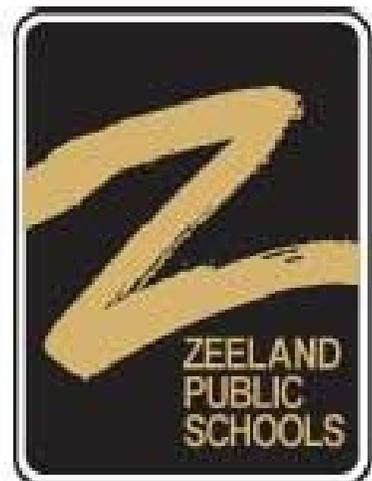


Zeeland Public Schools



LEARNING FOR LIFE!

SECTION 00005
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DIVISION 0 – GENERAL BIDDING INFORMATION

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DIVISION 1 – GENERAL AND CONTRACT REQUIREMENTS

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APPENDICES

<u>Section</u>	<u>Description</u>
A	Multi-Media Connection Diagram
B	Current Ethernet Network Inventory
C	Building Diagrams

END OF SECTION

SECTION 00010
LIST OF DRAWINGS

<u>File/Name</u>	<u>Description</u>
------------------	--------------------

None included with this package.

END OF SECTION

SECTION 00011
INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: MULTI-MEDIA TECHNOLOGY RENOVATIONS

A. Zeeland Public Schools (Owner) is seeking bid proposals for new classroom multi-media equipment, wireless systems and network electronics. Proposed systems shall be configured and installed to service Owner's classrooms across multiple instructional facilities, and as described herein.

B. Project: MULTI-MEDIA TECHNOLOGY RENOVATIONS

C. Owner: Zeeland Public Schools
183 W. Roosevelt Avenue
Zeeland, Michigan 49464

D. Designer: Communications by Design, Inc.

E. Sites of Work:

1. Administration Building
183 W. Roosevelt Avenue
Zeeland, Michigan 49646
2. Cityside Middle School
320 E. Main Street
Zeeland, Michigan 49646
3. Creekside Middle School
179 W. Roosevelt Avenue
Zeeland, Michigan 49646
4. Early Childhood Center
140 W. McKinley Avenue
Zeeland, Michigan 49646
5. Lincoln Elementary
60 E. Lincoln Avenue
Zeeland, Michigan 49646
6. New Groningen Elementary
10542 Chicago Drive
Zeeland, Michigan 49646
7. Quincy Elementary

10155 Quincy
Zeeland, Michigan 49646

8. Roosevelt Elementary
175 W. Roosevelt Avenue
Zeeland, Michigan 49646

9. Transportation Department
720 E. Main Street
Zeeland, Michigan 49646

10. Woodbridge Elementary
9100 Woodbridge Street
Zeeland, Michigan 49646

11. Zeeland Christian School
334 West Central Avenue
Zeeland, Michigan 49646

12. Zeeland East High School
3333 – 96th Street
Zeeland, Michigan 49646

13. Zeeland West High School
3390 – 100th Avenue
Zeeland, Michigan 49646

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: August 18, 2010
 - 2. Pre-bid Meeting: Friday, August 27, 2010 at 1:00 PM
 - 3. Intent to Bid Forms Due: Tuesday, August 31, 2010 by 4:00 PM
 - 4. Question and Clarification Deadline: August 31, 2010 by 4:00 PM
 - 5. Public Bid Opening: Monday, September 20, 2010 at 3:00 PM

1.03 TYPES OF PROPOSALS

- 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. Proposals shall be made on unaltered proposal forms as included herein. Bidder shall fill in all blank spaces and the proposal 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: 1:00 PM on Friday, August 27, 2010
- C. Location: Zeeland West High School
Media Center
3390 – 100th Avenue
Zeeland, Michigan 49646
- D. Any drawings identified in the table of contents herein will be distributed and reviewed at this conference.

1.05 TIME AND PLACE OF BID RECEPTION

- A. Physically sealed proposals for the base bid work will be received at the district office and read aloud at a public opening thirty minutes later at the High School (separate location). 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: 2:30 PM on Monday, September 20, 2010
- C. Bid Receipt Location: Zeeland Public Schools
Administration Building
183 W. Roosevelt Avenue
Zeeland, Michigan 49646
- D. Opening Time: 3:00 P.M. on Monday, September 20, 2010
- E. Opening Location: Zeeland West High School
Media Center

3390 – 100th Avenue
Zeeland, Michigan 49646

- F. Faxed or electronically delivered bids will not be accepted.
- 1.06 EXAMINATION AND PROCUREMENT OF DOCUMENTS
- A. Specifications and Drawings may be obtained from the Technology Designer. Contractors may obtain copies by documented request to Communications by Design, Attn: Carl VanderZee. Requests may be made by:
 - 1. Writing – PO Box 499, Ada, Michigan 49301
 - 2. Email – rszilagy@cbdconsulting.com
 - 3. Fax - 616-588-6251
- 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 OWNER'S RIGHT TO REJECT PROPOSALS
- A. The Owner reserves the right to reject any and/or all proposals. 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 Bid Proposal after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.
- 1.10 DEFINITIONS

- A. "Owner" is intended to mean Zeeland Public Schools, a Michigan Constitutional Body Corporate.
- 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 00300
BID PROPOSAL FORMS

Intent to Bid Form

Complete and submit the following form if you intend to submit a Bid Proposal for this project. Unaltered and completed forms must be received on or before 4:00 P.M. on August 31, 2010. Only bidders returning a completed "Intent to Bid Form" will be notified of required addenda for Bid #1924.

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 17100 – Communications Cables and Wires
- Section 17130 – Multi-Media Infrastructure
- Section 17210 – Network Electronics
- Section 17215 – Wireless Communication Network
- Section 17400 – Multi-Media Equipment
- Section 17410 – Digital Video System

Submit unaltered and completed form to:

Rebecca Szilagy

Communications by Design, Inc.

616-588-6251 (Fax)

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 Proposal Submission. Insure 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: Zeeland Public Schools
Administration Building
Attention: Mr. David VanGinhoven
183 W. Roosevelt Avenue
Zeeland, Michigan 49646

BID FROM: _____

PROJECT: MULTIMEDIA TECHNOLOGY RENOVATIONS
TECHNOLOGY BID PROPOSAL #1924

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

DUE: Monday, September 20, 2010 AT 2:30 PM

BID PROPOSAL FORM

BID TO: Zeeland Public Schools
Attention: Mr. David VanGinhoven
183 W. Roosevelt Avenue
Zeeland, Michigan 49646

BID FROM: _____

PROJECT: MULTI-MEDIA TECHNOLOGY RENOVATIONS
TECHNOLOGY BID PROPOSAL #1924

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

Bid Category _____ Title _____
_____ Dollars (\$ _____).

Said amount written above constituting the Base Bid

Bid Category _____ Title _____
_____ Dollars (\$ _____).

Said amount written above constituting the Base Bid

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 _____

Voluntary Alternate F _____

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.

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 Proposal 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 _____, 2010.

In the County of _____ State of _____

By _____
Notary Public Signature

Seal or Stamp:

My commission expires on: _____

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>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

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.

END OF SECTION

DIVISION 1 – GENERAL AND CONTRACT REQUIREMENTS

01000.0 NOTICE

01000.1 Division 0 – General Bidding Information is part of this division.

01000.2 This division provides detail and process definition for the General and Contract Requirements of the project.

01000.3 References in this division to industry wide standards or nationally recognized testing agencies shall denote the latest edition of such publications or standards unless otherwise indicated.

SECTION 01010
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 proposal 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. If portions of separate bids are deemed compatible and compliant with the intent of the project, and a combination of partial bids is deemed to be in the Owner's best interest, and the Owner reasonably expects willing and compliant bidders will cooperate with others for the benefit of the Owner during implementation of the system, the Owner reserves the right to award portions of the project to multiple bidders which will cooperate 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 Proposal 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 Proposal 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 RFP describes a particular implementation. All Bid Proposals 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 Proposal Forms contained herein. Voluntary Alternates may be further detailed and/or explained in attachments to the unaltered Bid Proposal Forms contained herein. Exceptions to the RFP 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. 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 proposal all costs for items listed in any/all Addenda, and shall acknowledge receipt and identifying number of each Addendum on the Bid Proposal 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 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. Fine Legal - \$50,000
 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.

3.04 MODIFICATION AND WITHDRAWAL

- A. Bid Proposals may be withdrawn and/or changed any time prior to the bid opening. Bid Proposal may not be withdrawn or changed after the bid opening, and shall be deemed a firm offer continuing for ninety (90) calendar days. Bid Proposals received after the time and date for the public opening will be returned unopened at the Owner's discretion.
- B. Withdrawal of any Bid Proposal 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 Proposal 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 PROPOSAL RESPONSE FORMAT

- A. Bidder shall provide four (4) complete Bid Proposal copies in two formats as described herein.
 - 1. Hard copy format responses shall be in a bound tabulated format. Each response shall have tab indicators for each section.
 - 2. Electronic copy format responses shall be submitted on a CD ROM disk, readable by a standard Microsoft Windows XP workstation. CD ROM shall contain separate folders to organize response documentation as described herein. Files submitted on CD ROM 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 Proposal 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 Proposal Responses shall include an index containing copies/PDF of a complete index of documents comprising Bid Proposal 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 PROPOSAL FORM
 - b. Michigan Familial Relationship Disclosure Statement
 - c. REFERENCES
 - d. CONTRACT EXCEPTIONS
 - e. SCHEDULE(s) OF VALUES
 - f. 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 proposals for this work, the Owner incurs no obligation to accept the lowest, or any bid proposal 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 proposal or 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 proposal.
- 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 proposal, 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 01710
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

DIVISION 17 – TECHNOLOGY SYSTEMS

- 17000.0 NOTICE
- 17000.1 Division 0 – General Bidding Information is part of this division.
- 17000.2 Division 1 - General and Contract Requirements is part of this division.
- 17000.3 This division provides detail and process definition for the Technology Systems materials and installation methods related to the project.
- 17000.4 All materials and labor required for a fully functional and industry standard working system for each category of work shall be provided by contractor unless specifically identified to the contrary herein.
- 17000.5 References in this division to industry wide standards or nationally recognized testing agencies shall denote the latest edition of such publications or standards unless otherwise indicated.

SECTION 17100
COMMUNICATIONS CABLES AND WIRES

PART 1 - GENERAL

1.02 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to structured cabling to support anticipated installation of video projectors and additional supporting hardware. Owner anticipates structured cable system will be used to provide Ethernet connectivity for new video projectors, control equipment, wireless access points or other devices.
- B. Structured cable system shall be compliant with EIA/TIA 568B.
- C. The Contractor shall design, engineer, configure, supply, connect, test, document 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. Cross connect blocks and devices
- D. Contractor shall coordinate their installation with other contractors, Designer and the Owner as is appropriate.
- E. Compliant cable connector shall be provided for each identified projector location (see Appendix A), within twenty (20) feet of projector location, in the same physical room as the projector location.
- F. Connectors shall be installed above or behind the finished ceiling where possible. In locations where concealed mounting is not possible, inconspicuous surface mounting is acceptable. Where mounting conditions may be questionable, Owner approval is required prior to any final installation activity being performed.

1.03 DRAWINGS

- A. Drawings show the location and general arrangement facilities and related items. They are provided for reference and shall be used to assist Contractor coordinate elements of construction.

- B. Drawings do not depict specific locations for cable outlets, but are provided for contractor facility reference. Drawings may be used as a basis for Contractor's required as built documentation.
- C. Examine and verify conditions of work sites. Arrange work accordingly.

1.04 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of ten (10) 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 documentation 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 documentation, 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. Onsite 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.

1.05 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, 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.
- C. Shop drawings and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
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 Designer.
 2. No work constituting final installation shall be commenced until after approval of shop drawings by Designer.

1.06 REFERENCE SPECIFICATIONS

- 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

1.07 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 Designer.
- 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 Proposal 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. AMP
 - 2. BELDEN
 - 3. BERK-TEK
 - 4. HUBBEL
 - 5. NORDX-CDT
 - 6. PANDUIT
- C. System shall be built upon an open and standard platform, supporting industry standards. Systems that are deemed Proprietary in nature will not be considered.

2.02 STATION 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.
 - 3. Twenty-four (24) AWG conductors

4. Compliant as per EIA/TIA-568 TSB-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 twenty four (24) ports each and maintain a minimum of 2U of rack spacing between individual patch panels.
 2. Furnish and install smear resistant, mechanically imprinted polyester or similar material labels to identify each port of all patch panels) in compliance with EIA/TIA 606 standards or Owner required scheme. Labels shall be permanently affixed to patch panels.
 3. Match all existing equipment and labeling.
 4. Fill any existing empty patch panel cable locations prior to installation of any additional 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. When required for cable routing, metal surface raceway shall be provided. Coordinate color and style with Designer and Owner.

7. Where station cable is to terminate above finished ceiling or behind a finished wall for projectors, cameras, access points, or other special station devices, modular jack may be surface mounted in appropriate high strength, impact resistant enclosure.
8. Furnish and install matching coordinating blank cover plates for all unused communications outlets indicated on drawings.
9. Mount flush plates so all four edges are in continuous contact with finished surfaces.
10. Furnish and install smear resistant, mechanically imprinted polyester or similar material labels to identify each outlet in compliance with EIA/TIA 606 standards or Owner required scheme. Labels shall be permanently affixed to surface adjacent to outlet. Where outlets are above or behind finished ceiling, labels shall also be provided, at Owner discretion in a visible location.
11. Match all existing equipment and labeling.

2.05 CATEGORY 5e ALTERNATE

- A. Bidders shall provide voluntary alternate for category 5e installation.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer 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 Designer prior to commencement of any final installation activities.

3.02 INSTALLATION

- A. Contractor shall be familiar with the environment where work will 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, face plates and cross connects.
 - 7. In-line cable splicing will not be permitted.
 - 8. Length of each individual run of horizontal cable from the MDF/IDF to the information outlet shall not exceed 90 meters (295 ft.).
 - 9. IDF 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 Designer of cable length exceptions prior to installation in writing and request direction.
 - 10. All copper data cabling will terminate on Category 6 compliant connectors. Approximately 10 ft. of material for each cable will be coiled and stored at each distribution center in order to accommodate future change. All such service loops shall be consistent with and matching of existing installation conditions.
 - 11. Wiring not installed in conduit shall not be routed within 18 inches of light fixture ballasts or within 36 inches of motors or transformers.
 - 12. Coordinate cable colors with Owner requirements prior to installation.

13. Assemble, install, configure and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
 14. Work shall be performed to meet local codes and industry standards, including, but not limited to:
 - a. Grounding and Bonding
 - b. Raceway fill ratios
 - c. Fire protection
- E. 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. 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.
- B. Documentation shall be coordinated with Owner to be consistent with existing documentation standards and file types

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 SCHEDULE, MEETINGS AND PLANS

- A. Sequence of operations shall be as required by Construction Manager.
- B. All work shall be coordinated with Owner's construction manager on site.

END OF SECTION

SECTION 17130
MULTI-MEDIA INFRASTRUCTURE

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to classroom multi-media infrastructure to support equipment and systems provided by others.
- B. Owner intends to install classroom based multi-media systems to support audio level enhancement, projection of video content, particular camera equipment and associated control and support components infrastructure must support.
- C. Contractors shall propose infrastructure and/or components to be deployed using standard procedures and technology components and as specified herein.
- D. Raceway is provided by others as indicated in related sections of this project manual.
- E. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant component connection infrastructure system complete 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 five (5) 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 documentation 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 documentation, 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.

1.03 SUBMITTALS

- A. Submittals shall consist of, but not be limited to, technical cut sheets and detailed information pamphlets on all components 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, 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. 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.

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. Lists of acceptable manufacturers have been provided to establish a standard of quality 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 on either acceptable manufacturer's components or components deemed equal in quality and function for the intended applications.
 - C. Judgment and determination associated with equivalency of components, compatibility with existing installed items and/or fitness for the intended use and application shall be solely by Owner and Designer.
- 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.
- 2.03 Furnish only new, first class quality materials and equipment.
- 2.04 SURFACE METAL RACEWAY
- A. Surface Metal Raceway shall be installed in each applicable classroom (See Classroom Multi-Media Schedule - Appendix A) to facilitate the connection of overhead multi-media components (including, but not limited to projectors, speakers and microphone sensors).
 - B. Acceptable Manufacturer:
 - 1. WIREMOLD
 - a. 3000 Series
 - 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.

2. After contract award, in consultation with the selected Contractor, and before final installation commences, for rooms where it is practical to use existing raceway, a contract deductive change order shall be issued and material shall be installed in existing raceway.
 - E. Raceway shall be carefully cut into suspended ceiling tiles and structure to provide a professional and clean installation. Where no suspended ceiling exists, raceway will be continued to the ceiling based components (including, but not limited to projectors, speakers and microphone sensors).
 - F. Appropriate nylon or rubber bushings and/or cable guards shall be installed on all raw metal edges that media may be in contact with.
 - G. Raceway shall extend to a double gang extra deep box mounted to match the height of existing power receptacles in the room (generally 16" AFF).
 - H. Raceway installation shall strictly comply with manufacture's installation instructions and recommendations and approved shop drawings.
 - I. Coordinate installation with adjacent work to ensure proper clearances and to prevent electrical hazards.
 - J. 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.
 - K. Metal raceway shall be electrically continuous and bonded in accordance with the National Electric Code for proper grounding.
 - L. Raceway shall be supported at intervals not exceeding 5 feet or in accordance with manufacturer's installation sheets.
 - M. Contractor shall provide accessories as required for a complete installation, including insulated bushings and inserts where required by manufacturer.
 - N. Close unused raceway openings using manufacturer's recommended accessories.
 - O. 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.
- 2.05 PROJECTOR CEILING PLATES/BRACKETS/KITS
- A. Projector Ceiling Plates/Brackets/Kits shall be provided at each location indicated on applicable room schedule.
 - B. Acceptable Manufacturer:

1. CHIEF

2. PEERLESS

a. Where projectors are to be mounted in drop ceilings, Peerless model CMJ500 with a 6" down-tube shall be provided.

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, alternative and compliant mounting hardware and installation shall be provided after change proposals are reviewed and accepted.

2.06 AUDIO SPEAKERS

A. Four (4) classroom speakers shall be installed in/on finished ceiling surfaces in each classroom for which projector installation is indicated.

B. Acceptable Manufacturer:

1. BOGEN

2. LIGHTSPEED

3. VALCOM

4. VIKING

5. 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" 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.
- 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 pairs 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 cable shall be rated for installation in plenum spaces at Quincy Elementary, all other work sites non plenum is acceptable.
- K. All speaker cable shall be protected in raceway.
1. Access above finished ceilings in some spaces is not available. Where these conditions exist, all media shall be installed in metallic raceway for protection and security as specified herein and/or indicated on drawings.
 2. Any speaker cable raceway required shall be two piece (base and cover) constructed of sturdy, durable powder coated metal.
 3. Speaker surface raceway shall be installed as required to insure cable is not exposed.
 4. Speaker surface raceway shall be compliant and compatible with wireway specified in raceway specifications contained in related sections of this project manual or approved equal.
 5. All raceway color shall be coordinated with Owner.
 6. All fittings, brackets, hangers, connectors and adapters shall be of the same manufacturer, product line and color of raceway.

7. Raceway shall be securely fastened to surfaces following manufacturer's best practice recommendations for installation

2.06 MULTI-MEDIA INFRASTRUCTURE CABLE

- A. Infrastructure cable to connect projector provided by others to a teacher station wall plate shall be provided.
- B. Acceptable Manufacturer:
 1. Cable shall be of commercial first class quality manufacture.
 2. Completely match manufacturer and color of materials specified in other related sections this project manual for surface raceway.
- C. Wall plate provided shall match electrical plates specified under related sections of this project manual or approved equal.
- D. 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. Primary VGA/XGA 15 pin connector (DE-15 Female)
 2. Serial Control (RS-232C –9 pin Female)
 3. Audio Sensor Cable (Category 6 UTP)
 4. NOTE: Audio Speaker (L/R) with Speakon Male for connection to speakers shall be co-located on this same wall plate
- E. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop ten (10) feet in length at projector location (approximately twelve [12] feet from the center of the teaching wall). All cable shall be shielded cable. Cable shall terminate in the following connector gender:
 1. Primary VGA/XGA 15 pin connector (DE-15 Male)
 2. Serial Control (RS-232C – 9 pin Female)
 3. Audio Sensor (8-position, 8-conductor Female Connector)
 4. NOTE: Audio Speaker (L/R) cable shall terminate on specified speakers and as indicated herein
- F. Cable shall be installed for minimal loss characteristics to maintain quality, high resolution video image from connector plate to Owner provided video projector.

- G. VGA/XGA Cable shall be of a three (3) seventy-five (75) ohm coaxial cable construction method, include a drain wire and support 1920x1200 video resolution for the installed distance plus fifteen (15) feet.
- H. Cable gauge and shielding shall be appropriate for length of cable installed to provide full standard quality signal over the media plus fifteen (15) feet.
- I. All cable shall be rated for installation in plenum spaces.

2.07 MULTI-MEDIA 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 feet in length and terminate in the following connector genders:
 - 1. Primary VGA/XGA 15 pin connector (DE-15) Male to Male. Cable shall be of a three (3) seventy-five (75) ohm coaxial cable construction method, including a drain wire support 1920x1200 video resolution for the installation.
 - 2. Serial Control (RS-232C-9) Male to Female.
 - 3. Audio Speaker (L/R) with Speakon Female to bare cable for connection to screw terminals.
 - 4. Audio Sensor (Category 6 Patch Cable)
 - 5. A single F6 Woven Wrap-Around Braided Sleeving to contain and protect all associated cable.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination 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 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. Written installation, coordination and test procedure to be followed by installing technicians and engineers.
3. 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 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/or other contractor's work 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. 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. 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.

6. 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.
 7. 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 match electrical outlet plates specified. 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.
 8. Work includes supply and testing of cables.
 9. 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.
 10. Label all cable connections for intuitive user access and as directed by Owner and Designer matching existing conditions.
- E. 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.

3.03 TESTING

- A. Contractor shall test all cables provided herein after installation, and prior to connection of Owner's equipment.
- B. Test methods shall be approved by Owner and Designer prior to commencement of final testing.
- C. Testing data shall be recorded and provided to Owner as part of final documentation in both electronic and hard copy formats.

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. Cable test results
 - 2. Manufacturer's warranty.
 - 3. Maintenance contract terms.
 - 4. Telephone numbers for service and support.
 - 5. 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.
 - 6. 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.
 - 7. CAD as built drawings for each building.
 - 8. Complete inventory of installed hardware items including, but not be limited to, model numbers, serial numbers, physical installation location and options.

3.05 TRAINING

- A. Contractor shall provide training for the Owner designated system administrator(s). at the convenience of the Owner personnel, and of sufficient duration to satisfactorily complete training on administration functions including, but not limited to:
 - 1. Basic trouble shooting of the installed components including diagnostic and problem resolution actions.

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Final Vendor Presentations: Week of September 27, 2010
2. Contractor Chosen: October 20, 2010
3. Work Commences: November 1, 2010
4. Substantial Completion of Project: January 28, 2010
5. Project Close-out: February 25, 2010

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

SECTION 17210
NETWORK ELECTRONICS

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to Ethernet switch infrastructure upgrades to replace existing equipment for the Zeeland Public Schools.
- B. System shall be comprised of a network core switch at the district head end, building core consolidation switches in each remote building end and distribution switches (stackable) in distribution closets for connection to end devices as described herein. Switches shall be installed, configured and connected to the existing building cable plant at the Owner's discretion.
- C. Contractor shall coordinate their delivery and 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 three (3) 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 and/or extended 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.
- 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.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
 - 1. Four (4) hours or less for matters that render twenty percent (20%) or more of the system unable to maintain normal functionality. Replacement

parts for any item determined to be functioning below full design capacity shall be replaced promptly. Replacement components shall be shipped to Owner in order to arrive on the next business. Replacement components shall be shipped in advance of Owner return of non-functional components (Advance Replacement).

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 for recommended maintenance programs for all equipment following the specified and included three (3) year period 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.

1.03 STORAGE OF MATERIALS

- A. All materials shall be secured when not in use by the Contractor.
- B. It shall be the Contractor's responsibility to secure all equipment including material to be installed as part of the contract. No changes shall be made to the contract due to loss or theft of equipment and/or materials not officially accepted by the Owner.
- C. Formal receipt of the materials shall not be completed by the Owner until completion of project closeout. The Contractor shall be responsible for all equipment until time of closeout as provided for herein.

1.04 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 and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.

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 Designer.
 2. No work constituting final installation shall be commenced until after approval of shop drawings 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 does 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. Microsoft Project is the software of choice for this schedule. 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. Owner will rely on such schedules to coordinate and otherwise plan related work of Owner personnel, other separate contractors, or the Owner's routine daily work.

1.05 REFERENCE SPECIFICATIONS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:
1. IEEE

2. EIA/TIA Commercial and Administration Standards
3. NEC
4. FCC – All Applicable Rules and Regulations
5. UL
6. MOSHA Safety Standards

1.06 CONTRACTOR

- A. 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.
- D. Contractor shall have offices or primary work locations for related personnel in physical proximity to sites of work that can reasonably be expected to allow service response times required for warranty and as described herein.
- E. The Contractor shall have a proven track record. This must be shown by the inclusion of references of at least three (3) projects involving similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid Proposal as provided herein. Bid Proposal Form(s) may be duplicated as required in order to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers (In alphabetical order):
 1. 3COM / HEWLETT-PACKARD
 2. CISCO
 3. EXTREME
 4. ENTERASYS / SIEMENS

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.
- A. Alternate bids for re-use of some of the Owner's existing Cisco infrastructure and/or trade-in credits will be carefully considered. Base bids shall not contain provision for any existing equipment use or any trade-in credits.
- 2.04 Individual switches shall be capable of being fully administered from any web browser attached to the network.
- 2.05 Administration access shall be protected by unique and secure log on (User ID and Password).
- 2.06 System administrator shall be capable of complete switch back-up and full switch restoration from a previously saved configuration.
- 2.07 In the event of a power failure, complete system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- 2.08 DISTRICT CORE SWITCH
- A. One (1) chassis based District Core Switch shall be provided meeting or exceeding the following features, ports and capabilities:
 - 1. Four (4) payload module slots available for future expansion following full and complete system configuration
 - 2. Sixteen (16) 10GB Ethernet ports with appropriate XFP optics packages for building connection to:
 - a. West High Building Switch (in the same room)
 - b. East High Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 0.3K)
 - c. Quincy Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 1.7K)

- d. Administration Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 3.2K)
 - e. Creekside Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 3.1K)
 - f. Roosevelt Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 3.1K)
 - g. Woodbridge Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 10.2K)
 - h. Cityside Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 5.3K)
 - i. Lincoln Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 6.2K)
 - j. Transportation Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 7.1K)
 - k. New Groningen Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 5.5K)
 - l. Early Childhood Center Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 4.0K)
 - m. Zeeland Christian Building Switch over Owner's existing Single Mode (SM) outside plant fiber network (distance of approximately 5.2K)
 - n. East Athletic Field over Owner's existing Single Mode (SM) outside plant fiber network (distance approximately 2K)
 - o. Three (3) ports for future expansion
3. Eight (8) 10G Copper ports for connection to high capacity Servers and SAN equipment provided for herein under Section 17270
 - a. Coordinate specific type and style of connector with Owner and others prior to final installation.
 4. A maximum of 2:1 blocking will be permitted on 10G ports
 5. Twenty four (24) 10/100/1000 UTP Ethernet ports for connection to central network devices and appliances.
 6. Redundant, load sharing switch fabric/engine

7. Redundant management/supervisor
 8. N+1 load balancing, hot swappable, redundant power supplies.
 9. RMON
 10. IEEE 802.1AB LLDP
 11. Jumbo frame support
 12. Auto-MDIX support
 13. IPv6
 14. Capable of up to 428 Million packets per second throughput
 15. 802.3ad LACP
 16. IP Routing support for Static, RIP and OSPF
 17. IP Multicast Routing support for PIM sparse and dense mode and IGMP
 18. IEEE 802.1p and IP-ToS utilizing eight (8) QoS queues
 19. Bandwidth Shaping
 20. IEEE compliant link aggregation across switch modules for backbone gigabit link aggregation to distribution switches/switch stacks.
- B. Bidders shall provide alternate bid to replace building 10GB connections with quad trunked Gigabit Ethernet connections over Owner's existing SMF WAN.

2.09 BUILDING DISTRIBUTION SWITCHES

- A. Thirteen (13) Building Distribution Switches shall be provided. Switches shall be installed in remote facility MDFs to facilitate building connection to District Core Switch over SM fiber. Switches provided shall each meet or exceed the following:
1. One (1) 10GB Ethernet port in each unit with appropriate XFP optics packages for building connection to district core switch over Owner's existing Single Mode outside plant cable
 2. Four (4) 10/100/1000 UTP Ethernet ports in each unit.
 3. One (1) 10GB Ethernet port in each unit with appropriate XFP packages for connection to Device Distribution Switch stack in the same room

4. In addition, the following number of 10GB Ethernet based ports with appropriate XFP optics packages for connection to each distribution closets over Owner's existing Multi-Mode Fiber Optic cable shall be provided in individual switches:
 - a. Administration Building
 1. None
 - b. Cityside Middle School
 1. Three (3)
 - c. Creekside Middle School
 1. None
 - d. Early Childhood Center
 1. None
 - e. East High School
 1. Seven (7)
 - f. Lincoln Elementary
 1. One (1)
 - g. New Gronigen Elementary
 1. One (1)
 - h. Quincy Elementary
 1. Two (2)
 - i. Roosevelt Elementary
 1. One (1)
 - j. Transportation Building
 1. None
 - k. West High School
 1. Five (5)

1. Woodbridge Elementary
 1. One (1)
- m. Zeeland Christian
 1. None
5. Dual redundant power supplies.
6. A maximum of 2:1 blocking will be permitted on 10G ports
7. IEEE 802.1p QoS
- B. Bidders shall provide alternate bid to replace building closet 10GB connections with dual trunked Gigabit Ethernet connections over Owner's existing MMF cable while maintaining building to building (WAN) 10GB connections.

2.10 DEVICE DISTRIBUTION SWITCHES

- A. Ninety six (96) stackable Device Distribution Switches shall be provided. Switches shall be installed to facilitate cross connection of all station cables in the district. Switches provided shall meet or exceed the following:
 1. Forty Eight (48) 10/100/1000 UTP Ethernet ports.
 2. One (1) 10GB Ethernet XFP based port.
 3. Eighteen (18) 10GE XFP based optics packages for MMF connectivity of switch stack uplink of switches.
 4. Fourteen (14) 10GE XFP based packages for copper connectivity of switch stack uplink of switches in the same room as Building Switches.
 5. Switches shall be stackable and support 288 ports per stack with a single IP address
 6. All cables/connectors to facilitate switches being installed in 32 stacks.
 7. Switches shall support uplink trunking across the stack
 8. IEEE 802.1p QoS with 4 queues per port.
 9. SNMPv1/v2c/v3
 10. 802.1X and Protocol based VLAN support.
 11. IEEE 802.3ad Link Aggregation (LACP).

12. Broadcast, Unicast and Multicast traffic suppression.
13. IGMP Snooping
14. DHCP Helper
15. IEEE 802.1X Port Based Network Access Control
16. POWER OVER ETHERNET
 - a. Thirty Two (32) switches provided shall be 802.3af PoE compliant.
 - b. Switch shall support forty eight (48) connections requesting 15.4w 802.3af PoE.

2.11 ENTERPRISE INFRASTRUCTURE MANAGEMENT

- A. Contractor shall integrate equipment into Owner's existing Network Infrastructure Management (NIM) product from Solar Winds.
- B. Integration shall include features such as, but not limited to:
 1. Automated discovery and mapping of network devices.
 2. Bulk configuration, back-up and restore tools.
 3. Troubleshooting tools that facilitate rapid location, isolation and repair of network problems.
 4. Assist and simplify deployment of IEEE 802.1X and RADIUS based network login.
 5. Provide detailed performance monitoring and assist in detecting network performance anomalies and trends both in real time and historical.
 6. Maintain and flexibly report network inventory, configuration details, device history and performance.
 7. Provide Graphical element management.
 8. Update management.

2.12 ALLOWANCES

- A. Contractor shall include allowances for contract service reimbursements as required below in base bid lump sum amount(s). 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 \$4,620.00 for contract services related to electrical power outlet renovation and relocation.
2. Allowance shall be made in the amount of \$12,425.00 for repairs of select existing fiber optic connections.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct a detailed walk through of all facilities to verify mounting and physical installation requirements.
- B. Contractor shall conduct a preliminary installation and configuration meeting to discuss Owner plans for network applications and device attachments to insure proper final configuration for all parameters including, but not limited to:
 1. VLAN and routing configuration
 2. Security configuration
 3. Physical layout and connection schemes and configurations
 4. PoE applications intended devices.
 5. Confirm switch and device naming and identification scheme.
 - a. Physical labeling
 - b. Electronic / configuration management information.
 6. Management and problem diagnostic options.
- C. Contractor shall insure all submittals and shop drawings have been provided to, and approval has been obtained from Designer prior to commencement of any final installation activities.
 1. Additionally, a detailed installation plan shall be provided for Owner and Designer approval prior to the commencement of any final installation activities. This plan shall included, but not be limited to the following:
 - a. Switch software configuration(s).
 - b. Physical layout and connection schemes and configurations

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.
- B. All equipment provided by contractor shall be fully configured and installed for the Owner's applications based on an installation plan provided by Contractor and meeting approval of Owner and Designer prior to the commencement of work.
- C. 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/or other contractor's work and cannot be removed shall be flagged and cordoned off by the Contractor prior to their departure.
- D. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- E. The Contractor shall furnish, set in place, and physically install all equipment necessary for a fully compliant and operational system as specified herein.
- F. Contractor shall fully cooperate with Owner for detailed switch software/firmware configuration and system integration activities.
- G. 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 at Owner designated and provided until such time those items are installed according to the specifications.
 - 3. Transport equipment to the Owner's installation location(s).
 - 4. Physically assemble, install, configure and test based on an approved test plan all equipment and components, maintaining accurate inventory records and status documents and discarding packaging as may be directed by Owner.
 - 5. Label all system devices as may be appropriate and required by Owner and Designer using approved Brady labels.

6. Work includes extending connection and interconnection cables from equipment, as required, to Owner identified connection ports at all locations.
 - a. Work includes re-connection of existing cables and/or supply of new connection cables as may be required for a fully functional and compliant system. Some devices may require special care and suitable tools to complete such connection or re-connection of cables.
 - b. Patch cables shall not exceed thirty (30) feet in length unless otherwise specified.
7. Complete system administrator training programs as specified herein.
8. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment.

H. Worksites include the following:

1. Administration Building
183 W. Roosevelt Avenue
Zeeland, Michigan 49646
2. Cityside Middle School
320 E. Main Street
Zeeland, Michigan 49646
3. Creekside Middle School
179 W. Roosevelt Avenue
Zeeland, Michigan 49646
4. Early Childhood Center
140 W. McKinley Avenue
Zeeland, Michigan 49646
5. Lincoln Elementary
60 E. Lincoln Avenue
Zeeland, Michigan 49646
6. New Groningen Elementary
10542 Chicago Drive
Zeeland, Michigan 49646
7. Quincy Elementary
10155 Quincy
Zeeland, Michigan 49646

8. Roosevelt Elementary
175 W. Roosevelt Avenue
Zeeland, Michigan 49646
 9. Transportation Department
720 E. Main Street
Zeeland, Michigan 49646
 10. Woodbridge Elementary
9100 Woodbridge Street
Zeeland, Michigan 49646
 11. Zeeland Christian School
334 West Central Ave.
Zeeland, Michigan 49464
 12. Zeeland East High School
3333 – 96th Street
Zeeland, Michigan 49646
 13. Zeeland West High School
3390 – 100th Avenue
Zeeland, Michigan 49646
- I. 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. 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.
- J. Contractor shall fully install and configure all network infrastructure for complete, compliant and final Owner applications and requirements including all physical labeling for asset management.

3.03 TESTING

- A. In an effort to insure 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 to Designer indicating they have completed full and final configuration of the system, and are ready to have system integrity and functionality tested. Such request shall include a written proposed test plan for complete system functionality.
 2. Within reasonable time after receipt of request and proposed test plan, Designer will provide amendment(s) to the proposed test plan, 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:
- D. 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 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. Manufacturer's warranty.
6. Maintenance contract terms.
7. Verification of maintenance contract engagement.
8. Telephone numbers for service and support.
9. Detailed technical support and service procedure instructions.
10. 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.
11. 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.
12. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, model numbers, serial number, physical installation location and software/firmware options.

3.05 TRAINING

- A. Contractor shall provide training for the Owner designated system administrator(s). Owner shall designate up to Three (3) administrators to be trained. Training shall be a minimum of two (2), four (4) hour session(s) 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. Component replacement procedure.

4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to, configuration changes, device and port status.
 5. Complete review and administration review and training for network management application provided.
- B. Contractor shall submit a written training plan, course description(s) and syllabus to Owner and Designer for approval. Owner and/or Designer may require amendments(s) to training plan, course description and syllabus prior to training being scheduled.

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Final Vendor Presentations: Week of September 27, 2010
 2. Contractor Chosen: October 20, 2010
 3. Work Commences: November 1, 2010
 4. Substantial Completion of Project: January 28, 2011
 5. Project Close-out: February 25, 2011
- 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

SECTION 17215
WIRELESS COMMUNICATION NETWORK

PART 2 - GENERAL

1.02 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to wireless systems for Zeeland Public Schools.
- B. Owner intends to install an IEEE 802.11n based Wireless Communications Network System covering all buildings within the district. Owner intends the Wireless Communications System to provide for full coverage within the buildings at the sites indicated for data communications applications.
 - 1. Owner's applications may include, but not be limited to:
 - a. High density workstation connectivity such as for 1:1 student initiatives across all grade and/or subject levels
 - b. Student owned device connectivity
 - c. Staff and/or administrator portable workstations.
 - d. Guest workstation connectivity
- C. Contractor shall propose a System to be deployed using IEEE 802.11 wireless technology foundation. The system shall be installed and connected to the Ethernet infrastructure by others and herein specified in Section 17210. System shall be of a "wireless switch" architecture using "thin" or "fit" Access Points (APs) and centrally located Wireless Controllers.
 - 1. Owner will provide adequate Ethernet switch ports for the number of devices specified herein.
- D. The centralized Wireless Control equipment shall be installed in the Owner's Network Operations Center (NOC) and as required.
- E. Contractor shall advise, coordinate and work cooperatively with Owner representatives related to any configuration changes required and/or proposed for Owner's Ethernet infrastructure (VLAN configuration, QoS mapping, routing, RADIUS Services, Firewall security provisions etc.).
- F. Power for all APs, shall be provided by way of standard IEEE Power over Ethernet (PoE) installed in appropriate distribution frames by others

throughout sites of work and configured for use as described in Section 17210.

- G. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant Wireless Communication System, complete and with full functionality as specified herein.
- H. Contractor shall coordinate their installation with other communication systems, contractors, Designer and the Owner as is appropriate.

1.03 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of three (3) 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 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.
- 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.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
 - 1. Four (4) hours or less for matters that render twenty percent (20%) or more of the system users unable to maintain normal productivity.
 - 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 for recommended maintenance programs for all equipment following the specified and included period 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.

1.04 STORAGE OF MATERIALS

- A. All materials shall be secured when not in use by the Contractor.
- B. It shall be the Contractor's responsibility to secure all equipment including material to be installed as part of the contract. No changes shall be made to the contract due to loss or theft of equipment and/or materials not officially accepted by the Owner.
- C. Formal receipt of the materials shall not be completed by the Owner until completion of project closeout. The Contractor shall be responsible for all equipment until time of closeout as provided for herein.

1.05 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 and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
 - 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 Designer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings 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 does 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. Microsoft Project is the software of choice for this schedule. 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. Owner will rely on such schedules to coordinate and otherwise plan related work of Owner personnel, other separate contractors, or the Owner's routine daily work.

1.06 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. MOSHA Safety Standards

1.07 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system. 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.
- D. The Contractor shall have a proven track record in Wireless Communication Network System 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 Proposal as provided herein. Bid Proposal Form(s) may be duplicated as required in order to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer:

1. 3COM / HEWLETT-PACKARD
2. ARUBA NETWORKD
3. CISCO SYSTEMS
4. MERU NETWORKS
5. RUCKUS WIRELESS
6. TRAPEZE NETWORKS
7. Xirrus

2.02 Supply most current version of all products provided.

- A. Prior and/or old versions of products, unless specifically approved and documented by Designer and/or Owner shall not be acceptable.
- B. 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.

- A. The Owner currently has deployed One (1) Ruckus ZoneDirector 3050 controller and thirty five (35) ZoneFlex 2942 APs and would be open to an alternate bid providing upgrade(s) to existing equipment to meet the specification requirements. Base bids may not include use of, or trade-in credits for, existing equipment. Alternate bids containing such provisions will be carefully considered.
- 2.04 System shall be comprised of interoperable components including, but not limited to, centrally located Wireless Controllers, 801.11 Access Points, management software, antennae, power injectors/switches and battery/power conditioning equipment, integrated into a common working system.
- 2.05 System shall be upgradeable to support the emerging 802.11n standard.
- 2.06 CENTRAL WIRELESS CONTROLLER
- A. System shall be capable of supporting the specified configuration and an additional five (5%) more APs without additional hardware or software investment required (actual AP and antenna hardware cost excluded).
 - B. Central Wireless Controller shall properly and acceptably communicate over, and attach to, Owner's standard, existing, installed Ethernet communications network provided by others.
 - C. Central Wireless Controller shall be installed as a physically separate external controller. Controllers based in chassis switch enclosures are not acceptable as a base bid configuration.
 - D. System shall provide full functionality of the following feature sets and/or standards either in the Central Wireless Controller(s) or in Access Points, and shall provide for all management, configuration and control of features and/or standards from Central Wireless Controller administrative interface:
 - 1. LWAPP
 - 2. WEP
 - 3. NAC
 - 4. Traffic Prioritization WMM
 - 5. WPA2
 - 6. 802.11i
 - 7. Radio Resource Management
 - 8. Support of Multiple Layer 3 networks per AP (L3 Forwarding)

9. 802.11x
 10. RADIUS
 11. TKIP
 12. AES
 13. Full support of roaming users across contiguous APs
 14. Automatic dynamic channel and power selection and adaptation
 15. Auto VLAN Assignment
 16. SNMP
 17. PEAP
 18. Rogue AP detection
 19. Rouge AP isolation (containment)
 20. IPSec
 21. Access Control Lists based on Layer 2, Layer 3 and Layer 4 criteria
 22. 802.11e (WLAN QoS)\
 23. Ability to disable/disconnect wireless devices/clients (i.e. blacklist devices)
- E. System shall be capable of being fully administered from any web browser attached to the network.
1. Administration access shall be protected by unique and secure log on (User ID and Password).
 2. System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.
 3. System reporting shall include, but not be limited to:
 - a. Real time AP status.
 - b. Historical AP utilization for administrator defined period.
 - c. Status of all system components.
 - d. Real time connection trace capability.

- e. Complete historical connection detail reporting.
- F. System shall be configured to provide standard acceptable Ethernet Quality of Service (QoS) identification at both layer two (2) and layer three (3) to Owner's existing network infrastructure so as to insure end-to-end priority delivery of voice traffic across the network.
- G. System shall provide for adequate connection admission control with Owner's existing network infrastructure to guarantee Local Area Network/Wide Area Network (LAN/WAN) links are not oversubscribed.
- H. 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.
- I. Central Wireless Controller equipment at the central site shall be fully redundant using multiple hardware components, and provide for fully transparent communications and full feature availability in the event of any individual component failure in a primary unit.
- J. All other features currently a part of the manufacturer's latest commercial release.

2.07 WIRELESS ACCESS POINTS (APs)

- A. Four hundred ten (410) Wireless Access Points shall be provided.
- B. APs shall properly and acceptably communicate over, and attach to, Owner's standard, existing, installed Ethernet communications network provided by others.
- C. System shall support the following features, standards and/or protocols:
 - 1. IEEE 802.11n
 - 2. IEEE 802.3af
 - 3. IEEE 802.11n MIMO
 - 4. Multiple simultaneous BSSIDs
 - 5. DHCP
 - 6. SNMP
- D. APs shall meet or exceed the following:
 - 1. All antennae shall be integrated into Access Point enclosure.
 - 2. Dual radio 2x2 MIMO compliance.

3. Transmit and receive 2.4Ghz and 5Ghz bands simultaneously
 4. 10/100/1000 PoE Compliant (802.3af)
- E. All APs shall be firmly and securely mounted to finished ceiling, wall, or other surfaces to maximize wireless coverage and minimize tampering potential.

2.08 CONNECTION AND POWER OVER ETHERNET (PoE)

- A. All equipment for system bid shall connect to Owner's Ethernet distribution system including standard IEEE 802.3af PoE by others. Proprietary power distribution shall not be acceptable.
- B. All other features currently a part of the manufacturer's latest commercial release.

2.09 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 \$12,300.00 for contract services related to special cable, installation, configuration, testing and/or documentation.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer and Owner 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 Designer prior to commencement of any final installation activities.

3.02 INSTALLATION

- A. Contractor shall conduct complete RF Propagation Site Survey for all IEEE 802.11 frequency bands throughout the Owner sites to determine specific and appropriate installation and programming standards for AP mounting, final antennae and channel selection.
 - 1. RF Propagation Site Survey shall be fully documented (Report) by Contractor and submitted to Owner and Designer for written approval prior to any physical arrangement or accommodation for installation of system.
 - 2. RF Propagation Site Survey shall include, but not be limited to:
 - a. Recommended physical AP placement.
 - b. Recommended AP channel selections.
 - c. Recommended AP antennae configuration.
 - 3. Owner and Designer shall require up to two weeks to complete review(s) of RF Propagation Site Survey and provide written approval. Approval will be dependent upon acceptable and timely response to answers Owner and Designer may require of Contractor after the presentation of the RF Propagation Site Survey Report.
 - a. If Owner and Designer are unable to approve Report, Contractor may be provided reasonable opportunity to amend, complete or correct Report.
 - b. If Contractor is unable to provide Report acceptable to Owner and Designer after a reasonable duration is extended to do so, Owner reserves the right to terminate Contract.
- B. 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 normal daily activities.
- C. 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.
- D. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.

- 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. This may include, but not be limited to VLAN configuration recommendation, SSID(s) broadcast coordination and security/encryption initiation.
 6. Label all system devices as may be appropriate and required by Owner and Designer.
 7. Complete end user and system administrator training programs as specified herein.
 8. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment.
 9. Work includes extending Ethernet patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - a. Work included to connect patch cables for some APs may be in air plenum spaces, above finished ceilings, or in other ways require special care and suitable tools to complete.
 - b. Patch cables shall not exceed thirty (30) feet in length.
 10. Work includes all material and labor to cross connect APs in communication closets to PoE switches provided by others.
 - a. Work included to connect patch cables shall be conducted in a neat and first class manner and follow all Owner and industry best practices as required.
 - b. Patch cables shall not exceed eight (8) feet in length.

- c. Coordinate all specific cable lengths and connection pathways with Owner prior to installation.

F. Worksites include the following:

1. Administration Building
183 W. Roosevelt Avenue
Zeeland, Michigan 49646
2. Cityside Middle School
320 E. Main Street
Zeeland, Michigan 49646
3. Creekside Middle School
179 W. Roosevelt Avenue
Zeeland, Michigan 49646
4. Early Childhood Center
140 W. McKinley Avenue
Zeeland, Michigan 49646
5. Lincoln Elementary
60 E. Lincoln Avenue
Zeeland, Michigan 49646
6. New Groningen Elementary
10542 Chicago Drive
Zeeland, Michigan 49646
7. Quincy Elementary
10155 Quincy
Zeeland, Michigan 49646
8. Roosevelt Elementary
175 W. Roosevelt Avenue
Zeeland, Michigan 49646
9. Transportation Department
720 E. Main Street
Zeeland, Michigan 49646
10. Woodbridge Elementary
9100 Woodbridge Street
Zeeland, Michigan 49646
11. Zeeland East High School
3333 – 96th Street

Zeeland, Michigan 49646

12. Zeeland West High School
3390 – 100th Avenue
Zeeland, Michigan 49646

- G. 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. 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.
- H. 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.

3.03 TESTING

- A. In an effort to insure 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 to Designer indicating they have completed full and final configuration of the system, and are ready to have system integrity and functionality tested. Such request shall include a written proposed test plan for complete system functionality.
 2. Within reasonable time after receipt of request and proposed test plan, Designer will provide amendment(s) to the proposed test plan, 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 provide Owner an appropriate storage system that shall adequately allow for inclusion of all necessary as-built drawings, owners manuals of all equipment installed, warranty and maintenance information and other information the Contractor, Designer and/or Owner deem necessary for final documentation package.
- 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 as built drawings for each building.
14. System Channel and Configuration Report.
15. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, AP and antenna types (model numbers), Ethernet MAC address, AP serial number, physical installation location and software options.

3.05 TRAINING

- A. Contractor shall provide training for the Owner designated system administrator(s). Owner shall designate up to three (3) administrators to be trained. Training shall be a minimum of two (2), four (4) hour days 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. AP additions, moves and changes as well as AP reconfiguration.
 4. Rouge AP location techniques.
 5. Review of system alerts, logs and monitoring of automatic configuration changes provided by the system in parameters including, but not limited to, channel assignment changes, transmission power changes, load balancing and AP status.

- B. Contractor shall submit a written training plan, course description(s) and syllabus to Owner and Designer for approval. Owner and/or Designer may require amendments(s) to training plan, course description and syllabus prior to training being scheduled

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Final Vendor Presentations: Week of September 27, 2010
2. Contractor Chosen: October 20, 2010
3. Work Commences: November 1, 2010
4. Substantial Completion of Project: January 28, 2011
5. Project Close-out: February 25, 2011

- 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. 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

SECTION 17400
MULTI-MEDIA EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to classroom multi-media instructional equipment for the Zeeland Public Schools.
- B. Owner intends to install classroom based multi-media systems to support audio level enhancement, projection of video content, particular camera equipment and associated control and support components.
 - 1. System shall be comprised of interoperable components which may include, but not limited to projectors, document cameras, interactive marker boards, equipment carts multi-media amplifications systems, component mounting brackets and housings, patch and connector cords and cables integrated into a common working system.
- C. 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.
 - 1. Some system components will connect to mounting hardware, cables and connectors provided by others and as specified in Section 17130 herein.
 - 2. Contractor shall be responsible for a fully functional and operational system. No components, cables or connections shall be provided by Owner for the system unless specifically identified herein.
- D. 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.
- 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.

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. Lists of acceptable manufacturers have been provided to establish a standard of quality 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 on either acceptable manufacturer's components or components deemed equal in quality and function for the intended applications.
- C. Judgment and determination associated with equivalency of components, compatibility with existing installed items and/or fitness for the intended use and application shall be solely by Owner and Designer.

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 VIDEO PROJECTORS

- A. Three hundred twenty two (322) projectors, each with accompanying projector universal mount shall be provided.
- B. Acceptable Manufacturers (In alphabetical order):
 - 1. EPSON
 - a. 826W+
 - 2. HITACHI

3. SANYO
 4. SHARP
 5. Or Equal.
- C. Projectors shall include full functionality of the following feature sets and/or standards in projector management software and/or remote access capability and in conjunction with proposed projectors, and shall provide for all management, configuration and control features and/or standards from a management administrative interface:
1. Administration access shall be protected by unique and secure log on (User ID and Password).
 2. System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.
 3. Projector reporting shall include, but not be limited to:
 - a. Bulb/Lamp life status management (bulb use).
 - b. Device power status (on/off).
 - c. Filter status management.
 - d. Source selection status.
 4. Projector Control shall include, but not be limited to:
 - a. Device power (on/off).
 - b. Source selection.
 - c. Internal or downloadable program schedule database for timed execution of projector control functions based on, but not limited to time of day and day of week.
- D. Projector management software and/or access shall be installed on equipment provided at Owner discretion to be located at the owner's discretion and communicate over the existing installed infrastructure provided by others.
- E. Projectors shall meet or exceed the following minimum output, port availability and other standards:
1. 2500 ANSI Lumens with WXGA resolution.
 2. +/- 30 degree keystone correction.

3. 7 second power-on to image.
 4. 1.2x optical zoom lens.
 5. Bidirectional RS-232 serial control port.
 6. RGB WXGA port.
 7. Operating volume level of less than 40dB (fan).
 8. Operating temperature range of 45 – 95 degrees Fahrenheit.
 9. Accessible top or front panel mechanical controls including, but not limited for the following functions:
 - a. Power on.
 - b. Power off.
 - c. Video input port selection.
 10. Mechanical keypad lock out to minimize tampering with device settings
 11. Ethernet connector for management, monitoring and control applications.
 12. User definable power on graphic to replace factory default or manufacturer logo
 13. Easily serviceable bulb and filter maintenance when mounted in ceiling kit
 14. Compatibility with standard ceiling mounting kits.
- 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.
- H. Bidder shall provide 1.5 bulbs for each proposed projector in base bid.
1. One (1) bulb shall be installed in each projector.
 2. Bulbs not installed in projectors shall be provided as shelf spares.

2.05 PROJECTOR CEILING PLATES/BRACKETS/KITS

- A. Three hundred twenty two (322) Projector Plates/Brackets/Kits shall be provided.

B. Acceptable Manufacturer:

1. CHIEF
2. PEERLESS
 - a. PRS-UNV
3. Or approved equal

C. Projector mounting bracket shall be black in color

D. Projector brackets shall be complete for the proposed projector and safely accommodate particular and specific mounting conditions.

2.06 DOCUMENT CAMERAS

A. Three hundred twenty two (322) document cameras shall be provided.

B. Acceptable Manufacturers

1. AVERMEDIA
 - a. AF+300
2. ELMO
3. QOMO
4. SAMSUNG
5. Or Equal.

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 and communicate over a USB 2.0 connection provided by bidder after a final configuration is fully tested and certified for final installation.
- E. Document cameras shall meet or exceed the following minimum standards:
 - 1. Powered 5x Optical Zoom.
 - 2. 8x Digital Zoom.
 - 3. Maximum tabletop camera capture field of 11" x 17".
 - 4. 1320 x 1040 effective pixel resolution
 - 5. USB 2.0 port connection to computer workstation to provide, but not be limited to the following:
 - a. Image "snap shot" capture.
 - b. Video capture.
 - c. Device control.
 - 6. 25 frames per second video capture rate.
 - 7. SD card slot.
 - 8. LED illumination lamp.
 - 9. WXGA output port with 1440 x 900 resolution at 60Hz.
 - 10. Auto focus adjustment with manual override.
 - 11. Auto white balance.
 - 12. Auto brightness adjustment with manual override.
 - 13. Availability of microscope attachment accessory or feature.
- 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.

2.07 MULTI-MEDIA SWITCH & AMPLIFICATION

- A. Three hundred twenty two (322) Multi-Media Switch and Amplification shall be provided.
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. AMX
 - 2. AUSTRALIAN MONITOR
 - 3. CALYPSO
 - 4. CRESTRON
 - 5. EXTRON
 - 6. HALL RESEARCH
 - 7. KRAMER
- C. Multi-Media Switch and Amplification shall provide capability for audio switching, audio mixing [Four (4) inputs – three (3) program and one future voice], level adjustment and input/output control in each classroom.
 - 1. Stereo speaker terminals for connection of speaker wire (L/R) to classroom speakers
- D. The system must be capable of audio ducking allowing for automatic volume control when a designated microphone channel is active with selectable time delays.
- E. Amplifier must provide a minimum of 30 watts of power per channel (L/R).
- F. Multi-Media Switch and Amplification shall provide capability for video switching [Four (4) WXGA inputs – PC, Guest PC, Document Camera and one Future] with video mute and EDID control and/or emulation.
 - 1. One (1) WXGA 15 pin video output port supporting multiple resolutions and aspect ratios up to and including 1600 x 1200 for connection to classroom projector
- G. Multi-Media Switch and Amplification shall provide front panel user controls for coordinated audio/video switching and volume control.
- H. Multi-Media Switch and Amplification shall provide serial bi-directional communication port for connection to future control system and/or projector interface.
- I. 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.

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

2.08 EQUIPMENT CARTS

- A. Three hundred twenty two (322) Equipment Carts shall be provided.
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. BRETTFORD
 - a. Model TC35-BK
 - 2. NUCRAFT
 - 3. PREMIUM MACHINES
 - 4. SPECTRUM INDUSTRIES
 - 5. VANERUM STELTER
 - 6. Or Equal.
- C. Equipment Carts shall meet or exceed the following minimum standards:
 - 1. Multi-Media Cart shall be 24 x 32 x 31
 - 2. Cart shall be constructed of a durable metal or laminate material that is scratch resistant fully finished
 - 3. Ability to house PC
 - 4. Sliding keyboard and mouse tray
 - 5. Monitor shall be capable of being placed on top of cabinet
 - 6. Ability to house all components for classroom media system
 - 7. Ability to lock securely to protect contents in ventilated storage area
 - 8. Four, four inch (4") hard rubber casters.
 - 9. Cart shall provide for 15' extension of power cable to allow routing to the nearest power outlet in classroom locations.
 - 10. Color shall be coordinated with Owner prior to final installation and shall have power coat or equally durable laminate finish

2.09 PROJECTION SCREENS

- A. Three hundred twenty two (322) Projection Screens shall be provided
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. DA-LITE
 - 2. DRAPER
 - 3. Or equal
- C. Projection Screens shall meet or exceed the following minimum standards:
 - 1. Viewing surface of 96” x 96”
 - 2. Matte white viewing surface
 - 3. Constructed of flame retardant and mildew resistant fabric
 - 4. Neutral color painted 21-gauge steel case
 - 5. 4’ pull cord securely fastened to bottom of screen
 - 6. Controlled screen return (CSR)
 - 7. Six (6) inch “L” brackets for mounting to vertical wall surface
- D. All other features currently a part of the manufacturer’s latest commercial version.

2.10 INTERACTIVE WHITEBOARDS

- A. Sixty Four (64) Interactive Whiteboards shall be provided.
- B. Acceptable Manufacturers (in alphabetical order):
 - 1. PROMETHEAN
 - 2. SMART
 - 3. Or Equal.
- C. Interactive Whiteboards shall meet or exceed the following minimum standards:
 - 1. 87” inches in diagonal size.
 - a. Smart Model 685.
 - b. 16:10 Board.

2. Pen Tray.
3. Touch Recognition.
4. Digital Ink.
5. Save Function.
6. Hard Coated Surface.
7. Software Included – Windows compatible.
8. Interactive Whiteboards should be installed in classrooms and integrated with projectors and other devices provided by others.

2.11 ALTERNATE EQUIPMENT

- A. The Owner may elect to install all or a portion of the below alternate classroom multimedia equipment in classrooms. Alternate equipment shall not be included in lump sum base bid amount.
- B. All equipment and installation specifications included in the “Base Bid” shall be strictly enforced in the installation of Alternate Equipment.

1. INTERACTIVE WIRELESS SLATE

- a. Three hundred twenty two (322) Interactive Wireless Slates shall be provided.
- b. Acceptable Manufacturers (in alphabetical order):
 1. eBEAM
 2. MIMIO
 3. SMART
 4. Or Equal.
- c. Interactive Wireless Slates shall meet or exceed the following minimum standards:
 1. Bluetooth wireless technology
 2. 100 points per second maximum report rate
 3. 2032 lpi resolution rate

4. Rechargeable battery providing for twenty four (24) hours of continual operation per charge
5. Microsoft Windows software included
6. Contractor shall coordinate Interactive Wireless Slate installation in classrooms and integrate with devices herein and provided by others including, but not limited to PCs.

2. DVD Player

- a. Three hundred twenty two (322) DVD Player shall be provided.
- b. Acceptable Manufacturers
 1. JVC
 2. SAMSUNG
 3. SANYO
 4. Or Equal
- c. DVD Player shall include full functionality of the following feature sets and/or standards in conjunction with proposed devices, and shall provide for all management, configuration and control functions from a standard user interface.
 1. Provide for IR controls including a battery powered remote control.
 - 2.11.B.2.c.1.1 Power
 - 2.11.B.2.c.1.2 Transport
 - 2.11.B.2.c.1.3 Play
 - 2.11.B.2.c.1.4 Pause
 - 2.11.B.2.c.1.5 Stop
 - 2.11.B.2.c.1.6 Fast Forward
 - 2.11.B.2.c.1.7 Menu and Menu Selection
 - 2.11.B.2.c.1.8 Skip Forward
 - 2.11.B.2.c.1.9 Skip Back

2.11.B.2.c.1.10 Eject

2. Composite Video and Audio (R/L) output ports

2.11.B.2.c.2.1 Special consideration will be given to bidders providing option/alternate for a device with WXGA output

3. Playback support including, but not limited to the following North American (US) formats:

2.11.B.2.c.3.1 DVD-R

2.11.B.2.c.3.2 DVD-RW

2.11.B.2.c.3.3 DVD+R

2.11.B.2.c.3.4 DVD+RW

4. 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.

5. All other features currently a part of the manufacturer’s latest commercial release.

2.12 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 \$16,750.00 for contract services related to infrastructure equipment and connectivity upgrades.

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 insure 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.
- 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/or other contractor's work 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. 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. 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.

E. Multi-Media Amplification System

1. Affix asset ID tags to all components as required by Owner.
2. Install appropriate cord/cable bundle and protection provided by others to equipment cart provided by others. Cord/cable bundle may include, but not limited to UTP category 6, speakers, XGA and composite video cables in addition to power extension cable provided with equipment cart.
 - a. Cable bundle shall be adequately and properly protected from damage by inclusion of flexible braided sleeve or wire loom materials from cart to wall connectors as provided by others.
3. Connect cord bundle cables to outlets and/or all input and output ports on connected equipment provided by others.

4. Connect AC power to devices supplied.
5. Install/mount mechanical “push button” and input panels as required.
6. Connect mechanical “push button” and input panel(s) to Multi-Media Automation System as required.
7. Install classroom personal computer provided by others.
 - a. Un-box, set in place, connect and secure all components in/on equipment carts provided by others. This will include, but not be limited to:
 1. Log serial numbers.
 2. Dispose of waste materials
 3. Complete image download from Owner network.
8. Connect to speaker system provided by others.
9. Set input level adjustment on all input ports.
10. Set default level, tone and mixing adjustments.
11. Provide materials for, coordinate and install cross connection to ALL control and input devices as provided for herein and/or as required by Owner and Designer. Connections shall include, but not be limited to the following:
 - a. Video Projector.
 - b. Personal Computer Workstation/Display Equipment.
 - c. Document Camera.
 - d. Interactive White Board
12. Label any auxiliary video device connections, if required, for intuitive user access.
13. Properly configure, program and test controller to provide functionality as required herein.
14. Provide unrestricted Owner access to un-compiled source code version of installed system programs and software.
15. Complete/Extend and label all other connections required to provide functionality as required herein.

F. Document Cameras

1. Connect AC power to outlet in/on mobile cart provided by others.
2. Connect classroom workstation provided by others.
3. Fully cooperate and coordinate with others for classroom workstation software installation. Installation will be performed by Owner.

G. Projector Screens

1. Mount and test screens.

H. Video Projectors

1. Affix asset ID tag.
2. Install, configure and test approved firmware configuration template including, but not limited to:
 - a. Power on Image.
 - b. Lamp setting.
 - c. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
 - d. Default port selection.
3. Neatly configure all cables as directed by Owner.
4. Attach projector to mount using projector security mounting plate provided by others.
5. Connect AC power using cord provided to projector.
6. Alight projector with screen.
7. Set keystone adjustment(s) as required.
8. Zoom and focus projector as required.
9. Secure all adjustment points.
10. Remove and dispose of all existing screens, brackets, excess materials and packaging as directed by Owner.
11. Remove and dispose of all existing television screens, brackets, excess materials as directed by Owner.

12. Install manufacturer's control software on Owner provided PC.

I. Equipment Carts

1. Equipment carts shall be fully assembled and fully functional for intended application of equipment housing in classroom environments.
2. Coordinate equipment placement and mounting to cart with Owner prior to any final installation activity.

J. Interactive Wireless Tablet

1. Install system for complete and final operation as required by Owner.

K. 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.
4. Provided the removal is done in a neat and workman like manner, using care and best practices, areas of equipment removal (Existing Screens, Televisions and brackets will not require Contractor patching and painting as part of the contracted scope of work.

L. 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.

M. Worksites include the following:

1. Administration Building
183 W. Roosevelt Avenue
Zeeland, Michigan 49646

2. Cityside Middle School
320 E. Main Street
Zeeland, Michigan 49646
3. Creekside Middle School
179 W. Roosevelt Avenue
Zeeland, Michigan 49646
4. Early Childhood Center
140 W. McKinley Avenue
Zeeland, Michigan 49646
5. Lincoln Elementary
60 E. Lincoln Avenue
Zeeland, Michigan 49646
6. New Groningen Elementary
10542 Chicago Drive
Zeeland, Michigan 49646
7. Quincy Elementary
10155 Quincy
Zeeland, Michigan 49646
8. Roosevelt Elementary
175 W. Roosevelt Avenue
Zeeland, Michigan 49646
9. Transportation Department
720 E. Main Street
Zeeland, Michigan 49646
10. Woodbridge Elementary
9100 Woodbridge Street
Zeeland, Michigan 49646
11. Zeeland East High School
3333 – 96th Street
Zeeland, Michigan 49646
12. Zeeland West High School
3390 – 100th Avenue
Zeeland, Michigan 49646

3.03 TESTING

- A. In an effort to insure 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. Category 5e station cable certification test results
 - a. Full IEEE compliant test results shall be certified by contractor using approved test equipment.
 2. Equipment description.
 3. Equipment make.
 4. Model number.
 5. Software release.
 6. Date installed.
 7. Manufacturer's warranty.
 8. Maintenance contract terms.
 9. Verification of maintenance contract engagement.
 10. Telephone numbers for service and support.
 11. Detailed technical support and service procedure instructions.
 12. 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.
 13. 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.
 14. CAD as built drawings for each building.
 15. System Configuration Report.

16. Complete inventory of installed hardware and system software including, but not be limited to, model numbers, 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 two (2), three (3) 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 enroll single Owner representative in control system manufacturer sponsored education support and training programs at the discretion of the Owner at no additional cost.
- D. Contractor shall provide end user training for classroom instructors district wide. Training shall be a minimum of 180 minutes in length and conducted three (4) times across the district in locations designated by Owner prior to the start of the resumption of classes for the school year. Sessions shall be conducted based on groupings of similar grade level instructors. Contractor shall provide an adequate number of trainers with current teaching certifications (or equal credentials in post-secondary education) to support this requirement. End user training 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. System care and classroom maintenance best practices.
 6. Equipment cart relocation and adjustments.
 7. Screen operation and care.
 8. Problem reporting.
 9. Lesson plan modification/enhancement to leverage equipment as an enhanced teaching tool.
 10. Specific modeling of appropriate full system utilization enhancing Owner's existing Curriculum for relevant grade levels.
 11. Finding and review of relevant resources (both district owned, licensed and public domain) for useful banks of materials/content that can be leveraged by installed system.
- E. "First day" training support shall be provided for all buildings (district wide) during the initial day of the resumption of classes for the school year. 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.
- F. All training shall be recorded on video and delivered to Owner for future new staff and guest teacher training. Recording shall be clear and audible on Owner's playback device of choice.
1. While "professional grade" recording is not required for this application, poor quality or poorly produced content will not be acceptable.

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Final Vendor Presentations: Week of September 27, 2010
2. Contractor Chosen: October 20, 2010
3. Work Commences: November 1, 2010
4. Substantial Completion of Project: January 28, 2011
5. Project Close-out: February 25, 2011

- 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

SECTION 17410
DIGITAL VIDEO SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to classroom digital IP video solution for Zeeland 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. 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.
- E. Owner reserves the right to award separate sections of work to separate potential bidders in the event it is considered to be in the best interest of the Owner. Such award separation may include, but not be limited to:
 - 1. Encoders
 - 2. Decoder/Management of streams
 - 3. Storage (including possible use of existing)
 - 4. Video on Demand
- 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. All on-site work shall be completed in a manner which does not interfere in any way with student activities. Work will therefore likely be required to take place before and/or after normal school hours of activity.
- H. 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 proactive annual system service during warranty period. Such warranty service shall include, but not be limited to refresher instruction for technical team, review of best practice operations and detailed written commentary review of system logs and files.
- F. 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.

- G. 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.

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. Lists of acceptable manufacturers have been provided to establish a standard of quality for individual components associated with the specified system. Indicated components may include particular models and makes currently installed and/or preferred by Owner.
- B. Any system bid shall be based on either acceptable manufacturer's components or components deemed equal in quality and function for the intended applications.
- C. Judgment and determination associated with equivalency of components, compatibility with existing installed items and/or fitness for the intended use and application shall be solely by Owner and Designer.

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 IP VIDEO SYSTEM

- A. One IP Video System encoding head end shall be provided for IP streaming video distribution from district head end.
- B. Acceptable Manufacturers:
 - 1. CISCO
 - 2. MEDIACAST

3. OPTIBASE
 4. V-BRICK
 5. VIDEO FURNACE / HAIVISION
 6. Or equal
- C. Major components of system shall be installed in/on racks and shelves provided by Owner.
- D. IP Video Encoding Head-end shall meet or exceed the following minimum standards:
1. Dual stream H.264 hardware compression
 - a. One stream is expected to be a higher quality and higher bit rate for wire based viewing (such as on teacher workstations) and the second simultaneous stream will be a lower bit rate, lower quality for limited bandwidth (such as wireless) based viewing.
 2. Provide video image at full frame rates and D1 resolution
 3. Frame rates of 30 NTSC frames per second
 4. Image resolution 720x480
 5. Video bit rate configurable 1.5Mbits/s to 7.5Mbit/s
 6. MPEG-1 Audio encoding 256 kbps or with 48 KHz sample rate
 7. Twenty (20) simultaneous dual bit rate IP Video Streams shall be supported in the base configuration.
 - a. Four (4) of which must be portable encoders for potential use in special applications such as event video origination with Owner provided remote camera/broadcast equipment, occasional use in remote locations or other connected district facilities.
 - b. Sixteen (16) of which must be rack based in the Owner's existing data center / district head end.
 8. Ability to decode streams easily and clearly on all of Owner's Windows, Macintosh and/or Linux based PC workstations through a standard web browser image.
 - a. Special consideration will be given to solutions providing for viewing of streams in standard, common players including, but not limited to

Windows Media Player and Flash and common players associated with portable devices such as iPods and Android based devices.

- E. Bidder shall provide IP Video on Demand (VoD) meeting or exceeding the following:
1. Integrated scheduling for broadcast of local content on local defined “channels”.
 2. Four hundred (400) hours of encoded video storage based on standard definition resolution, 30fps and H.264 encoding.
 - a. Special consideration will be given to solutions providing an option to store encoded video on Owner’s existing Storage Area Network.
 3. Distribution of fifty (50) simultaneous Video on Demand (VoD) streams.
 4. Simple production oriented ability to encode video assets from any number of original source materials including, but not limited to VHS tapes, DVDs, Blue Ray Disks, and existing digital media.
 - a. Encoded assets shall have the ability to be “tagged” with a unique URL for easy reference distribution. Such distribution may include, but not be limited to links on district websites.
 5. Playback and video recording scheduling.
 - a. All playback and recording of content shall be available in dual H.264 formats.
 1. One available stream format is expected to be a higher quality and higher bit rate for wire based viewing and the second available stream format at a lower bit rate, lower quality for limited bandwidth (such as wireless) based viewing.
 6. Integrated Create, Edit, Publish, Delete, Load, Save operations for Media Assets including Metadata.
 7. Simultaneous ingest of up to five streams.
 8. Full network playback controls supported in included player:
 - a. Play
 - b. Pause
 - c. Fast Forward
 - d. Rewind

- e. Step forward and reverse
 - f. Shuttle and slow-motion in both directions
9. RDBMS Management of Assets for, but not limited to searching, sorting, categorizing, archiving and reporting.
 10. Published assets available for on request viewing and/or Scheduled Playback.
 11. RDBMS of asset metadata.
 12. Owner desires federated, coordinated or linked search capabilities of multiple databases of assets (both internal and external), including but not limited to, local Video on Demand content, Learn 360 and Discovery Education's United Streaming products.
- F. Bidder shall provide Video Playback Management System meeting or exceeding the following:
1. System shall provide secure, simple, easy to use, end-to-end system for distributing video to computers, portable devices and set-top boxes.
 - a. Basic program guide for broadcast channels
 - b. User selection of content to initiate stream
 2. Track distribution of H.264 streams and enforce security and access controls provided by Owner's existing LDAP directory based policies.
 3. Provide for scheduled controls/streams.
 4. Reporting of system use including, but not limited to:
 - a. Viewership at particular times for particular streams
 - b. User attempted access to restricted content
 5. Bidder shall provide deduct amount as alternate to remove Video Playback Management System from their base bid.
- G. Special favorable consideration will be given to systems compatible with Owner's existing virtual server installation.
- H. 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.
- I. All other features currently a part of the manufacturer's latest commercial release.

2.05 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 \$3,500.00 for contract services related to rack/cabinet upgrades to facilitate IP video system installation.
 2. Allowance shall be made in the amount of \$8,500.00 for contract services related to supply, installation and connection of data center cross connect upgrades to facilitate core equipment connection.

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 insure 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.
- 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/or other contractor's work 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. 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. 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.

11. IP VIDEO SYSTEM

- a. Affix asset ID tags.
- b. Install hardware in data center.
- c. Connect to district Ethernet switch(s) as required.
- d. Install, secure and/or mount all television monitor equipment as required by Owner.
- e. Provide all appropriate patch cord/cable bundle and protection. Cord/cable bundle may include, but not be limited to power, UTP category 6, audio cables and video cables.
 1. Cables shall be adequately and properly protected from damage and potential of physical tampering.
- f. Connect AC power to all devices supplied and necessary for system operation.
- g. Connect central, rack mounted encoders to Owner provided video stream isolation units (set-top boxes / tuners) supplied by broadcast content provider.
 1. Provide all cables and connectors as may be required for a full and complete operating system.
 2. All cable management shall be neat and workman like following industry best practices and relevant manufacturer recommendations for installation and connection.
- h. Properly configure and verify operation as directed by Owner.

- E. 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.

- F. 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.

- G. Worksites include the following:
 - 1. Zeeland West High School
3390 – 100th Avenue
Zeeland, Michigan 49646

3.03 TESTING

- A. In an effort to insure 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 documentation system that shall include 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. Category 5e station cable certification test results
 - a. Full IEEE compliant test results shall be certified by contractor using approved test equipment.
 2. Equipment description.
 3. Equipment make.
 4. Model number.

5. Software release.
6. Date installed.
7. Manufacturer's warranty.
8. Maintenance contract terms.
9. Verification of maintenance contract engagement.
10. Telephone numbers for service and support.
11. Detailed technical support and service procedure instructions.
12. 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.
13. 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.
14. CAD as built drawings for each building.
15. System Configuration Report.
16. Complete inventory of installed hardware and system software including, but not be limited to, model numbers, Ethernet MAC address, serial numbers, physical installation location and software options.

3.05 TRAINING

- A. 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 two (2), three (3) 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.
- B. Contractor shall enroll single Owner representative in manufacturer sponsored/certified support and training program(s) at the discretion of the Owner. Such included training shall enable attendee to take, and reasonably expect to pass, relevant certification test/exam. Such class shall include allowance for reasonable travel and expense of Owner designated attendee.

3.06 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Final Vendor Presentations: Week of September 27, 2010
2. Contractor Chosen: October 20, 2010
3. Work Commences: November 1, 2010
4. Substantial Completion of Project: January 28, 2011
5. Project Close-out: February 25, 2011

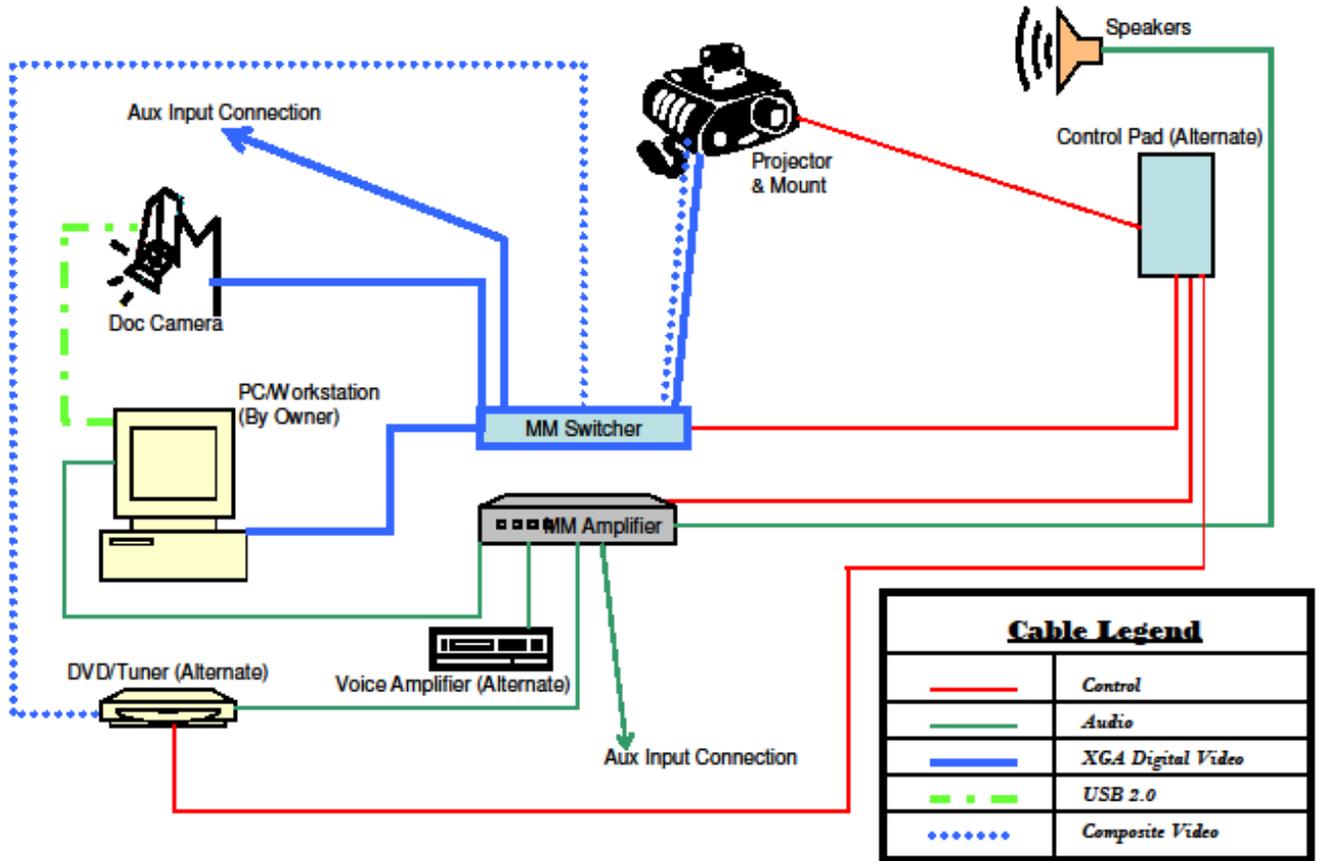
B. Planed sequence of operations shall be established by the Contractor within guidelines established by the Owner, as required herein and to meet schedules.

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

Zeeland Public Schools Multi-Media Typical Classroom Connection Diagram



APPENDIX B – NETWORK INVENTORY

Elementary Buildings

<i>Hostname</i>	<i>Device Type</i>	<i>Software Version</i>
ZPS-NewGroningen-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Roosevelt-3548-3	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Roosevelt-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Lincoln-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ECC-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Roosevelt-3548-2	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Woodbridge-3550-PWI-24-IDFA-1	WS-C3550-24-PWR	12.2(35)SE5-IP-BASE
ZPS-Woodbridge-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Quincy-3750-48-MDF-1	N/A	N/A
ZPS-Quincy-3750-48-MDF-1-1	WS-C3750-48TS	12.2(50)SE2-IP-BASE-CRYPTO
ZPS-Quincy-3750-48-MDF-1-2	WS-C3750-24TS	12.2(50)SE2-IP-BASE-CRYPTO
ZPS-LIN-3548-2	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-NewGroningen-3548-2	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-QUI-3550-48-IDF2-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-QUI-3550-48-IDF1-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ECC-3524-2	WS-C3524-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-NewGroningen-3548-3	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-NewGroningen-3548-IDF1-4	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-QUI-3550-24-IDF2-2	WS-C3550-24	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-Roosevelt-3524-IDF1-1	WS-C3524-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-QUI-3550-24-IDF1-2	WS-C3550-24	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-HS-4506	WS-C4506	12.2(25)EWA13-SMI
ZPS-Lincoln-3458-3	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-Roosevelt-3550-48-4	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO

Middle School Buildings

<i>Hostname</i>	<i>Device Type</i>	<i>Software Version</i>
ZPS-CRK-3550-48-2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-Cityside-3550-48-IDF2-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-Cityside-3548-IDFA-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-HS--4506	WS-C4506	12.2(25)EWA13-SMI
ZPS-Cityside-3508-1	WS-C3508G-XL	12.5(5)WC17-C3500XL-C3H2S-M
ZPS-Creekside-3508-1	WS-C3508G-XL	12.5(5)WC17-C3500XL-C3H2S-M
ZPS-Cityside-3550-48	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-CRK-3550-48-3	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-Creekside-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-CRK-3550-48-7	WS-C3550-48	12.2(25)SEE2IP-BASE
ZPS-CTY-3550-24-PWI-IDFC-1	WS-C3550-24-PWR	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-CRK-3550-48-6	WS-3550-48	12.1(12c)EA1-SMI

ZPS-CTY-3550-24-IDFC-1	WS-C3550-24	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-Cityside-3550-48	WS-C3550-24	12.2(44)SE6-IP-BASE-CRYPTO

High School Buildings

<i>Hostname</i>	<i>Device Type</i>	<i>Software Version</i>
ZPS-HS-4506	WS-C4506	12.2(25)EWA13-SMI
ZPS-ZEHS-3550-48-IDFA-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZEHS-3550-48-IDFC-1	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZEHS-3550-48-IDFD-2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-HS-3548-1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZEHS-3548-D1	WS-C3548-D1	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZEHS-3548-B1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZEHS-3548-E1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZEHS-3548-F1	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZWHS-3550-12T	WS-C3550-12T	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF1-4	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZEHS-3500-48-IDFD3	WS-C3548-XL	12.0(5)WC17-C3500XL-C3H2S-M
ZPS-ZWHS-3350-48-MDF2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-MDF3	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF1-2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF1-3	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-2960G-MDF1-4	WS-C2906G-24TC-L	12.2(50)SE1-LAN-BASE-CRYPTO
ZPS-ZEHS-355024-PWI-B2	WS-C3550-24-PWR	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF-1-1	Cisco WS-C35450-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-MDF1	Cisco WS-C35450-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF2-3	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3560-48-MDF	WS-C3560-48TS	12.2(50)SE1-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF2-2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZEHS-3550-24-PWI-IDFD4	WS-C3550-24PWR	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF2-1	Cisco WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF3-2	WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZWHS-3550-48-IDF3-1	Cisco WS-C3550-48	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ETS-DEAN-1	WS-C2960-8TC-L	12.2(50)SE1-LAN-BASE-CRYPTO
ZPS-ETS-DEAN-2	WS-C2960G-24	12.2(50)SE1-LAN-BASE-CRYPTO
ZPS-ZWHS-3550-24-IDF5-1	WS-X3550-24	12.2(44)SE6-IP-BASE-CRYPTO
ZPS-ZEHS-3550-12G	WS-X3550-12G	12.2(35)SE5-IP-SERVE
ZPS-ZWHS-3560-24-IDF4-1	WS-C3560-24TS	12.2(50)SE1-IP-BASE-CRYPTO

APPENDIX C – BUILDING DIGRAMS

Please refer to companion file, “Building Diagrams”.