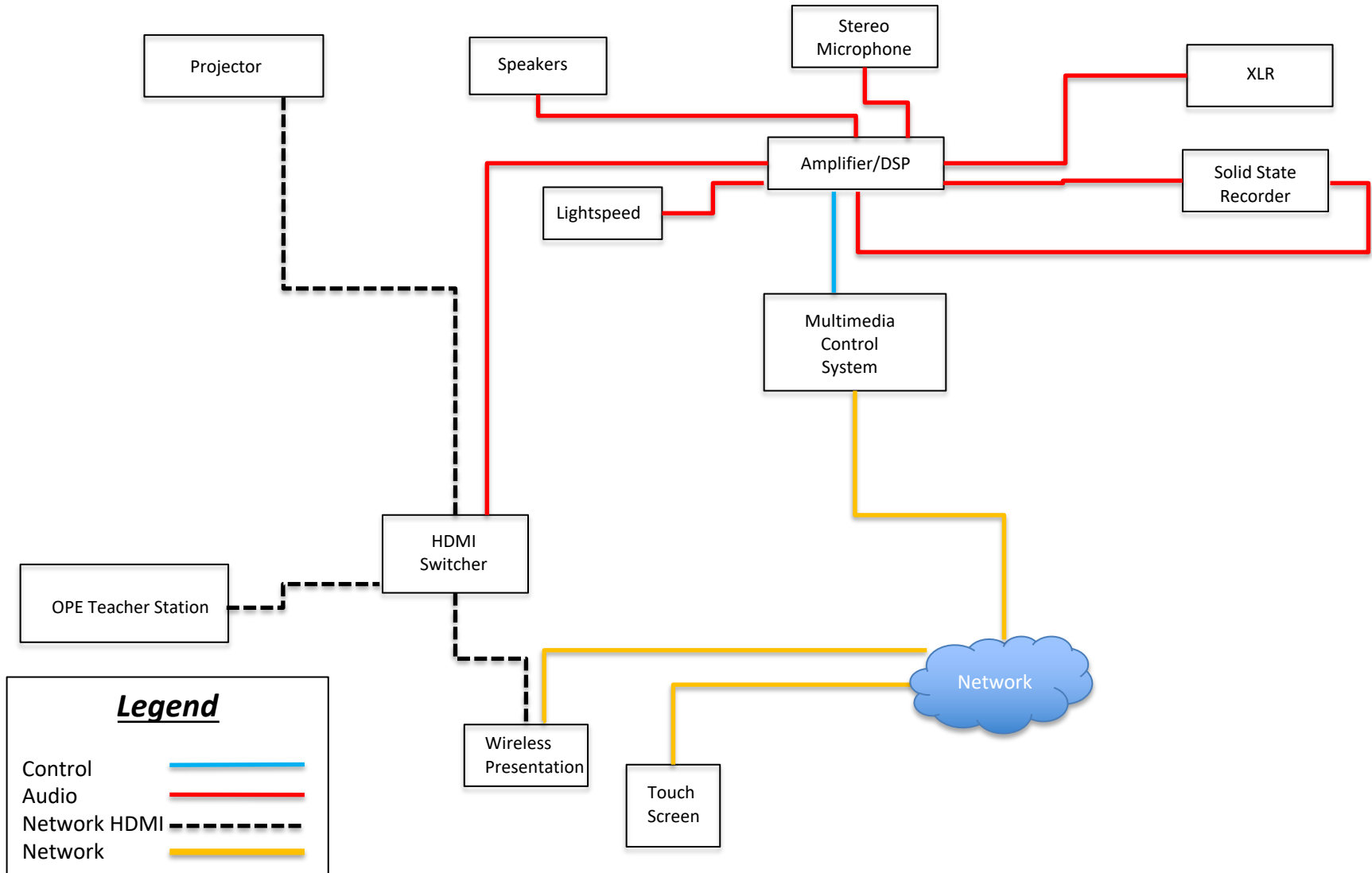
Appendix D - Connection Line Diagram

MS Media Center

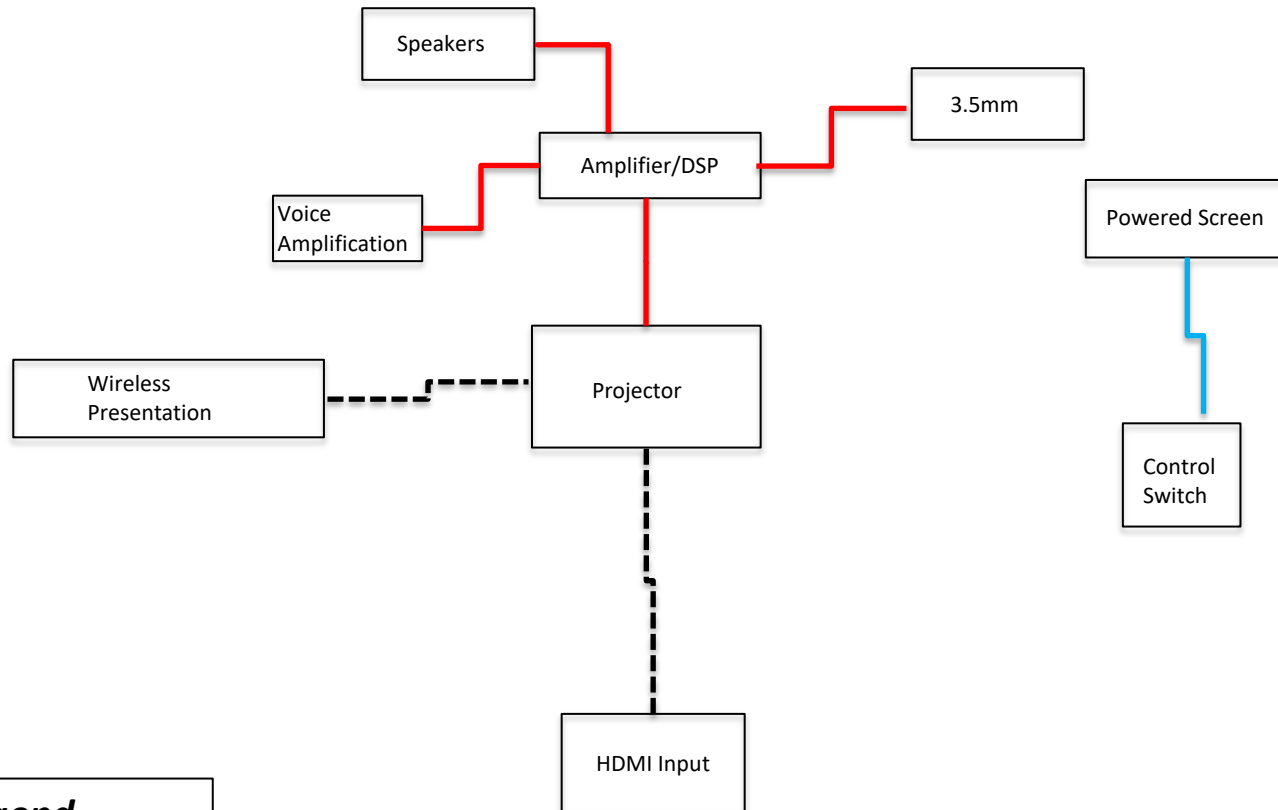


Band and Choir





Appendix D – AV Connection Line Diagram

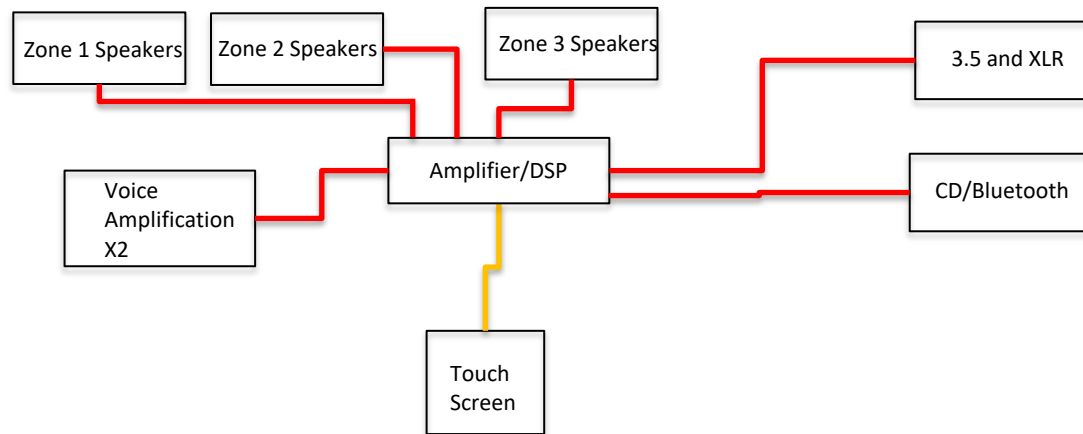


Appendix D – AV Connection Line Diagram






Legend

Control	
Audio	
Network HDMI	
Network PoE	



Legend

Control	
Audio	
Network HDMI	
Network PoE	