PROJECT MANUAL

WAYNE STATE UNIVERSITY
DETROIT, MICHIGAN

STUDENT CENTER BUILDING
5TH & 7TH FLOOR RENOVATION
DETROIT, MICHIGAN

BID PACKAGE 2
AUDIO-VISUAL

MAY 27, 2016

WSU PROJECT # 034-261806
N/S PROJECT NO. 2015025

ARCHITECT:
NEUMANN / SMITH ARCHITECTURE
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<th>STUDENT CENTER BUILDING RENOVATIONS DETROIT, MICHIGAN</th>
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<tr>
<td>OWNER</td>
<td>WAYNE STATE UNIVERSITY FACILITIES PLANNING AND MANAGEMENT OFFICE 5454 CASS DETROIT, MICHIGAN 48202</td>
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<tr>
<td>ARCHITECT</td>
<td>NEUMANN / SMITH ARCHITECTURE 400 GALLERIA OFFICENTRE; SUITE 555 SOUTHFIELD, MICHIGAN 48034</td>
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<tr>
<td>MECHANICAL AND</td>
<td>DICLEMENTE SIEGEL DESIGN, INC. 28105 GREENFIELD, SUITE 200 SOUTHFIELD, MICHIGAN 48076</td>
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<tr>
<td>ELECTRICAL ENGINEER</td>
<td>ACOUSTICS BY DESIGN, INC. 124 FULTON STREET EAST, 2ND FLOOR GRAND RAPIDS, MICHIGAN 49503</td>
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| N/S PROJECT NO.   | 2015025 |

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SECTION 01 1100 - SUMMARY OF WORK

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 PROJECT
   A. The Owner intends to renovate an part of an existing Building, and associated work, in Detroit, Michigan. Audio-Visual work is being issued as a separate package from the main renovation.
   B. Refer to the Owner's bidding information for additional descriptions and requirements.
   C. The Work is being issued by the Architect to the Owner and Contractor in a single Audio-Visual Package.
   D. Incase of conflict between these Division 00 and 01 specifications and those provided by WSU, the WSU requirements shall govern.
   E. The Audio-Visual contractor shall coordinate schedule and work efforts with the renovation's General Contractor.

1.03 CONTRACTS
   A. The Owner will solicit lump-sum proposals for the Work. The extent of work shall be fully described by the Contract Documents. Refer to the Owner's bidding information for additional descriptions and requirements.
   B. Work for the Audio-Visual package will be under a single Contract awarded by the Owner.
      1. The successful Audio-Visual Contractor will manage the procurement and installation of the audio-visual work and assume responsibility for coordination, phasing, and monitoring of the Work.

1.04 OCCUPANCY BY OWNER
   A. The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the Work.

1.05 CONTRACTOR USE OF PREMISES
   A. General: During the construction period the Contractor shall have full use of the Site for construction operations.
      1. The Contractor’s use of the Site is limited only by the Owner’s right to perform work or retain other contractors on portions of the Project.
      2. Work and personnel on site will not be permitted on weekends, holidays, before 7:00 am or after 5:00 pm on weekdays, unless authorized in writing by Owner.
   B. Limit use of premises to construction activities in areas indicated; allow for Owner occupancy and public use. Coordinate use under direction of Owner and Architect.
      1. Move any stored materials, equipment or products, which interfere with operations of the Owner.
   C. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
   D. Keep driveways and entrances serving the premises clear and available to the Owner, Owner's employee's, and General Public at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
   E. Owner Regulations: All construction personnel shall observe the Owner's regulations at all times when on the Project Site. Refer to WSU standards.
1.06 TEMPORARY FACILITIES AND CONTROLS

A. Regulations: Comply with governing regulations.
C. Temporary Site Access: Enter site only as directed by Owner. Arrange in advance with Owner for deliveries requiring other access.
D. Construction Parking: Park only within area designated by Owner. Control as required for orderly use.
   1. Do not permit parking on sidewalks, lawns or undesignated parking areas.
E. Storage: Store materials and equipment and stage operations only within site staging area.
   1. Suitably store materials so as not be exposed to weather where damage could result, or not invite tampering or theft. Storage is at Contractor's risk, except as provided under insurance.
F. Temporary Sanitary Facilities: Comply with governing regulations including safety and health codes.
   1. Existing toilet facilities on the floor undergoing renovation may be used by the contractor.
G. Temporary Electric Power Service: Electric power will be made available for use by the Owner.
H. Security: Do not allow unauthorized persons into construction areas. Carefully monitor and control all access to work areas. Lock all doors and gates when not in use and after working hours.
I. Construction Aids: Design, construction and maintenance of construction aids is sole responsibility of Contractor.
J. Cleanup: Maintain the premises free of accumulation of waste material or rubbish caused by construction operations at all times. Remove all waste materials and rubbish on a daily basis. Remove all tools, construction equipment, machinery and surplus materials at completion of work.
K. Safety: Comply with applicable requirements of OSHA, MIOSHA, EPA and any other government entity having jurisdiction.

1.07 PERMITS AND INSPECTIONS

A. No State, County or local permits are required for this project.
B. Inspections shall be conducted by Wayne State University's FP&M department, C&IT department, possibly other WSU departments, and possibly outside consultants contracted by WSU. Contractor shall coordinate and schedule all inspections.
C. Contractor shall establish a meeting with WSU prior to construction to review inspection procedures and submittals.

PART 2 PRODUCTS - NOT APPLICABLE
PART 3 EXECUTION - NOT APPLICABLE
END OF SECTION 01 1100
SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES

A. Administrative and procedural requirements for handling requests for substitutions made after award of the Contract.

1.03 DEFINITIONS

A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for “substitutions”. The following are NOT considered substitutions:

1.04 REQUESTS FOR SUBSTITUTION

A. Substitutions: For a period of 15 working days after Subcontract Award, Architect will consider written requests from Contractor for substitution of products. Requests received more than 15 working days after Subcontract award may be considered or rejected at the discretion of the Architect.

1. Architect will consider substitutions after 15 days of Subcontract award only if one of the following conditions applies.

B. A request for substitution constitutes a representation that the Contractor:

C. Submit a separate request for each product. Each request shall be on a separate “Substitution Request” form, included at the end of this Section. Provide complete data, drawings and samples as appropriate, with each request, including:

1. Comparison of qualities of proposed substitution with that specified.
2. Changes required in other elements of work because of substitution.
3. Effect on construction schedule.
4. Cost data comparing proposed substitution with product specified.
5. Any required license fees or royalties.

D. Architect will be judge of acceptability of proposed substitution except where cost is involved.

E. Substitutions WILL NOT be considered when they are indicated or implied on shop drawings or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Architect will review requests for substitutions with reasonable promptness and notify Contractor in writing of decision to accept or reject requested substitution.

1.05 SUBMITTAL REQUIREMENTS

A. Submit 3 copies of each request for substitution for consideration. Submit requests on the “Substitution Request” form included at the end of this Section and in accordance with procedures required for Change Order proposals.

1. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

a. Certification by the Contractor and Supplier that the substitution proposed is equal-to or exceeds the specified product in every significant respect to that required by the Contract Documents, and will perform adequately in the application indicated.

B. For products:

1. Product identification, including manufacturer’s name.
2. Manufacturer's literature, marked to indicate specific model, type, size, and options to be considered:
   a. Product description.
   b. Performance and test data.
   c. Reference standards.
   d. Difference in power demand, air quantities, etc.
   e. Dimensional differences from specified unit.

3. Full size samples if requested.

4. Architect reserves right to retain sample until physical units are installed on Project for comparison purposes.

5. Requester pay all costs of furnishing and return of samples.

6. Architect is not responsible for loss of, or damage to, samples.

7. Name and address of at least 3 similar projects and name of Owner's Representative Architect can contact; to discuss product, installation, and field performance data.

C. For construction methods:
   1. Detailed description of proposed method.
   2. Illustrate with drawings.

D. Itemized comparison of proposed substitute to specified item; indicate variations including size, weight, durability, and visual effect.

E. Data relating to changes in construction schedule.

F. Effect and changes required on separate or other contracts.

G. Coordination information necessary to accommodate the proposed substitute. Include a list of changes or modifications needed to other parts of the Work and to construction performed by separate contractors.

H. Complete breakdown of costs, of proposed substitution which shall include additional costs and saving generated by proposed substitution and shall indicate amount, if any, to be deducted from Contract Sum if proposed substitution is accepted.

I. Availability of maintenance and repair services, and sources of repair or replacement items.

PART 3  EXECUTION (NOT APPLICABLE)
SUBSTITUTION REQUEST

<table>
<thead>
<tr>
<th>Project:</th>
<th>Substitution Request Number:</th>
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<tr>
<td></td>
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<tr>
<td>To:</td>
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<tr>
<td>Re:</td>
<td>A/E Project Number:</td>
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<table>
<thead>
<tr>
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<tr>
<td>Address:</td>
</tr>
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<td>Phone:</td>
</tr>
<tr>
<td>Trade Name:</td>
</tr>
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<td>Model No.:</td>
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<tr>
<td>Installer:</td>
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<td>Address:</td>
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<th>History:</th>
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<tr>
<td>New product</td>
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<tr>
<td>2-5 years old</td>
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<tr>
<td>5-10 yrs old</td>
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<tr>
<td>More than 10 years old</td>
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Differences between proposed substitution and specified product:

Point-by-point comparative data attached - REQUIRED BY A/E

Reason for not providing specified item:

Similar Installation:

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<th>Architect:</th>
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<tbody>
<tr>
<td>Address:</td>
<td>Owner:</td>
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<td></td>
<td>Date Installed:</td>
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</table>

Proposed substitution affects other parts of Work: No [ ] Yes; explain [ ]

Savings to Owner for accepting substitution: ($ )

Proposed substitution changes Contract Time: No [ ] Yes [Add] [Deduct] ________________ days.

Supporting Data Attached: [ ] Drawings [ ] Product Data [ ] Samples [ ] Tests [ ] Reports [ ]

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CSI Form 13.1A 01 25 00.13 - 1
The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: ________________________________

Signed by: ________________________________

Firm: ________________________________

Address: ________________________________

Telephone: ________________________________

Attachments: ________________________________

A/E’s REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: ________________________________  Date: ________________________________

Additional Comments:  ☐ Contractor  ☐ Subcontractor  ☐ Supplier  ☐ Manufacturer  ☐ A/E  ☐  

______________________________________________________________________________

______________________________________________________________________________

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SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
A. Administrative and procedural requirements for handling and processing Contract Modifications.

1.03 MINOR CHANGES IN THE WORK
A. Supplemental instructions authorizing minor changes in the Work not involving an adjustment to the Contract Sum or Contract Time may be issued by the Architect on AIA Form G710, Architect's Supplemental Instructions.

1.04 CHANGE ORDER PROPOSAL REQUEST
A. Owner Initiated Proposal Requests: Proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time will be issued by the Architect with a detailed description of the proposed change and supplemental or revised drawings and specifications, if necessary.
   1. Proposal requests issued by the Architect are for information only. Do not either stop work in progress or execute any proposed change based on any description or instruction. Continue work in areas surrounding the proposed change as possible, but only to the extent it will not increase the Contract Sum or Contract Time.
   2. Unless otherwise indicated in the proposal request, submit an estimate of the cost necessary to execute the proposed change to Owner/Architect for his review within 21 days of receipt of the proposal request.
      a. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental and amounts of trade discounts.
      c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

B. Contractor Initiated Change Order Proposal Requests: When latent or other unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Owner/Architect.
   1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
   2. Include a list of quantities of products to be purchased and unit costs along with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
   3. Indicate applicable taxes, deliver charges, equipment rental and amounts of trade discounts.
   4. Comply with requirements in Section 01 2500 - Substitution Procedures, if the proposed change in the Work requires substitution of one product or system for a product or system specified.

1.05 CONSTRUCTION CHANGE DIRECTIVE
A. When the Owner and the Contractor are not in total agreement on the terms of a Change Order Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714 instructing the Contractor to proceed with a change in the work for subsequent inclusion in a Change Order.
   1. The Construction Change Directive will contain a complete description of the change in the work and designate the method to be followed to determine change in the Contract Sum or Contract Time.
B. Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
   1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.06 CHANGE ORDER PROCEDURES

A. Upon Owner's approval of a Request for Change Order, Contractor will issue a Change Order with Architect's concurrence for signatures of the Owner and Contractor as provided in the Conditions of the Contract.

PART 2 PRODUCTS - NOT APPLICABLE
PART 3 EXECUTION - NOT APPLICABLE

END OF SECTION 01 2600
SECTION 01 2613 - REQUESTS FOR INTERPRETATION (RFI)

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for handling and processing Requests For Information.

1.03 DEFINITIONS
   A. Definitions used in this article are not intended to change or modify the meaning of other terms in the Contract Documents.
   B. Request for Interpretation (RFI): A request for information by the Contractor to the Architect of Record for clarification of intent of any portion of the Contract Documents after the Award of Contract and during the construction of the Project.
   C. The following are NOT Requests for Information.
      1. Change Orders.
      2. Construction Change Directives.
      5. Field Order.
      7. Normal questions contained in a typical shop drawing submittal.

1.04 REQUESTS FOR INTERPRETATION (RFI’S) DURING CONSTRUCTION
   A. RFI’s are logged-in at the Architect’s Office, not necessarily with same date as indicated by the Contractor on RFI form. The response time will commence upon the date of receipt by the Architect.
      1. E-mail copies of RFI’s sent by the Contractor and received on or after a Friday after 2:00 PM are to be dated the following Monday, holidays excepted.
   B. Requests for Interpretation (RFI): If clarification of any portion of Construction Documents is required, submit a Request for Interpretation to the Architect of Record and the Owner’s Representative in accordance with the following procedures:
      1. RFI Format:
         a. Submit on a standard form developed by the Contractor.
         b. RFI’s shall be sequentially numbered; and include the following:
            1) Date
            2) Project name and number
            3) Contractor’s name, address, telephone number and fax number.
            4) Description of subject and discipline (trade) in question.
            5) Adequate space for Architect of Record to respond, sign, and date.
         c. Contractor shall submit a copy of the format to the Architect of Record and Owner’s Representative at start of Project for review and comment.
      C. RFI Inquiry:
         1. Clearly state and completely define the issue requiring interpretation. Provide drawing and detail numbers, specification section numbers and paragraphs, sketches and other reference information.
         2. Provide potential solutions to issues when possible.
         3. Provide cost and schedule implications, if any.
         4. Ambiguous RFI’s will be returned to Contractor without action taken.
   D. RFI Submission Process:
1. The Contractor shall submit an RFI, in writing, to Architect of Record immediately with a copy to the Owner's Representative when any issue requiring clarification arises.
   a. Unless specifically stated on RFI, the Architect of Record and the Owner will assume adjustments to the Contract Amount and the Project Schedule are NOT REQUIRED.
2. The Architect of Record will review and respond only to RFI's received in writing from the Contractor.
3. Submit two (2) copies of each RFI and Architect of Record response, including any supplemental drawings and additional instructions, to the Owner’s Representative for record purposes.
4. The Contractor shall allow seven (7) days for the Architect of Record to review and respond to the RFI.
5. RFI’s submitted to the Architect of Record without following these submission procedures will result in rejection of the submission.

E. RFI Log:
1. Contractor shall maintain an RFI log indicating the RFI number, subject, date, response date and impact, if any on schedule and cost.
2. Contractor shall publish the log at least bi-monthly to the Architect of Record and Owner’s Representative.

PART 2 PRODUCTS - NOT APPLICABLE
PART 3 EXECUTION - NOT APPLICABLE
END OF SECTION 01 2613
SECTION 01 2900 - PAYMENT PROCEDURES

PART 1  GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for handling and processing Contractor's applications for payment.
   B. Refer to additional WSU requirements for payment procedures.

1.03 RELATED SECTIONS
   A. Section 01 2600 - Contract Modification Procedures.
   B. Section 01 3113 - Project Coordination.
   C. Section 01 3216 - Construction Progress Schedule.
   D. Section 01 7700 - Project Closeout.

1.04 SCHEDULE OF VALUES
   A. Coordinate preparation of Schedule of Values with preparation of Construction Schedule.
      1. Prepare Schedule of Values, typed, on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.
      2. Correlate line items in schedule of values with other required administrative schedules and forms including:
         a. Construction schedule.
         b. Application for payment form.
         c. List of subcontractors.
         d. List of products.
         e. List of principal suppliers and fabricators.
         f. Schedule of submittals.
      3. Submit Schedule of Values to Contractor within 7 days after contract award.
         a. Schedule of Values shall be approved by the Contractor prior to Initial Application for Payment.
      4. Submit schedule of values to Owner/Architect at the earliest feasible date, but in no case later than 30 days before the date scheduled for submittal of initial application for payment.
      5. Provide separate schedule of values for each phase of the Project.
   B. Use the Table of Contents of this Project Manual to establish the format for Schedule of Values.
      1. Provide a breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of applications for payment and progress reports. Break principal subcontract amounts down into several line items.
      2. Provide separate line items on Schedule of Values for each part of the Work where an application for payment may include materials and equipment purchased or fabricated and stored but not yet installed.
      3. Show line items for indirect costs and margins on actual costs only to extent that such items will be listed individually in applications for payment. Each item in the schedule of values and applications for payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
      4. Provide separate line items on Schedule of Values for the following Division 01, "General Requirements" cost items. The aggregate total value of Division 01 Requirements and all other line items shall be equal to the total Contract Sum. Provide separate break down for Labor and Material for each item as required by the Contractor.
         a. Performance and Labor and Material Payment Bonds.
         b. Mobilization and demobilization.
         c. Project closeout at 5 %, or amount agreed to by Contractor.
d. Field supervision and layout, Barricades and Safety precautions, Temporary Office and equipment (by month).
  e. Shop drawings and Samples.

5. Update and resubmit the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.05 APPLICATIONS FOR PAYMENT

A. Each application for payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. The initial application for payment, application for payment at time of substantial completion, and final application for payment involve additional requirements.
  2. Submit construction schedule update including narrative with each application for payment.

B. Applications for Payment WILL NOT be processed until the Schedule of Values is submitted and approved.

C. Applications for Payment WILL NOT be processed until reviewed and approved by the Contractor. Review of proposed invoice shall be done in person with the Contractor not less than 5 days before monthly Progress Payment date.
  1. Percentage completion of a line item will be the percent complete projected through the end of the month.
  2. Obtain approval of the Contractor prior to purchasing material for early payment of material stored.
     a. Material must be incorporated in the final work.
     b. Multiple unit items must be inventoried each month.
     c. Submit two copies of the Supplier Invoice.
     d. Submit two copies of the executed “Materials Stored Payment Form”, along with Contractor required proof of title and insurance.
  3. Material stored offsite will not receive consideration for payment until complete documentation of legal title, insurance, material supply bond, and property security is approved by Contractor.
  4. Stored Material Payment will not be considered for common readily available items

D. Progress payments will be made monthly, on date determined by Owner, for construction work performed in the preceding thirty days.
  1. Payments to Trade Contractors will be made within 10 days of receipt of payment by Contractor from Owner.

E. Use AIA Form G702 and G703 - Application and Certificate for Payment for application for payment.
  1. Electronic facsimiles of standard forms are acceptable if they are of like content and size, subject to approval by Contractor.

F. Retainage: Ten (10) percent of the estimated amounts will be retained until Substantial Completion.
  1. The balance of the retained percentage will be paid thirty (30) days after Owner's acceptance of Work, providing that all requirements of the Contract are met.

G. Complete every entry on form including notarization and execution by person authorized to sign legal documents on behalf of Contractor. Incomplete applications will be returned without action.
  1. Listing of items on Application for Payment shall match listing on Schedule of Values and Contractor's construction schedule. Use updated schedules if revisions have been made.
  2. Include amounts of Change Orders and Construction Change Directives issued prior to last day of the construction period covered by the application.

H. Submit not less than 4 executed copies of each Application for Payment to Architect. Include waivers of lien and sworn statements.
  1. Transmit each copy with transmittal form listing attachments and recording appropriate information related to the application in manner acceptable to Architect and/or Contractor.
PAYMENT PROCEDURES

I. Submit Waivers of Lien and Sworn Statements from every entity who may lawfully be entitled to file a mechanics lien arising out of the Contract and related to Work covered by the Payment.
   1. Submit partial waivers of lien with each monthly Application for Payment on each item for the amount previously requested less the deduction for retainage on each item. Show both the amount requested and the deduction for retainage.
   2. Submit final or full waivers when an application shows an item is complete.
   3. Submit final application for payment with or preceded by final waivers and sworn statements from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.
   4. Waiver Forms: Submit waivers of lien on forms acceptable to Owner and/or Contractor.
   5. Sworn Statement Forms: Submit sworn statements on forms acceptable to Owner and/or Contractor.
   6. Provide waivers from subcontractors, sub-subcontractors and material suppliers as required by WSU.

J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first application for payment include the following as applicable:
   1. List of subcontractors.
   2. List of principal suppliers and fabricators.
   3. Schedule of values.
   5. Schedule of principal products.
   7. List of Contractor's staff assignments.
   8. List of Contractor's principal consultants.
   9. Copies of building permits including applicable trade permits.
   11. Initial progress report.
   13. Certificates of insurance and insurance policies.
   15. Initial settlement survey and damage report.

K. Application for Payment at Substantial Completion: Following issuance of Certificate of Substantial Completion, submit an application for payment. Reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. Administrative actions and submittals that must precede or coincide with this application include:
   1. Occupancy permits and similar approvals.
   2. Warranties and maintenance agreements.
   3. Test/adjust/balance records.
   5. Meter readings.
   7. Change-over information related to Owner's occupancy, use, operation and maintenance.
   8. Final cleaning.
   10. Advice on transferring insurance coverages.
   11. Final progress photographs.
   12. List of incomplete work recognized as exceptions to Architect's Certificate of Substantial Completion.

L. Final Payment Application Administrative actions and submittals which must precede or coincide with submittal of the final application for payment include the following:
   1. Completion of project closeout requirements including those specified in Section 01 7700.
PAYMENT PROCEDURES

2. Completion of items specified for completion after Substantial Completion.
3. Assurance that unsettled claims will be settled as acceptable to Owner and Architect.
4. Assurance that work not complete and accepted will be completed without undue delay as acceptable to Owner and Architect.
5. Transmittal of required project construction records to Owner.
6. Certified property survey.
7. Proof that taxes, fees and similar obligations have been paid.
10. Change of lock cylinders to Owner’s access.

1.06 RECOMMENDATION FOR PAYMENT BY THE ARCHITECT

A. Issuance of Recommendation For Payment by the Architect, constitutes a representation by the Architect to the Owner, based on his observations at the Project Site, as provided in the Owner-Architect Agreement, and data comprising the Application For Payment, the Work has progressed to the point indicated; to the best of his knowledge, information and belief, the quality of Work is in accordance with the Contract Documents (subject to evaluation of the Work for conformance with the Contract Documents upon substantial completion, to the results of any subsequent test required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in this certificate); and the Contractor is entitled to payment in the amount recommended.

B. However, by issuing a Certificate of Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality of Work or that he has reviewed the construction means, methods, techniques, sequences or procedures, or has made any examination to ascertain or for what purpose the Contractor has used monies previously paid on account of the Contract sum.

C. A Recommendation For Payment or a progress payment does not constitute acceptance of Work not in accordance with Contract Documents.

PART 3 EXECUTION (NOT APPLICABLE)
SECTION 01 3113 - PROJECT COORDINATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for project coordination.
   B. Employ and pay for services of a full-time project superintendent for duration of construction work.
      1. Provide additional administrative and supervisory personnel including services of a project manager and expeditor as required for performance of the work including coordination of subcontractors.

1.03 QUALITY ASSURANCE
   A. Project Coordinator Qualifications: Not less than five years experience performing project coordination work on projects of similar size and scope.
   B. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection and operation.
      1. Where installation of one part of the work is dependent on installation of other components, either before or after its own installation, schedule construction activities in sequence required to obtain best results.
      2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
      3. Make adequate provisions to accommodate items scheduled for later installation.
   C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the work.
   D. Conservation: Coordinate construction activities to ensure operations are carried out with consideration given to conservation of energy, water and materials.

1.04 PROJECT COORDINATION
   A. Coordinate work of subcontractors including that related to:
      1. Temporary facilities and controls.
      2. Work specified in Divisions 02 through 49 of the specifications.
   B. Coordinate schedules of subcontractors and material suppliers as required to:
      1. Verify timely deliveries and materials and products for installation by other subcontractors.
      2. Verify labor and materials are adequate to maintain schedules.
   C. Conduct conferences with subcontractors and other concerned parties as necessary to:
      1. Maintain coordination and schedules.
      2. Resolve matters in dispute.
   D. Participate in project meetings to ensure coordination and to:
      1. Report on progress of work.
      2. Recommend needed changes in schedules.
   E. Coordinate temporary facilities and controls as required to:
      1. Verify installation, operation and maintenance complies with governing codes and regulations.
      2. Verify adequacy of facilities and controls for construction activities and operations.
   F. Coordinate shop drawings, product data and submittals. Review for compliance with requirements of Contract Documents prior to submittal.
1. Verify field dimensions and clearances.
2. Verify relation to available space.
3. Verify settings of anchorages including anchor bolts.
4. Review effects of changes in work with subcontracts and other contracts.
5. Verify compatibility of equipment with work of other subcontracts.
6. Verify motor voltages and control characteristics.
7. Coordinate controls and interlocks to verify voltages and phase, and wiring of pneumatic electric switches and relays.

G. Prepare coordination drawings as required to assure coordination of work and to resolve conflicts prior to installation.

H. Observe required testing, maintain records of tests and record:
   1. Testing agency and name of inspector.
   2. Subcontract work being tested.
   3. Representatives present.
   4. Date and time of testing.
   5. Type of products or work being tested.
   6. Types of tests and results.
   7. Any retesting required.

I. Verify subcontractors are maintaining accurate project record documents.

J. Review proposals and requests for substitutions, modifications and changes:
   1. Verify compliance with requirements.
   2. Verify compatibility with work and equipment of other subcontracts.
   3. Recommend action.

K. Verify work complies with requirements of Contract Documents:
   1. Maintain record of observed deficiencies and discrepancies.
   2. Promptly report deficiencies and discrepancies to Architect.

L. Assemble documentation associated with any claims or disputes.

M. Attend equipment start-up:
   1. Verify services and connections are complete and equipment is in operable condition.
   2. Observe testing, adjusting and balancing.
   3. Record results including time and date of start-up.

N. Coordinate inspection and acceptance of equipment:
   1. Prior to inspection, verify equipment is clean, tested and operational.
   2. Assist inspector and prepare list of items to be completed or corrected.
   3. Should acceptance and operation of equipment constitute the beginning of any specified guarantee period, prepare and transmit written notice.

O. Coordinate inspection and acceptance of work:
   1. Prior to inspection verify work is complete and ready for acceptance.
   2. Assist inspector and prepare list of items to be completed or corrected.
   3. Should acceptance of work constitute the beginning of any specified guarantee period, prepare and transmit written notice.

P. Assemble project record documents.

Q. Submit copies of lists, tests and operating logs to Architect.

PART 3 EXECUTION (NOT APPLICABLE)
SECTION 01 3119 - PROJECT MEETINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for project meetings including pre-construction conference, coordination meetings and progress meetings.
   B. Contractor is specifically responsible for:
      1. Preparing agenda for each meeting which includes specified topics.
      2. Providing written notice of each meeting including agenda to all attendees not less than four days in advance of meeting date.
      3. Making physical arrangements for each meeting.
      4. Presiding at each meeting.
      5. Recording minutes of each meeting including but not limited to all significant proceedings, decisions, action required and persons assigned to action.
      6. Reproducing and distributing minutes of each meeting to all attendees and other parties affected by decisions made at meeting not later than three days after each meeting.

1.03 PRE-CONSTRUCTION CONFERENCE
   A. Schedule a pre-construction conference and organizational meeting for the Project at project site or other convenient location no later than 15 days after execution of Agreement and prior to commencement of construction activities. Conduct meeting to review goals, responsibilities and personnel assignments.
   B. Contractor shall submit the following prior to meeting and such additional items as Architect may direct:
      1. Signed Contract.
      2. Bonds as required.
      3. Proof of insurance.
      4. Required permits.
      5. Preliminary construction schedule.
      7. Schedule of values.
      8. Preliminary payment schedule.
      9. Project directory.
      10. Safety plan and name of Safety Officer.
   C. Attendees: Owner, Architect and its consultants, Contractor and its project manager, project coordinator and project superintendent, major subcontractors, and Owner's General Contractor. Other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.
   D. Agenda: Discuss items of significance that could affect progress including such topics as:
      1. List of subcontractors, manufacturers and suppliers.
      2. Tentative construction schedule.
      3. Critical work sequencing.
      4. Designation of responsible personnel.
      5. Procedures for processing field decisions and Change Orders.
      6. Procedures for processing applications for payment.
      8. Submittals of shop drawings, product data and samples.
      10. Use of premises.
      11. Office, work and storage areas.
12. Temporary facilities and controls.
13. Equipment deliveries and priorities.
15. First aid.
17. Housekeeping.
18. Working hours both within and outside of the Building.

1.04 PROGRESS AND COORDINATION MEETINGS

A. Attend WSU's General Contractor's progress and project coordination meetings at regularly scheduled times. Project coordination meetings are in addition to specific meetings held for other purposes, such as special pre-installation meetings.

1.05 PROGRESS MEETINGS

1.06 ADDITIONAL MEETINGS

A. Conduct additional meetings as needed or as requested by the Owner to review the following:
   1. Applications for payments.
   2. Change orders.
   3. Schedule and procurement.
   4. Coordination.
   5. Owner or Architect concerns.

B. Reporting: Record meeting results including agreements and disagreements, and distribute copies of minutes of each meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since previous meeting and report.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)
SECTION 01 3323 - SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittals of shop drawings, product data and samples as required by Contract Documents. Receive, check and coordinate all submittals of all contractors for compliance with Contract Documents prior to submission to Architect, as provided herein.

1.02 DEFINITIONS

1.03 SUBMITTAL SCHEDULE

A. After acceptance by the Contractor of the Contractor's Construction Schedule, prepare a complete Schedule of Submittals. Submit schedule no later than 30 days before Initial Application for Payment.

B. Prepare the schedule in chronological order. Provide the following information:

C. Distribution: Following Architect's response to initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated.

D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with each meeting report.

1.04 SUBMITTAL REQUIREMENTS

A. Coordinate preparation and processing of submittals with performance of the work, so work will not be delayed by submittals. Coordinate and sequence different categories of submittals for the same work, and for interfacing units of work, so one will not be delayed for coordination with another. No extension of time will be allowed because of failure to properly coordinate and sequence submittals.

1. Transmit each submittal from Contractor to Architect using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

2. .pdf documents must be unencrypted (unlocked) to allow for processing of shop drawings (stamping). Documents received that do not allow the stamping of the electronic file will not be reviewed and will be returned to sender. Time will not accrue against the allowable time for submittal review.

B. Submit electronic copies of manufacturer's descriptive product data including catalog sheets for materials, equipment and fixtures, showing dimensions, performance characteristics and capacities, wiring diagrams and controls, schedules, and other pertinent information as required. Where materials describe more than one product or model, clearly identify which is to be furnished.

C. Submit samples cured and finished as specified and identical to product proposed for use. Include generic description, source product name or manufacturer, and compliance with requirements. Submit samples for kind, color, pattern, and texture for comparison to actual units delivered and installed.

D. Shop drawings, product data and samples shall be dated, including Contractor and subcontractor dates of submittal and approval, and marked to show the names of the Project, Architect, Contractor, origination Subcontractor, manufacturer or supplier, and separate detailer, if pertinent. Shop drawings shall completely identify specification section and locations at which materials or equipment are to be installed.

1. Reproductions of Contract Drawings as Shop Drawings are strictly PROHIBITED.

E. Shop drawings, product data and samples shall be accompanied by an electronic transmittal letter containing project name, Contractor's name, number of drawings, and samples, titles and other pertinent data. Transmittal shall bear signature of the Contractor as evidence he checked same and found them in conformance with the Contract Documents.

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SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

01 3323 - 1
F. The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work or in the work of the Owner or any separate Contractor, all shop drawings, product data and samples required by the Contract Documents.

G. By approving and submitting shop drawings, product data and samples, the Contractor represents he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the work and the Contract Documents.

H. The Contractor shall not be relieved of responsibility for deviation from the requirements of the Contract Documents by the Architect's acceptance of shop drawings, product data or samples, unless the Contractor has specifically informed the Architect and Owner in writing of such deviation at time of such deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the shop drawings, product data or samples by the Architect's acceptance thereof.

I. Direct specific attention, in writing or on re-submitted shop drawings, product data or samples, to revisions other than those requested by the Architect on previous submittals.

J. No portion of the work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been accepted by the Architect. Such portions of work shall be in accordance with approved submittals.

K. The Architect will review shop drawings, product data and samples.

L. Contractor is responsible for obtaining and distributing required prints of shop drawings, product data, and samples, to his subcontractors and material suppliers; after as well as before final approval. Make prints of reviewed shop drawings from transparencies which carry Architect's appropriate stamp.

M. Obtain copies of all shop drawings, product data and samples submitted to date and accepted from other Contractors.

N. Submit all specified submissions for a division of work at one time in complete packages unless arrangements are made beforehand. Incomplete and multiple submittals will be rejected.

1.05 USE OF CONTRACT DRAWINGS

1.06 ARCHITECT'S ACTION

A. Except for submittals for the record, for information and similar purposes, where action and return on submittals is required or requested, Architect will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is Contractor's responsibility, and not considered part of Architect's review and indication of action taken.

2. Acceptance does not authorize any change in the Contract Documents unless specifically stated in a separate letter or Change Order.

B. Action Stamp: Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked to indicate the action taken.

C. Other Action: Where a submittal is primarily for information or record purposes, for special processing or other Contractor activity, the submittal will be returned, marked "Action Not Required".

PART 3 EXECUTION (NOT APPLICABLE)
AUTHORIZATION FOR RELEASE OF AUTOCAD FILES
AS BACKGROUND FOR DEVELOPING DESIGN-BUILD/SHOP DRAWINGS

PROJECT

N/S PROJECT NO.

CONTRACTOR

ADDRESS

DOCUMENTS

TOTAL FEE

DATE ISSUED

Neumann/Smith Architecture hereby issues the designated AutoCAD base files for use by the designated Contractor ONLY, for use as backgrounds in the preparation of Contractor's Design-Build/Shop Drawings, as a means to expedite their submittal process. The Contractor shall not copy or distribute these documents in any form to others or use them for other projects without the written consent of Neumann/Smith Architecture.

The ONLY electronic base files available for this process are

- Architectural Floor Plans, Reflected Ceiling Plans, and Elevations
- Structural Floor Plans
- Mechanical Floor Plans
- Electrical Plans

Wall Sections and Details WILL NOT be released.

Contract Document electronic drawing files WILL NOT be released.

Adhere to the following procedure to obtain designated AutoCAD files.

Designated Contractor to fax or E-mail request for specific drawings to Construction Manager/General Contractor. The Construction Manager/General Contractor will forward request to Neumann/Smith Architecture Project Manager.

Request submitted directly by Contractor/Subcontractor to Neumann/Smith Architecture will be returned without processing.

Neumann/Smith Architecture will review requested list of drawings and issue invoice for total amount due directly to the Designated Contractor via E-mail or fax.

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Upon receipt of returned invoice with total amount due, Neumann/Smith Architecture will process request and send AutoCAD files, via E-mail or disc, within 5 working days, dependent on volume, directly to designated Contractor. Contractor shall identify Neumann/Smith Architecture Project Number on returned invoice for processing.

It is acknowledged these AutoCAD files were prepared by Neumann/Smith Architecture solely as a convenience for the recipient and that Neumann/Smith Architecture cannot be held responsible for the completeness or accuracy of the information conveyed on these AutoCAD files. It is further acknowledged these AutoCAD files are not presented as being copies of project contract documents otherwise transmitted to the above mentioned recipient. This information has not necessarily been updated to reflect subsequent Bid Packages, Addenda, Bulletins or other project revisions.

The designated Contractor assumes all liability for the use of these files for shop drawing documentation, coordination and all other purposes. It shall be understood that the recipient will, to the fullest extent permitted by law, hold harmless and indemnify Neumann/Smith Architecture and/or its consultants from all claims, liabilities, losses, damages and costs, including attorney's fees, arising out of or in any way connected with any use, modification or misuse by the recipient or its affiliates of the electronic media released.

The Contractor shall have a legally authorized individual endorse both copies of this statement. Retain one copy and return the other. Neumann/Smith Architecture will prepare backup files of the transmitted information being sent for record purposes.

Recipient is advised to check all electronic media for computer viruses before loading the files. Recipient is fully responsible for intercepting and disabling viruses, if any, that may be inadvertently transmitted with the electronic files and hereby agrees to indemnify and hold Neumann/Smith Architecture harmless from and against all claims of any type or nature asserted by recipient or any third party as a result of viruses inadvertently transmitted with the electronic media.

**AUTHORIZATION**

NEUMANN/SMITH ARCHITECTURE

________________________________________  ________________________________
NAME                                           DATE

________________________________________
TITLE

**AUTHORIZATION ACCEPTANCE**

CONTRACTOR

________________________________________  ________________________________
NAME                                           DATE

________________________________________
TITLE

COPIES:

OWNER’S REPRESENTATIVE

GENERAL CONTRACTOR/CONSTRUCTION MANAGER

CLIENT’S REPRESENTATIVE

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SECTION 01 4216 - DEFINITIONS

PART 1  GENERAL

1.01  RELATED DOCUMENTS

A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02  SECTION INCLUDES

A. This Section defines various terms used throughout the Contract Documents.

1.03  DEFINITIONS

A. Addendum: An Addendum is a written and/or graphic instrument issued by the Owner’s Representative prior to award of Contract which modifies or interprets the Bidding Documents by additions, deletions, clarifications, or corrections. The Bidding Documents for the original Work shall govern the work described therein, unless modified by the Addendum. All costs or credits due to the Addendum shall be incorporated into the Bidder's Proposal Form for Addenda issued prior to the Owner’s receipt of Bids, and by letter on Bidder’s letterhead modifying Bid Form amounts for Addenda issued after Owner’s receipt of Bids. Letter shall be signed by, and as for the original Bid Form submission.

B. Alternate Price: A variation to the Base Bid amount stated on the Proposal Form to cover a variation in the Contract Requirements. If the Alternate Price is accepted by the Owner, the variation becomes a part of the Contract, and the amount quoted is then added to, or deducted from, the Lump Sum Base Bid amount to determine the Contract Sum. Variations may include a change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

C. Awardee: A Bidder selected to enter into a Contract with the Owner for Work included under the Bidder’s Proposal, until such time as he is awarded a Contract and becomes a Subcontractor to the Contractor.

D. Base Bid: The Bid amount before any Alternate Price or Substitution is considered.

E. Bid: As used in the Instructions to Bidders: A Proposal prepared and submitted as required herein.

F. Bidding Documents: A term used for the Advertisement, Instruction to Bidders, Proposal Form, Contract, Bid Security, and the proposed Contract documents including any and all addenda.

G. Bulletin: A written and/or graphic instrument issued by the Owner’s Representative, after award of the Contract, used to solicit a proposal for a change in the Work which may affect cost and/or time. The Contract Documents for the original Work Shall Govern the work described unless modified by the Bulletin. A Bulletin is NOT AN ORDER to do the work, But a request to submit a quotation. Changes to the Contract Amount or time shall be adjusted by a Change Order.

H. Clarification: A written and/or graphic instrument issued by the Owner’s Representative after Award of Contract to describe certain clarifications of or deviations from, the Contract documents not affecting cost or time. A Clarification IS AN ORDER to do the Work.

I. Complete: Where used, it shall mean “Complete with connections, supports, attachments, and incidental items necessary for a finished and properly operating assembly or operation”.

J. Connect: The term shall mean "to bring service(s) to point of installation and make final connections of the service(s) to the installed equipment, and provide miscellaneous auxiliary appurtenances necessary to make operable for its intended use.”

K. Construction Issue: A written and/or graphic instrument issued by the Owner’s Representative to provide the Contractor a method for obtaining expedient additions, revisions, or clarifications of Drawings and Specifications during the Design and Construction process.

L. Contract Documents: Drawings and Specifications setting forth in detail the requirements for construction of the Project.
M. Days and/or Calendar Days: Days listed on the calendar, including Saturdays, Sundays, and legal holidays where the Project is located.

N. Directed: Terms such as "directed", "requested", "authorized", "selected", "approval", "satisfactory", "accepted", "required", and "permitted" are used without reference to specific entity, they shall mean "as directed by the Architect or Contractor", and similar phrases. However, no implied meaning shall be interpreted to extend the Owner's, Architect's, or Contractor's responsibility into the Contractor's area of construction supervision, administration, means, or methods.

O. Drawing: Plans and detail drawings, both large and small scale, furnished by the Architect for the purpose of giving instructions and showing the Work to be done.

P. Experienced: Unless otherwise defined in the technical specifications, means having successfully completed a minimum of 5 previous Projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with the requirements of authorities having jurisdiction.

Q. Field Order: A directive to make changes in the Work that is issued to the Contractor. Contractual obligations are the same as those for a Construction Change Directive.

R. Furnish: To supply (only) to another party for their use or installation, including cost of delivery to the jobsite.

S. Hours of Work: Standard hours of work for the Project shall be proposed by the Subcontractor, subject to approval of the Contractor, and shall be for all standard working days. Hours of work other than these "standard hours of work" will be considered "premium time hours" and shall include, if any, cost penalty. Work to be performed on "premium time hours" requires written permission from the Owner's representative and shall be requested a minimum 48 hours prior to such need.

T. Indicated: Graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in specifications, and similar requirements in the Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference. No limitation on location is intended except as specifically noted.

U. Install: To unload, temporarily store, distribute, uncrate, unpack, assemble, erect, and anchor into the intended final positions. The installer shall provide all miscellaneous hardware and supplies required to anchor and support securely, connect, clean-up, and dispose of rubbish.

V. Installer: The Contractor or entity engaged by the Contractor, as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

W. Not-In-Contract / NIC: Work not included in this Contract.

X. Packaged Equipment: Equipment or Product that is complete with all integral components, including, but not limited to, piping, conduit, wiring, main power disconnect, starter, control transformer, relays, and controls fully mounted and completely interconnected ready for installation at final location and to receive final connection of mechanical and electrical services. For shipping of "Packaged Equipment" too large for completed assembly, the assembly may be "broken down" into shippable subassemblies requiring only minimal reassembly, refastening, reconnection, etc. Any piping and/or electrical connections required between subassemblies shall be provided with quick-connect fittings which do not require special tools to secure the connections.

Y. Per: "in accordance with the requirements of".

Z. Plan(s): The terms shall read to mean “Contract Drawings”.

AA. Product: Materials, systems, and equipment.

AB. Project: The total construction of which the work performed under the Contract Documents may be the whole or a part.
AC. Project Manual: The volume(s) assembled for the Work which may include Introductory Information, Bidding Requirements, Contract Forms, Conditions of the Contract, the Specifications, and Reference Materials.

AD. Project Site / Site: The space available for the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the drawings and may or may not be identical with the description of the land upon which the Project is to be built.

AE. Provide: To furnish, install, and connect, complete and ready for intended use.

AF. Regulations: Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

AG. Request for Information (RFI): A request for information by the Contractor to the Architect of Record for clarification of intent of any portion of the Contract Documents after the Award of Contract and during the construction of the Project.

AH. Review: Where used in conjunction with the Architect’s action on the Contractor’s submittals, applications, and requests, is limited to the duties and responsibilities of the Architect as stated in the General Conditions and Supplementary Conditions. Such review shall not release the Contractor from responsibility to fulfill Contract requirements unless otherwise provided in the Contract Documents.

AI. Supplier: As used herein; A firm or organization furnishing or delivering products directly to the jobsite, and because of such direct delivery, could be construed under the lien laws of the State in which the work is being performed as having lien rights against funds due the Contractor. Suppliers of materials and equipment, delivering to Contractor or Subcontractor on an open account basis and not having lien rights on the Work, will not be considered suppliers within the meaning of the Contract Documents.

AJ. Testing Agency: An independent entity engaged to perform specific inspections or tests, either at the project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

AK. Trades: The use of titles such as “Carpentry” is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as “carpenter”. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

AL. Trade Specialists: Certain Sections of the Specifications require that specific construction activities be performed by specialists who are recognized experts in the operations to be performed. The Specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option.

AM. Unit Price: An amount proposed by Bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to, or deducted from, the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

AN. Work: (Capitalized) The construction services required by the Contract Documents, whether completed or partially completed, and including all other labor, materials, equipment and other services provided or to be provided by the Contractor too fulfill the Contractor’s obligations. The Work may constitute the whole or part of the Project.

AO. work: (Lower Case) Activity to do or perform something, a specific task being a part or phase of some larger activity, or something that results from a particular manner or method, working, operating, or devising.

AP. Working Days: Standard working days for the Project shall be all calendar days except Saturdays, Sundays, and legal holidays where the Project is located and shall invoke no cost or time penalties. Working days other than “standard working days” will be considered “premium working days” and shall include, if any, cost penalty. Work to be performed on “premium
working days” requires written permission from the Owner’s Representative, and shall be requested a minimum 48 hours prior to such requirement.

PART 3 EXECUTION (NOT APPLICABLE)
SECTION 01 6000 - COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
A. Administrative and procedural requirements governing the Contractor's selection of products and their use in the Project.
B. General product requirements.
C. Transportation, handling, storage and protection.
D. Procedures for Owner-supplied products.
E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.03 DEFINITIONS
A. Definitions used in this Article are not intended to change or modify the meaning of other terms used in the Contract Documents.
B. Base and Optional Manufacturers: Acceptable manufacturers are often listed in Part 2 of a specification section. A particular manufacturer and product are often listed as a "Design Standard" or "Basis of Design".
1. The "Design Standard" or "Basis of Design" is the manufacturer of the specific product used as the basis for design.
2. The other manufacturers listed are "Optional" manufacturers, and manufacture a product similar to the specific product used as the design basis. Listing of a manufacturer indicates acceptance of that manufacturer as a supplier of the product, without a substitution, but only if the "optional" manufacturer's product complies with the specified requirements, including the salient qualities provided by the "Design Standard" manufacturer's product. Salient qualities include, but are not necessarily limited to the following:
   a. Purpose and function.
   b. Material and finish.
   c. Strength, durability and other applicable physical properties.
   d. Compatibility and performance attributes for the indicated application.
   e. Capacity and operating characteristics, where applicable.
   f. Size and configuration to the extent required for fit with adjoining and adjacent conditions and within spatial limitations.
   g. Appearance, including exposed dimensions, profile, texture, pattern and color, where visible to personnel in a finished space or from the exterior.
3. The Contractor is responsible for costs to provide any dimensional, structural, utility and other related adjustments required to fit an "Optional" manufacturer's product into the Work.

1.04 SYSTEM PERFORMANCE REQUIREMENTS
A. Generally provide products, materials and equipment that:
   1. Comply with specified standards and related requirements.
   2. Comply with requirements for size, make, type and quality specified, or as specifically directed in writing by Architect.
   3. Where manufactured and fabricated products:
      a. Design, fabricate and assemble per best engineering and shop practices.
      b. Manufacture like parts of duplicate units to standard sizes and gages, and to be interchangeable.
      c. Provide two or more items of the same kind as identical and by the same manufacturer.
d. Provide products that are suitable for service conditions.
e. Provide equipment capacities, sizes and dimensions shown or specified unless variations are specifically authorized in writing.

4. Do not use products, materials or equipment for any purpose other than that for which they are designed unless otherwise indicated or specified.

1.05 QUALITY ASSURANCE
A. Source Limitations: To the greatest extent possible, provide products of the same kind from a single source.
B. Compatibility of Options: When Contractor is given option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.06 DELIVERY, STORAGE, AND PROTECTION
A. Deliver, store and handle products per manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft.
1. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft or other losses.
2. Deliver products to site in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storage, unpacking, protecting and installing.
3. Store products at site in manner to facilitate inspection and measurement of quantity or counting of units.
4. Store heavy materials away from Project structure in manner that will not endanger supporting construction.
B. Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at site.
1. Deliver products in undamaged condition in manufacturer's original containers or packaging with identifying labels intact and legible.
2. Immediately on delivery inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, quantities are correct, and products are properly protected and undamaged.
C. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.
D. Store products per manufacturer's instructions with seals and labels intact and legible.
1. Store products subject to damage by elements in weather-tight enclosures.
2. Maintain temperature and humidity within ranges required by manufacturer's instruction.
E. Exterior Storage: Store fabricated products above ground on blocking or skids to prevent soiling or staining. Cover products subject to deterioration with impervious sheet covers and provide adequate ventilation to avoid condensation.
F. Arrange storage in manner to provide easy access for inspection. Make periodic inspections of stored products to assure products are maintained under specified conditions and free from damage or deterioration.

PART 2 PRODUCTS
2.01 PRODUCT SELECTION
A. General Product Requirements: Provide products that comply with Contract Documents, are undamaged, and unless otherwise indicated, unused at time of installation.
1. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for intended use and effect.

B. Product Selection Procedures: Product selection is governed by Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:
1. Proprietary Specification Requirements: Where only a single product or manufacturer is named, provide product indicated. No substitutions will be permitted.

2. Semi-proprietary Specification Requirements: Where two or more products or manufacturers are named, provide one of the products indicated. No substitutions will be permitted.
   a. Where one product and manufacturer is named as the "Design Standard" and other manufacturers are specified by name, other manufacturer's equivalent product may be acceptable, subject to compliance with Contract requirements, including specifications of the product designated as the "Design Standard", as determined by Architect.
   b. Specific equivalent manufacturer's products shall be identified in the initial submittal period.

3. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements. Use products of listed manufacturers but verify compliance with specified characteristics.

4. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products with these requirements, and are recommended by manufacturer for application indicated. Verify proposed product complies with performance requirements.
   a. Manufacturer's recommendations may be contained in published product literature or by manufacturer's certification of performance.

5. Compliance with Standards, Codes and Regulations: Where Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with standards, codes or regulations specified.

6. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.

7. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.

2.02 MAINTENANCE MATERIALS
   A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
   B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 OWNER-SUPPLIED PRODUCTS
   A. Owner's Responsibilities:
      1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
      2. Arrange and pay for product delivery to site.
      3. On delivery, inspect products jointly with Contractor.
      4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
      5. Arrange for manufacturers' warranties, inspections, and service.
   B. Contractor's Responsibilities:
      1. Review Owner reviewed shop drawings, product data, and samples.
      2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
      3. Handle, store, install and finish products.
      4. Repair or replace items damaged after receipt.
3.02 TRANSPORTATION AND HANDLING
A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
D. Transport and handle products in accordance with manufacturer's instructions.
E. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

3.03 STORAGE AND PROTECTION
A. Store and protect products in accordance with manufacturers' instructions.
B. Store with seals and labels intact and legible.
C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
D. For exterior storage of fabricated products, place on sloped supports above ground.
E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
G. Comply with manufacturer's warranty conditions, if any.
H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
J. Prevent contact with material that may cause corrosion, discoloration, or staining.
K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

3.04 INSTALLATION OF PRODUCTS
A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.
B. Handle, install, connect, clean, condition and adjust products per manufacturer's instructions and in conformance with specified requirements.
   1. Should project conditions or specified requirements conflict with manufacturer's instructions, consult with Architect for further direction.
   2. Do not proceed with work without clear instructions.
C. Protection after Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

END OF SECTION 01 6000
SECTION 01 7423 - FINAL CLEANING

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for final cleaning at Substantial Completion.
      1. Additional special cleaning requirements for specific elements of Work are specified in individual Section in Divisions 02 through 49.

1.03 QUALITY ASSURANCE
   A. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply with federal and local environmental and anti-pollution regulations.
      1. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
      2. Burning or burying of debris, rubbish or other waste material on premises will not be permitted.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Use cleaning material and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents potentially hazardous to health or property, or might damage finish surfaces.

PART 3 EXECUTION

3.01 FINAL CLEANING
   A. Provide final cleaning operations when required. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations.
   B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion for the entire Project or for a portion of the Project.
      1. Remove tools, construction equipment, machinery and surplus materials from the site.
      2. Clean interior hard-surfaces finishes to a dirt-free condition, free of dust, stains, films and similar foreign substances.
      3. Clean monitors. Remove substances that are noticeable vision-obscuring materials.
      4. Remove labels that are not permanent labels. Clean all permanent labels.
      5. Leave equipment clean and ready for occupancy.
   C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during remainder of construction period.
   D. Compliances: Comply with safety standards and governing regulations for cleaning operations. Remove waste materials from site and dispose of in lawful manner.

END OF SECTION 01 7423
SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES

A. Administrative and procedural requirements for project closeout.

1.03 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following, listing exceptions in the request:

1. In the Application for Payment that coincides with, or first follows the date Substantial Completion claimed, show 100 percent completion for the portion of Work claimed as substantially complete. Include supporting documentation for completion as required and a statement showing an accounting of change to the Contract Sum. Comply with requirements of the General Conditions.
   a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction and reasons the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specified warranties, maintenance agreements, final certifications and similar documents as required by the General Conditions.
4. Obtain and submit releases enabling Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
5. Submit record documents including maintenance manuals, damage or settlement survey, property survey and similar final record information.
6. Deliver tools, spare parts, extra stock and similar items to Owner.
7. Make final changeover of permanent locks and transmit keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete start-up testing of systems and instruction of Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from site, along with construction tools, mockups and similar elements.
9. Complete final cleaning requirements including touch-up painting.

B. Inspection Procedures: On receipt of a request for inspection, Architect will either proceed with inspection or advise Contractor of unfilled requirements. Architect will prepare the Certificate of Substantial Completion following inspection, or advise Contractor of construction that must be completed or corrected before the certificate will be issued.

1. Architect will repeat inspection when requested and assured the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

C. Operating and Maintenance Procedures:

1. Operating instructions shall include necessary printed directions for correct operation, adjustment, servicing, and maintenance of movable parts. Operating instructions shall include complete integration of new systems with existing systems and how they are to operate together, in series, sequence, etc. Also, include a suitable parts list, approved shop drawings, and diagrams showing parts location and assembly.
2. Arrange for each installer of equipment requiring regular maintenance to meet with Owner's personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items:
   a. Maintenance manuals.
   b. Record documents.
c. Spare parts and materials.

d. Tools.
e. Lubricants.
f. Fuels.
g. Identification systems.
h. Control sequences.
i. Hazards.
j. Cleaning.
k. Warranties and bonds.
l. Maintenance agreements and similar continuing commitments.

3. As part of instruction for operating equipment, demonstrate the following procedures:
   a. Start-up.
   b. Shutdown.
   c. Emergency operations.
   d. Noise and vibration adjustments.
   e. Safety procedures.
   f. Economy and efficiency adjustments.
   g. Effective energy utilization.

D. Upon Architect's approval and prior to issuance of final payments, submit 3 correct and complete copies of maintenance manuals.

1.04 FINAL REVIEW

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following, listing exceptions in request:
   1. Submit final payment request with releases and supporting documentation not previously submitted and accepted. Comply with requirements of Paragraph 9.10 of the General Conditions. Include certificates of insurance for products and completed operations.
   2. Submit an updated final statement, accounting for final additional changes to Contract Sum.
   3. Submit a certified copy of Architect's final inspection list of items to be completed or corrected, stating each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by Architect.
   4. Submit record drawings and similar final record documents.
      a. Each drawing shall be labeled "Project Record", dated and signed by the Contractor.
      b. Each project record document shall be labeled "Project Record Document".
   5. Submit consent of surety to final payment.
   6. Submit evidence of final continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: Architect will re-inspect Work upon receipt of notice the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to Architect.
   1. Upon completion of reinspection, Architect will prepare Certificate of Final Acceptance, or advise Contractor of incomplete Work or of obligations not been fulfilled but required for final acceptance.
   2. If necessary, reinspection will be repeated for final acceptance.

PART 2 PRODUCTS (NOT APPLICABLE)
PART 3 EXECUTION (NOT APPLICABLE)
END OF SECTION 01 7700
SECTION 01 7839 - PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS
   A. Division 00 - Procurement and Contracting Requirements, and Division 01 - General Requirements, are hereby made part of this Section.

1.02 SECTION INCLUDES
   A. Administrative and procedural requirements for project record documents.
      1. Additional project record document requirements are specified in individual Sections in Division 02 through 49.

1.03 DEFINITIONS
   A. Project Record Documents: Contract drawings, specifications, and shop drawings, indicating "As-Built" conditions and actual products selected for use.

1.04 RECORD DOCUMENT SUBMITTALS
   A. General: Do not use record documents for construction purposes, protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for Architect's reference during normal working hours.

   B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark set to show the actual installation where installation varies substantially from Work originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements difficult to measure and record at a later date.
      1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of Work.
      2. Mark new information important to Owner, but not shown on Contract Drawings or Shop Drawings, including the following:
         a. Changes made by addenda, change orders, supplemental instructions, or other modifications.
         b. Significant changes and selections made during the construction process.
         c. Significant detail not shown in the original Contract Documents.
         d. Physical measurements locating underground utilities and appurtenances, dimensionally referenced to permanent surface improvements.
         e. Location of internal utilities and appurtenances concealed in building structure, referenced to visible and accessible features of the building.
      3. Note related Change Order numbers, Field Order numbers, and other contract modifications, where applicable.
      4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
      5. Obtain and pay for a complete set of Mylar auto positive transparencies using the Architect's original reproducibles.
         a. Transfer all corrections, changes and revisions from the job record set to the transparencies and add the legend "Record Drawings Prepared By (name) Contractor" and the date of printing to each transparency.
         b. Print three complete sets of blueprints. The transparencies and two sets become the property of the Owner, while the Architect will retain the other set.

   C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
      1. Legibly mark and record at each "Product" section of each Specification Section, the description of the actual products installed, including the following:
a. Manufacturer's name and product model and number.
b. Product substitutions or alternates utilized.
c. Changes made by Addenda or Bulletin.

2. Upon completion of the Work, submit record Specifications to Architect for Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from manufacturer's installation instructions and recommendations.

1. Legibly mark each Product Data submittal indicating actual product number and model installed in the Work.
2. Note related Change Orders.
3. Markup applicable record drawings and Specifications.
4. Upon completion of markup, submit complete set of record Product Data to Architect for Owner's records.

E. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work.

1. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference.
2. Submit to Architect for Owner's records.

F. Maintenance Manuals: Organize operating and maintenance data into suitable sets of manageable size.

1. At a minimum, Operation and Maintenance Manuals shall contain:
   a. Manual index cross referencing specification numbers for each item.
   b. Operating instructions.
   c. Emergency instructions.
   d. Spare parts list.
   e. Copies of warranties.
   f. Wiring diagrams.
   g. Recommended maintenance procedures and “turn around” cycles.
   h. Inspection and system-test procedures.
   i. Copies of applicable Shop Drawings.
   j. Copies of applicable Product data.
   k. Fixture lamping schedule.
   l. Maintenance drawings and diagrams.
   m. Listing of required maintenance materials.
   n. Precautions against improper maintenance.
   o. All organized by Specification Section.
   p. Names and addresses of nearest service outlets, distributors, or factory outlets for each piece of equipment.
2. Commence preparation of manuals after Shop Drawings and Product Data submittals have been accepted.
3. Finished manuals shall be heavy-duty loose-leaf type 3-ring binders with hardboard covers and titled tabs identifying each particular portion or item of Work.
   a. Provide binders with pocket folders for folded sheet information.
   b. Provide each binder a detailed Table of Contents referring to index tabs.
   c. Mark appropriate identification on front and spine of each binder.
4. For each titled item or work portion, manual must provide names, addresses, and phone numbers of the following parties:
   a. Contractor/installer.
   b. Manufacturer.
   c. Nearest dealer/supplier.
d. Nearest agency capable of supplying parts and service.
5. Each manual label on front cover or spine shall indicate the following information.
   a. Project name and address.
   b. Owner's name.
   c. Name and address of Architect.
   d. Name and address of Contractor.
   e. Name and address of Contractor.
   f. Date of Submission.
6. Submit three copies of maintenance manuals to Architect for Owner's records.

PART 2 PRODUCTS (NOT APPLICABLE)
PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 01 7839
1. GENERAL

1.1 RELATED DOCUMENTS:

A. Some information contained in this specification is also found on the associated drawings. Work shown on either is deemed to be in both.

B. The drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

C. If a discrepancy in quantity exists between this specification and the associated drawings, the Contractor shall furnish the greater quantity or value unless otherwise directed by the Owner.

D. Some information contained in this specification and the associated drawings is also noted on the project electrical specification and drawings. Any conflicts between the electrical sections and the Audio and Video Systems shall be immediately reported to the Architect and Consultant.

1.2 SUMMARY OF WORK

A. Digital Signage and Digital Directory:

This bid section is for the provision, installation, and termination of all electronics associated with the digital signage and digital directory systems on the 5th and 7th floor. This contractor is responsible for plugging all of the cabling installed in the Digital Signage and Digital Directory Coaxial Infrastructure specification into all necessary electronics to make a working system.

This contractor will incorporate a new multi-channel RF encoder into the rack in MDF Room 049 along with the existing encoder system that feeds the lower floors. Broadcast channels must be coordinated around the existing systems as to not interfere with or disrupt service. Output RF level of the new encoder shall be matched with existing system to create a properly balanced system.

A new four channel RF combiner will replace the existing two channel RF combiner to allow for the addition of the new RF encoder. New 1x4 RF splitters will be installed on in the IDF closets on both the 5th and 7th floors. Coordination with the Coaxial Infrastructure contractor must be made to determine splitter locations.

All electronics installed in MDF Room 049 are to utilize the existing 208v PDUs (power distribution units) by utilizing C14 to C15 power cables. This contractor must field survey the installation location so that proper length cabling is installed.

New flat panel monitors will be installed at designated locations on the 5th and 7th floors. Security measure must be installed to mitigate the ability of unauthorized removal of the display. It is the responsibility of the installing contractor to verify that proper reinforcement backing has been installed in the proper location and is substantial enough to fully support the specified display.

All displays are to be wired to the RF connection plate at each location.

RF signal level is to be tested and certified at every monitor location. A level between -5 dBmV and +10 dBmV must be achieved at the output to the display. RF taps or amplifiers are to be installed as needed to achieve proper function.

All work and product must follow WSU guidelines and standards without exception. It is the
contractor's responsibility to obtain and follow the latest WSU standards.

All cabling shall be tested and a certified performance record must be created and submitted verifying cable performance.

*Installation of any product and/or termination or installation of any cabling must FIRST be field verified/coordinated with WSU C&IT Department. No exceptions.*

B. **Shared Conference Room 588:**

This bid section is for the provision, installation, and termination of all electronics and cabling for a conference room AV system.

A new flat panel display shall be mounted to the wall with security measures in place to mitigate the possibility of unauthorized removal.

A POE powered wall mounted button controller will be installed and programmed to support all functions of the room including, but not limited to, display power, source selection, and volume control. Contractor to coordinate with WSU to determine if connection to campus Fusion system is desired.

Installing contractor is expected to install and wire up an Owner furnished DirecTV receiver behind the display in such a fashion that it is hidden but IR control from DirecTV remote is still possible.

AV cabling is to be strain relieved and installed in such a manner as to allow for cabling to easily extend to the presentation area. A wall mounted "cable hook" is to be installed to create a place to neatly hang the cables when not in use.

All work and product must follow WSU guidelines and standards without exception. It is the contractor's responsibility to obtain and follow the latest WSU standards.

All cabling shall be tested and a certified performance record must be created and submitted verifying cable performance.

C. **Shared Conference Room 792:**

This bid section is for the provision, installation, and termination of all electronics and cabling for a conference room AV system.

A new flat panel display shall be mounted to the wall with security measures in place to mitigate the possibility of unauthorized removal.

A POE powered wall mounted button controller will be installed and programmed to support all functions of the room including, but not limited to, display power, source selection, and volume control. Contractor to coordinate with WSU to determine if connection to campus Fusion system is desired.

AV cabling from the display is to be terminated into the floor pocket under the conference table. Additional AV cables are to extend the floor connections up through the table for use during presentations. Contractor to verify signal integrity and performance to the display. Contractor is responsible for providing any signal boosters or amplifiers to ensure proper performance based on onsite conditions.

All work and product must follow WSU guidelines and standards without exception. It is the
contractor’s responsibility to obtain and follow the latest WSU standards.

All cabling shall be tested and a certified performance record must be created and submitted verifying cable performance.

1.3 DEFINITIONS AND TERMS

A. The following definitions shall be used.

B. The following terms shall be used to refer to the division of labor and define various entities associated with the project.

1. Owner – Organization or person who has undertaken to construct the space.

2. Construction Manager – General Contractor as hired by the owner.

3. Installing Contractor – The successful bidder of this section as awarded by the construction manager.

4. Electrical Contractor – The successful bidder for the electrical portions of the contract, typically, but not limited to, division 26.

5. Subcontractor – Company or organization contracted by the Installing Contractor to perform or supply any portion of this specification.

6. Consultant – Individual or company hired by the architect or owner to design the systems, write the specification, and detail schematic drawings.

7. Architect – Company or individual hired by the owner to provide the design of the space.

1.4 SUBMITTALS

A. Submittal sheets are required to be submitted for all specified equipment. All submittals and shop drawings shall be submitted and approved by the Consultant prior to the beginning of installation. These submittals shall be provided not more than 6 weeks following award of contract.

1. Installing Contractor shall furnish an electronic PDF document for any equipment request that is not the specified product.

2. A complete Bill of Materials will be submitted by the Installing Contractor showing all the equipment to be installed. Materials will be listed in the same order that the products are listed in Section 2 of this specification. Each sub system will be shown with all of the products to be installed as part of that sub system in the order listed in the specification. The Bill of Materials will indicate the quantity being supplied, the manufacturer, the model of the equipment, and a brief description of the equipment.

3. All product data sheet submittals shall be organized in the same order that products are listed in Section 2 of this specification. Each sub system of the design shall have the product data sheet for each piece of equipment contained in that sub system – organized in the order listed in the specification. Under no circumstance shall the product data sheets be organized in alphabetical order. Any product data sheet submittals not conforming to this will be automatically rejected.

4. Installing Contractor shall furnish an electronic PDF of shop drawings detailing a complete
installation plan. Shop drawings are expected to expand upon the construction documents and shall show all components and wires, complete with individual wire numbers, proposed rack layouts, riser diagrams and schematics for individual subsystems, calculations, and details of proposed rigging. Schematics shall show a separate designation for each device and labeling shall correspond to that of the rack layouts. Installing Contractor shall convey that that the system is ready to install as shown in the shop drawings, and that details not explicitly defined by this specification or on the drawings have been addressed by the Contractor.

5. Scanned or copied versions of the construction documents will not be accepted and shall be automatically rejected. All drawings are to be done in a clear and professional manner.

6. Failure to furnish all information as noted above shall result in the rejection of submittals. Questions regarding submittal information should be directed to the Consultant prior to drawing submissions.

7. The Consultant’s ACAD 2014 drawings shall be available for floor plans, conduit & wire pull layouts, and some detail drawings. Earlier versions of drawings can be supplied for an additional charge of $20 per drawing. It shall be the responsibility of the Contractor to implement any drawings furnished by the Consultant. Any time expended by the Consultant at the request of the Installing Contractor to interface drawings to other third party software shall be billed to the Installing Contractor at the Consultant’s standard hourly rate. Additional charges may be assessed by the Architect or Construction Manager for furnishing electronic copies of drawings.

B. See section 3 for additional post-installation submittal requirements.

1.5 DIVISION OF LABOR

A. Electrical Contractor shall furnish and install all conduit and boxes associated with the AV Systems as specified, as shown on the drawings, and as required by the Installing Contractor.

B. Electrical Contractor shall supply a pull string in all conduits for the AV Contractor.

C. All AV wiring shall be supplied and installed by the AV contractor.

D. All electrical connections carrying line voltage (above 100 volts) shall be connected and terminated by the Electrical Contractor. All line voltage wire and cable for the audio and video systems shall be provided by the Electrical Contractor.

E. All electrical connections carrying low voltage (below 100 volts) shall be connected and terminated by the Installing Contractor. All low voltage wire and cable for the audio and video systems shall be provided by the Installing Contractor.

1.6 QUALITY ASSURANCE

A. All electrical installation shall be in compliance with the N.E.C., and shall be inspected by the Michigan Department of Labor/State Electrical Inspection Authority. All installation shall be subject to inspection by the Local Authority Having Jurisdiction. All installation shall be in accordance with the AHJ. Any installation methods found to not be in compliance with the AHJ shall be rectified by the AV contractor without claim for additional payment.

B. Bidders for this section are expected to be an authorized dealer for all major pieces of equipment or purchasing them through an authorized dealer. Documentation of dealer status may be
requested from bidders. Failure to provide adequate documentation may be grounds for disqualification from the bidding process.

C. The master/lead technician working on site shall have a minimum certification of NICET Level 2, CTS, or C-EST. Contractors unable to provide proper certification should confirm qualifications with the Consultant prior to bidding. Failure to provide proper qualifications shall be grounds for disqualification from the bidding process.

1.7 STANDARDS

A. All equipment and installation practices, where applicable standards have been established, shall be built and installed to the standards of the following institutions:

1.8 DELIVERY, STORAGE, AND HANDLING

A. Include delivery, storage, and handling of all products and materials to be delivered and installed.

B. Installing contractor shall be responsible for providing on-site storage if necessary. Installing Contractor may negotiate a storage facility with the Construction Manager, but shall still be responsible for his own materials.

1.9 PROJECT CONDITIONS

A. Installing Contractor bears the responsibility to verify all site conditions and coordinate with the Electrical Contractor to ensure a complete and functional system is supplied to the Owner.

B. Verify dimensions of major components to check for entry through doors, ceiling height clearance, and column interference prior to the installation of the equipment.

C. Installing Contractor shall stay aware of all project time schedules and shall coordinate with all other trades for all aspects of the work.

D. During the installation, and up to the date of final acceptance, the Contractor shall be under obligation to protect his/her work against damage and loss. Such damage shall be replaced or repaired at no cost to the Owner.

E. Installing Contractor shall include provisions in the bid to make at least three (3) visits to the site prior to beginning of site work to verify site conditions, coordinate with other trades, meet with representatives of the Owner, or deal with other issues that may arise in the course of building construction.

F. In addition to the three (3) site visits the Installing Contractor shall attend progress meetings and foreman meetings as required by the Construction Manager.

1.10 WARRANTY

A. The Installing Contractor shall provide timely maintenance of any malfunctions of the installed systems, at no additional cost to the owner, for a period of twelve (12) months from the date of acceptance by the owner unless damage or failure of the system is caused by misuse, abuse, neglect, or accident.

B. The Installing Contractor shall guarantee availability of local service by factory-trained personnel from an authorized distributor of the equipment manufacturer. The distributor shall have available a stock of the manufacturer's standard parts.
2. PRODUCTS

2.1 EQUIPMENT AND MATERIALS—GENERAL

A. All equipment and components shall be new and the manufacturer's current model.

B. All components and the system as a whole shall meet or exceed the minimum standards issued by the EIA.

C. All work and materials in conjunction with this installation shall meet or exceed the provisions of the National Electrical Code and other applicable codes.

D. The materials, appliances, equipment and devices shall be tested and listed by Underwriters' Laboratories, Inc. or other similar testing agency. The system shall be listed by U.L. or other testing agency, and each major component shall bear the manufacturer's name, catalog number, and U.L. or other testing agency label.

E. The Installing Contractor shall be responsible for providing a complete and fully functional system, including all necessary components, whether included in this specification or not.

F. Pricing for Alternates shall be provided on the same document as the base bid, under a separate line item for each Alternate. All costs associated with each Alternate shall be included in the price for each.

2.2 MANUFACTURERS

A. Listing of approved manufacturers for each component follows component description below.

B. The base bid shall be based on the specified equipment or approved equivalent equipment. Alternate equipment must be so noted on a separate bid form with an ADD or DEDUCT to the base bid.

C. All approved equivalent equipment must meet or exceed the specified equipment in every aspect of performance, form, and function.

2.3 REQUESTS FOR ALTERNATE EQUIPMENT

A. Requests for equipment to be considered as alternates shall be considered only when the following have been submitted to the Consultant:

1. A list of such alternate equipment and materials for consideration as equal

2. Cut sheet and product information in PDF form.

3. EASE Speaker data (if applicable)

4. A demo piece of the proposed equipment to be substituted may, at the discretion of the consultant, be requested for testing and review. If such a request is made by the consultant, the Installing Contractor shall provide a demo piece (or pieces if applicable) of the proposed equipment or arrange a demonstration of the proposed equipment in a similar environment.

5. If a request for alternate equipment is refused, the Installing Contractor shall provide the equipment as specified.
2.4 COMPONENTS

A. The following approved manufacturers, quantities, and model numbers shall form the basis of the system. These are minimum requirements. Installing Contractor shall verify all quantities prior to ordering and installation. Quantities are provided for reference only. Installing Contractor is still responsible to provide a complete and working system without claim for additional payment. All equivalents and alternates must be approved by the Consultant prior to system installation.

B. The Installing Contractor shall furnish all equipment and work as noted or implied on the drawings or specifications. In case of a conflict between the drawings and specification, furnish the equipment and work with the greatest cost impact.

C. Digital Signage and Digital Directory

1. RF Encoder (qty 1): Rack mountable RF encoder with ATSC output and four unencrypted HDMI inputs.
   a. ZeeVee HDb2840

2. Flat Panel Signage/Directory Display (qty 3): Professional 55” LED flat panel with ATSC tuner and 1920x1080 native resolution.
   a. NEC P553-AVT

3. Flat Panel Wall Mount (qty 3): Non-tilting, wall mount for specified display.
   a. Chief RXF2

4. Security Kit (qty 3): Cable lock accessory kit for specified mount. Kit to include low-profile padlock, key, cable and velcro to ensure it remains hidden behind screen.
   a. Chief PACLK1

5. Coaxial Jumper (as needed): RG-6U, 75 Ohm rated, quadshielded, doublebraided cable. Terminate with Thomas & Betts “Snap-n-Seal” connectors. All cable assemblies must meet WSU standards.
   a. Commscope

6. 4x1 Combiner/Splitter (qty 3): High bandwidth splitter/combiner capable of passing all channels in the ATSC tuner range with no more than 3.5 dBmV of degradation. Provide a 75 Ohm terminator on any unused ports.
   a. C-Cor
   b. Phillips
   c. Approved

7. 208V PDU Power Cable (qty as needed): C14 to C15 power cables to connect items installed in MDF Room 049 to the existing 208V PDUs (power distribution units). After site verification, order proper length for installation location.
8. Digital Signage PC (qty 2): Small form factor PC with Intel Quad Core 2.5 GHz processor, Windows 7 Professional, 128Gb SSD drive, and 8 Gb of RAM for digital signage applications at WSU. Contractor to reach out to WSU C&IT to get full and current specifications of PC being used at the time of bidding. Provide a rack shelf for proper installation into equipment rack.
   a. Dell OptiPlex 7040 Micro Form Factor

D. Shared Conference Room 588

1. Flat Panel Display (qty 1): Hospitality 50” flat panel with ATSC tuner, internal speakers, rs232 control, 2 HDMI, VGA, and 1920x1080 native resolution.
   a. Panasonic TH-50LRU70

2. Flat Panel Wall Mount (qty 1): Non-tilting, wall mount for specified display.
   a. Chief RXF2

3. Security Kit (qty 1): Cable lock accessory kit for specified mount. Kit to include low-profile padlock, key, cable and velcro to ensure it remains hidden behind screen.
   a. Chief PACLK1

4. Wall Controller (qty 1): Three gang, 10 button wall controller with rs232, Ethernet, relays, and POE power capability. Coordinate color with Owner before ordering.
   a. Crestron MPC-M5

5. Programming: Programming of wall controller. Controller shall include, but not be limited to, display power On/Off, volume Up/Down, and source selection. Contractor should refer to the controller in Conference Room 009 as a reference for expected performance. Controller should be set up for integration into WSU’s Fusion system.
   a. Crestron certified programming.

6. HDMI Cable (qty as needed): High speed HDMI cable capable of passing 1080p signal at the distance required for the installation location.
   a. Crestron
   b. Extron
   c. Kramer
   d. FSR

7. VGA Cable with audio (qty as needed): High resolution, flexible cable with EDID capability capable of passing 1920x1200 signal at the distance required for the installation location.
   a. Extron
   b. Approved Equal

Terminate with Thomas & Betts “Snap-n-Seal” connectors. All cable assemblies must meet WSU standards.

a. Commscope

9. Cat5e wire – C5e (qty as needed): UTP Cat5e, 8 conductor, 24AWG, overall PVC jacket. Use plenum versions were necessary.
   a. Liberty Wire & Cable 24-4P-L5-EN-Color
   b. Mohawk Cable 4245
   c. Belden 1583
   d. West Penn 4245

10. Locking Pass Thru (qty 1): Locking cable pass thru wall plate cover. Modify cover to allow only the installed cables to pass thru when cover is locked closed.
   a. FSR WB-MS2G

E. Shared Conference Room 792

1. Flat Panel Display (qty 1): Hospitality 65” flat panel with ATSC tuner, internal speakers, rs232 control, HDMI, VGA, and 1920x1080 native resolution.
   a. Panasonic TH-65LRU60

2. Flat Panel Wall Mount (qty 1): Non-tilting, wall mount for specified display.
   a. Chief RXF2

3. Security Kit (qty 1): Cable lock accessory kit for specified mount. Kit to include low-profile padlock, key, cable and velcro to ensure it remains hidden behind screen.
   a. Chief PACLK1

4. Wall Controller (qty 1): Three gang, 10 button wall controller with rs232, Ethernet, relays, and POE power capability. Coordinate color with Owner before ordering.
   a. Crestron MPC-M5

5. Programming: Programming of wall controller. Controller shall include, but not be limited to, display power On/Off, volume Up/Down, and source selection. Contractor should refer to the controller in Conference Room 009 as a reference for expected performance. Controller should be set up for integration into WSU’s Fusion system.
   a. Crestron certified programming.

6. HDMI Cable (qty as needed): High speed HDMI cable capable of passing 1080p signal at the distance required for the installation location.
   a. Crestron
   b. Extron
c. Kramer

d. FSR

7. VGA Cable with audio (qty as needed): High resolution, flexible cable with EDID capability capable of passing 1920x1200 signal at the distance required for the installation location.

a. Extron

b. Approved Equal

8. Coaxial Jumper (as needed): RG-6U, 75 Ohm rated, quadshielded, doublebraided cable. Terminate with Thomas & Betts “Snap-n-Seal” connectors. All cable assemblies must meet WSU standards.

a. Commscope

9. Cat5e wire – C5e (qty as needed): UTP Cat5e, 8 conductor, 24AWG, overall PVC jacket. Use plenum versions were necessary.

a. Liberty Wire & Cable 24-4P-L5-EN-Color

b. Mohawk Cable 4245

c. Belden 1583

d. West Penn 4245

10. AV plates (see drawings for details and qty): AV connection plates for floor pocket.

F. Miscellaneous stand alone items:

1. iPad (qty 1): Provide iPad with 16 Gb of storage to WSU that they will use for room scheduling outside of a conference room on the 7th floor

a. Apple iPad Air 2

3. EXECUTION

3.1 GENERAL INSTALLATION (MATERIAL AND WORKMANSHIP)

A. Non-compliance with any of the following so viewed by Owner’s sole discretion shall be cause for rejection of Work by the Owner, and replacement by Installing Contractor to Owner’s satisfaction, and at no added cost to the Owner.

B. Material, workmanship, wire, and wiring methods shall be performed as specified.

C. If, in the opinion of the Installing Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the Owner and Engineer. Modifications shall not be implemented without the written approval from the Engineer.

D. All materials and labor shall be furnished, whether specifically mentioned or not, to form a complete system operational as per the intentions and description set forth in Part 1. Include the delivery, unloading, placement, fastening to walls, floors, ceiling, or counters, other structures
where required, interconnecting wiring of the systems components, equipment alignment, and all other work whether it is necessary to result in complete operational systems.

E. All installation activities shall be in accordance with accepted broadcast and audio engineering practices. All efforts shall be invoked to ensure the owner’s desire that the system have extended life.

F. It shall be the responsibility of the Installing Contractor to cooperate at all times, and to the fullest extent, with all trades and contractors doing work in the building, to the end that lost time, work stoppages, interference, and inefficiencies do not occur. Communicate installation scheduling with the Electrical Contractor, and coordinate with other trades.

G. Installing Contractor bears the responsibility to verify all site conditions and coordinate with the Electrical Contractor to ensure a complete and functional system is provided to the Owner.

H. Verify dimensions of major components to check for entry through doors, ceiling height clearance, and column interference prior to the installation of the equipment.

I. During the installation, and up to the date of final acceptance, the Installing Contractor shall be under obligation to protect his/her finished and unfinished work against damage and loss; such work shall be replaced or repaired at no cost to the Owner.

3.2 SUBCONTRACT

A. The Installing Contractor shall be responsible for the complete and unconditional implementation of each system, even though he may have subcontracted a portion of the installation or had certain manufacturers install their own equipment.

B. Any delay in system commissioning caused by a Subcontractor shall be the responsibility of the Installing Contractor. If such delays cause significant disruption to the successful completion and usage of the project, the Installing Contractor shall be liable for reasonable compensation to the owner.

3.3 PHYSICAL INSTALLATION

A. All equipment not specifically portable shall be held firmly in place and supported by fastenings, brackets, etc., capable of supporting the load with a minimum safety factor of 5 or as approved by the Architect.

B. Boxes, equipment, cabling, rack, etc. shall be installed and secured plumb and square with building lines.

C. At all times during the installation the Installing Contractor shall consider not only the operational efficiency of equipment but also the aesthetics of the space. Questions or conflicts between operation and aesthetics should be directed to the Architect and Owner’s Representative.

3.4 CONDUIT AND CABLE ROUTING

A. Electrical Contractor shall furnish and install all conduit and boxes associated with the audio and video systems as shown on the drawings or as required by the Installing Contractor.

B. Electrical Contractor shall provide all junction boxes for the audio and video systems with appropriate covers.

C. All conduits not specifically identified shall be 3/4".
D. All conduits below grade shall be PVC or as required by code. All conduits above grade shall be EMT or as required by code. Refer to conduit specification for details.

E. There shall be no more than three (3) 90-degree bends in audio or video conduit between pull points. If a conduit run requires more than two bends or if the conduit run is in excess of 150" in total length, insert a pull box. If it is not practical to install a pull box in the run due to field conditions, the conduit size shall be increased to the next trade size for each additional 90-degree bend. Offsets shall be considered as equivalent to a 90-degree bend.

F. All conduits to be labeled at the source box with the destination box in a clear and logical manner.

G. Ends of all conduits are to be deburred and bushed.

H. All conduits terminating inside of an audio/video enclosure (e.g. rack) or not terminating in a junction/pull box shall be provided with plastic insulated bushings.

I. Electrical Contractor shall provide a poly pull-line in each conduit.

J. Line voltage conduits shall maintain a minimum of 24" separation from audio or video signal conduits except to cross at 90-degree angles when necessary.

K. The main audio racks, any auxiliary audio rack, and any other audio panel containing electronic audio system devices, must be isolated or insulated from any metallic conduits. The final connection to these audio racks or panels shall be with PVC, non-metallic flex or any other non-metallic conduit. Or, where shown the cables can enter the rack or panel in a bundle through a bushed opening.

L. Junction boxes and pull boxes in the conduit system do not have to be isolated, only racks or panels with electrical power and electronic audio devices.

M. Electrical power feed to an audio rack or audio panel shall also be via PVC or non-metallic or insulated conduit.

N. All cables shall be laced or tied securely to assure no malfunctions resulting from interference of other trades or routine future maintenance.

3.5 CABLE INSTALLATION

A. All wires and cables shall be marked at every termination and connection point with permanent clear wrap-around number or letter cable markers. There shall be no unmarked cables in the systems. Any unmarked cables found at Contractor Checkout shall be immediately labeled. Failure to label wires can be cause for rejection of work by the Owner and shall be corrected at no additional cost to the owner. Marking codes used on cables shall correspond to codes shown on drawings or be approved by the Owner and Consultant.

B. Cables utilizing molded plastic or solderless insulation displacement connectors shall be unacceptable.

C. All cable installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP (refer to NEC Article 800.53) or be installed in metallic conduit (in compliance with NEC Article 300.22).

D. There shall be no wire splices in conduit.
E. Terminal block, boards, strips, or connectors shall be furnished for all cables, which interface with racks, cabinets, consoles, or equipment modules.

F. All cables shall be grouped according to the signals being carried in order to reduce signal contamination and cross-talk. Separate groups shall be formed for the following cables.

1. Group one: Power Cables
2. Group two: Control Cables
3. Group three: Video Cables
5. Group five: Line level audio cables.

G. Do not mix signal cables and electrical power cables in the same conduit.

H. Do not tie-wrap or bundle signal cables to an electrical power cable.

I. Power cables, control cables, and high level cables shall be run on the left side of an equipment rack, as viewed from the rear. All other cables shall be run on the right side of the equipment rack, as viewed from the rear.

J. All inter-rack cabling shall be neatly strapped, dressed, and supported as approved by the Owner or Consultant. Cabling within racks shall be contained in Panduit finger tray and secured to lacer bars when appropriate. Such cables shall remain separated as indicated herein.

K. All cables routed outside of racks and conduit shall be contained in a suitable harness or wireway to maintain a neat, clean, and finished product.

L. All cables shall be cut to the length dictated by the run. All equipment installed in racks shall have a service loop of appropriate length.

1. For equipment mounted in drawers or slides, the interconnecting cables shall be provided with a service loop of appropriate length to allow for full travel of drawer or slide and enough slack to service and remove any necessary items.

2. For equipment mounted in racks accessible from both front and back, provide a service loop length sufficient to plug and unplug cable from the unit to allow for trouble-shooting and service of equipment.

3. For equipment mounted in racks accessible from the front only, provide a service loop length sufficient to remove the unit from the rack and easily plug and unplug all connectors.

3.6 IDENTIFICATION

A. Except where otherwise specified, label all connectors on plates or panels, switches, controls, and receptacles. Labeling material to have white lettering and to be engraved black plastic laminate with metal backing or engraved black anodized aluminum plates. Minimum plate thickness shall be .125". Black P-Touch Extra Strength Adhesive labels with white lettering for rack-mounted equipment labels are also acceptable. All labels are to be relatively permanent and shall be done in a professional and orderly manner. Any labels found to be unacceptable upon
project inspection shall be remedied by the Installing Contractor without claim for additional payment. All labels shall correspond to the drawings.

B. Identify all wires and cables at every termination and connection point with permanent type markers.

C. Every piece of rack-mounted equipment shall have an engraved or P-Touch label indicating function and schematic label. Provide and install on front panel engraved labels for each item of rack-mounted equipment. Designate function and input and output line(s) or loudspeaker(s) served by labeled equipment. Key all designations to system functional and patch panel diagrams.

3.7 SYSTEM PERFORMANCE, TESTS AND ADJUSTMENTS

A. Acceptance testing: Before Acceptance Tests are scheduled, the Installing Contractor shall perform his own systems checkout. Installing Contractor shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of these specifications and drawings. This work shall include the following:

1. Testing of all inputs, outputs, and tie-lines.
2. Testing of all display devices, equipment configurations, speakers and jacks.
3. Testing of any other wires or components.
4. Test all audio for compliance with the Performance Standards.
5. Check all controls functions, from all controlling points to all controlled devices, for specified operation.

B. Testing Personnel: The Installing Contractor shall have a minimum of two persons knowledgeable as to the systems as installed available for testing and adjustment with the Consultant.

1. All costs to the Installing Contractor for testing personnel shall be included in the bid.
2. Installing Contractor shall allow for up to (8) eight hours of testing and adjustments with the Consultant.
3. Failure of the Installing Contractor to provide adequate personnel or testing equipment causing lost time to the Consultant shall result in the Installing Contractor paying the Consultant’s standard hourly rate for additional time and expenses as necessary.

C. Test Equipment:

1. All equipment for testing and adjustments to the sound system shall be furnished by the Installing Contractor. Test equipment shall include:

2. Computer Measurement Platform: SMAART, TEF, SIM or other approved equal
3. Dual Trace Oscilloscope
4. High Quality Multi-meter: Fluke or Similar
5. Sweepable Tone Generator
6. The Consultant may choose to bring and use some of his own test equipment.

7. Furnish make, model, and serial number of all test equipment to be used by the Consultant prior to performing any test and adjustments to the system.

D. Noise and RF Pickup:

1. Set up system for each specified mode of operation.

2. Check to ensure that system is free of noise, hum, and radio frequency interference.

E. Buzzes, Rattles, Distortion:

1. Apply high-quality music signal to the system. Adjust the system for frequent peaks at its specified maximum sound pressure level.

2. Apply sine-wave sweep from 50 to 5,000 Hz at 10 dB below full amplifier power.

3. In both cases, listen carefully for buzzes, rattles and objectionable distortion.

4. Correct all causes of such defects. If cause is outside system, promptly notify the Owner indicating cause and suggested corrective procedures.

F. Prior to the consultant commissioning of the system, provide a written report to the consultant documenting the system performance in each of the areas noted above.

3.8 PURCHASER TRAINING

A. The Installing Contractor shall provide a minimum of six (6) hours (three 2 hour sessions) of on-the-job training sessions for the installed systems for Owner-designated personnel, instructing them in the operation and maintenance of the systems. The training sessions shall take place after the systems are operational, at a time prearranged with the Owner. The training time is to be part of the total of the installation and shall be included in the installation charges.

B. A printed “quick start” guide will be given to each of the training participants. Additionally, the quick start guide will be posted at the tech desk and on the equipment rack. Guides should be laminated.

C. The Installing Contractor shall provide a copy of the software for every component that utilizes an outboard computer for setup and configuration. The Installing Contractor shall demonstrate the usage of each configuration software and train the Owner’s Representative for at least one hour for each software. This training time is to be part of the training time listed in part A above.

D. The Installing Contractor shall instruct the owner in the proper use of all equipment. The Installing Contractor shall have a knowledgeable representative present for the first official use of each system (i.e. production, meeting, event, etc.). Installing Contractor’s Representative shall have sufficient knowledge of systems as installed so as to troubleshoot any problems that may arise during the first usage. Installing Contractor’s Representative shall be present for the entire first usage of the system unless other arrangements are made with the Owner.

E. Furnish and turn over to the owner a digital set of operating/maintenance manuals consisting of:

1. A numerical index with equipment items listed

2. Equipment Brochures/Data Sheets
3. Operating Instructions
4. Service information and schematic diagrams
5. System as-built drawings and wiring diagrams
6. Test and tuning data
7. List of keys and numbers

3.9 FINAL ACCEPTANCE TESTING AND INSPECTION OF COMPLETED INSTALLATION

A. Upon approval of the Contractor Test Report, the Installing Contractor shall demonstrate operation of each major component in the presence of the Consultant and the Owner’s Representative, using each microphone and loudspeaker furnished, all required microphone and loudspeaker positions, and all input, control and amplification equipment. Testing of each video and computer input of the system shall also be performed to verify proper function.

B. After demonstration, assist as required in acceptance tests by representatives of the Owner.

C. A factory-trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect. The demonstration shall be made in the presence of the Owner.

D. The Consultant and the Owner’s Representative will both verify that all of the above items have been completed to satisfaction and that all installation details have been completed before a recommendation of final payment shall be made.

E. The Installing Contractor, at the Installing Contractor’s expense, shall rectify any components not found to function in a satisfactory manner as defined by this specification.

END OF SECTION
1. GENERAL

1.1 RELATED DOCUMENTS:

A. Some information contained in this specification is also found on the associated drawings. Work shown on either is deemed to be in both.

B. The drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

C. If a discrepancy in quantity exists between this specification and the associated drawings, the Contractor shall furnish the greater quantity or value unless otherwise directed by the Owner.

D. Some information contained in this specification and the associated drawings is also noted on the project electrical specification and drawings. Any conflicts between the electrical sections and the Audio and Video Systems shall be immediately reported to the Architect and Consultant.

1.2 SUMMARY OF WORK

A. Digital Signage and Digital Directory Coaxial Infrastructure:

This bid section is for the provision, installation, and termination of all vertical and horizontal coaxial cabling infrastructure for the digital signage and digital directory systems on the 5th and 7th floor. This contractor is responsible for all cabling starting from the output of the coaxial signal splitter located in MDF Room 049 all the way through to terminate at the associated VJ locations. This contractor is also responsible for the provision and installation of the associated VJ plate and connector(s). The provision of intermediate signal splitters is outside the scope of this contractor but coordination must be made to assure that all cabling is run to the proper locations where the intermediate electronics will be installed.

All work and product must follow WSU guidelines and standards without exception. It is the contractor’s responsibility to obtain and follow the latest WSU standards. The latest standards document can be found here: http://computing.wayne.edu/docs/wsu-communications-standards.pdf. See section 17500.

All cabling shall be tested and a certified performance record must be created and submitted verifying cable performance.

*Installation of any product and/or termination or installation of any cabling must FIRST be field verified/coordinated with WSU C&IT Department. No exceptions.*

B. DirecTV Coaxial Infrastructure:

This bid section is for the provision, installation, and termination of all horizontal coaxial cabling infrastructure for the internal distribution of DirecTV signal on the 5th and 7th floor. This contractor is responsible for all cabling starting from the output of the coaxial signal splitter located in each floor’s Janitorial closet all the way through to terminate at the associated VJ locations. This contractor is also responsible for the provision and installation of the associated VJ plate and connector(s).

All work and product must follow WSU guidelines and standards without exception. It is the contractor’s responsibility to obtain and follow the latest WSU standards. The latest standards document can be found here: http://computing.wayne.edu/docs/wsu-communications-standards.pdf. See section 17500.
All cabling shall be tested and a certified performance record must be created and submitted verifying cable performance.

*Installation of any product and/or termination or installation of any cabling must FIRST be field verified/coordinated with WSU C&IT Department. No exceptions.*

1.3 DEFINITIONS AND TERMS

A. The following definitions shall be used.

B. The following terms shall be used to refer to the division of labor and define various entities associated with the project.

1. Owner – Organization or person who has undertaken to construct the space.

2. Construction Manager – General Contractor as hired by the owner.

3. Installing Contractor – The successful bidder of this section as awarded by the construction manager.

4. Electrical Contractor – The successful bidder for the electrical portions of the contract, typically, but not limited to, division 26.

5. Subcontractor – Company or organization contracted by the Installing Contractor to perform or supply any portion of this specification.

6. Consultant – Individual or company hired by the architect or owner to design the systems, write the specification, and detail schematic drawings.

7. Architect – Company or individual hired by the owner to provide the design of the space.

1.4 SUBMITTALS

A. Submittal sheets are required to be submitted for all specified equipment. All submittals and shop drawings shall be submitted and approved by the Consultant prior to the beginning of installation. These submittals shall be provided not more than 6 weeks following award of contract.

1. Installing Contractor shall furnish an electronic PDF document for any equipment request that is not the specified product.

2. A complete Bill of Materials will be submitted by the Installing Contractor showing all the equipment to be installed. Materials will be listed in the same order that the products are listed in Section 2 of this specification. Each sub system will be shown with all of the products to be installed as part of that sub system in the order listed in the specification. The Bill of Materials will indicate the quantity being supplied, the manufacturer, the model of the equipment, and a brief description of the equipment.

3. All product data sheet submittals shall be organized in the same order that products are listed in Section 2 of this specification. Each sub system of the design shall have the product data sheet for each piece of equipment contained in that sub system – organized in the order listed in the specification. Under no circumstance shall the product data sheets be organized in alphabetical order. Any product data sheet submittals not conforming to this will be automatically rejected.
4. Installing Contractor shall furnish an electronic PDF of shop drawings detailing a complete installation plan. Shop drawings are expected to expand upon the construction documents and shall show all components and wires, complete with individual wire numbers, proposed rack layouts, riser diagrams and schematics for individual subsystems, calculations, and details of proposed rigging. Schematics shall show a separate designation for each device and labeling shall correspond to that of the rack layouts. Installing Contractor shall convey that the system is ready to install as shown in the shop drawings, and that details not explicitly defined by this specification or on the drawings have been addressed by the Contractor.

5. Scanned or copied versions of the construction documents will not be accepted and shall be automatically rejected. All drawings are to be done in a clear and professional manner.

6. Failure to furnish all information as noted above shall result in the rejection of submittals. Questions regarding submittal information should be directed to the Consultant prior to drawing submissions.

7. The Consultant’s ACAD 2014 drawings shall be available for floor plans, conduit & wire pull layouts, and some detail drawings. Earlier versions of drawings can be supplied for an additional charge of $20 per drawing. It shall be the responsibility of the Contractor to implement any drawings furnished by the Consultant. Any time expended by the Consultant at the request of the Installing Contractor to interface drawings to other third party software shall be billed to the Installing Contractor at the Consultant’s standard hourly rate. Additional charges may be assessed by the Architect or Construction Manager for furnishing electronic copies of drawings.

B. See section 3 for additional post-installation submittal requirements.

1.5 DIVISION OF LABOR

A. Electrical Contractor shall furnish and install all conduit and boxes associated with the AV Systems as specified, as shown on the drawings, and as required by the Installing Contractor.

B. Electrical Contractor shall supply a pull string in all conduits for the AV Contractor.

C. All AV wiring shall be supplied and installed by the AV contractor.

D. All electrical connections carrying line voltage (above 100 volts) shall be connected and terminated by the Electrical Contractor. All line voltage wire and cable for the audio and video systems shall be provided by the Electrical Contractor.

E. All electrical connections carrying low voltage (below 100 volts) shall be connected and terminated by the Installing Contractor. All low voltage wire and cable for the audio and video systems shall be provided by the Installing Contractor.

1.6 QUALITY ASSURANCE

A. All electrical installation shall be in compliance with the N.E.C., and shall be inspected by the Michigan Department of Labor/State Electrical Inspection Authority. All installation shall be subject to inspection by the Local Authority Having Jurisdiction. All installation shall be in accordance with the AHJ. Any installation methods found to not be in compliance with the AHJ shall be rectified by the AV contractor without claim for additional payment.
B. Bidders for this section are expected to be an authorized dealer for all major pieces of equipment or purchasing them through an authorized dealer. Documentation of dealer status may be requested from bidders. Failure to provide adequate documentation may be grounds for disqualification from the bidding process.

C. The master/lead technician working on site shall have a minimum certification of NICET Level 2, CTS, or C-EST. Contractors unable to provide proper certification should confirm qualifications with the Consultant prior to bidding. Failure to provide proper qualifications shall be grounds for disqualification from the bidding process.

1.7 STANDARDS

A. All equipment and installation practices, where applicable standards have been established, shall be built and installed to the standards of the following institutions:

1.8 DELIVERY, STORAGE, AND HANDLING

A. Include delivery, storage, and handling of all products and materials to be delivered and installed.

B. Installing contractor shall be responsible for providing on-site storage if necessary. Installing Contractor may negotiate a storage facility with the Construction Manager, but shall still be responsible for his own materials.

1.9 PROJECT CONDITIONS

A. Installing Contractor bears the responsibility to verify all site conditions and coordinate with the Electrical Contractor to ensure a complete and functional system is supplied to the Owner.

B. Verify dimensions of major components to check for entry through doors, ceiling height clearance, and column interference prior to the installation of the equipment.

C. Installing Contractor shall stay aware of all project time schedules and shall coordinate with all other trades for all aspects of the work.

D. During the installation, and up to the date of final acceptance, the Contractor shall be under obligation to protect his/her work against damage and loss. Such damage shall be replaced or repaired at no cost to the Owner.

E. Installing Contractor shall include provisions in the bid to make at least three (3) visits to the site prior to beginning of site work to verify site conditions, coordinate with other trades, meet with representatives of the Owner, or deal with other issues that may arise in the course of building construction.

F. In addition to the three (3) site visits the Installing Contractor shall attend progress meetings and foreman meetings as required by the Construction Manager.

1.10 WARRANTY

A. The Installing Contractor shall provide timely maintenance of any malfunctions of the installed systems, at no additional cost to the owner, for a period of twelve (12) months from the date of acceptance by the owner unless damage or failure of the system is caused by misuse, abuse, neglect, or accident.

B. The Installing Contractor shall guarantee availability of local service by factory-trained personnel.
from an authorized distributor of the equipment manufacturer. The distributor shall have available a stock of the manufacturer's standard parts.

2. PRODUCTS

2.1 EQUIPMENT AND MATERIALS—GENERAL

A. All equipment and components shall be new and the manufacturer's current model.

B. All components and the system as a whole shall meet or exceed the minimum standards issued by the EIA.

C. All work and materials in conjunction with this installation shall meet or exceed the provisions of the National Electrical Code and other applicable codes.

D. The materials, appliances, equipment and devices shall be tested and listed by Underwriters' Laboratories, Inc. or other similar testing agency. The system shall be listed by U.L. or other testing agency, and each major component shall bear the manufacturer's name, catalog number, and U.L. or other testing agency label.

E. The Installing Contractor shall be responsible for providing a complete and fully functional system, including all necessary components, whether included in this specification or not.

F. Pricing for Alternates shall be provided on the same document as the base bid, under a separate line item for each Alternate. All costs associated with each Alternate shall be included in the price for each.

2.2 MANUFACTURERS

A. Listing of approved manufacturers for each component follows component description below.

B. The base bid shall be based on the specified equipment or approved equivalent equipment. Alternate equipment must be so noted on a separate bid form with an ADD or DEDUCT to the base bid.

C. All approved equivalent equipment must meet or exceed the specified equipment in every aspect of performance, form, and function.

2.3 REQUESTS FOR ALTERNATE EQUIPMENT

A. Requests for equipment to be considered as alternates shall be considered only when the following have been submitted to the Consultant:

1. A list of such alternate equipment and materials for consideration as equal

2. Cut sheet and product information in PDF form.

3. EASE Speaker data (if applicable)

4. A demo piece of the proposed equipment to be substituted may, at the discretion of the consultant, be requested for testing and review. If such a request is made by the consultant, the Installing Contractor shall provide a demo piece (or pieces if applicable) of the proposed equipment or arrange a demonstration of the proposed equipment in a similar environment.
5. If a request for alternate equipment is refused, the Installing Contractor shall provide the equipment as specified.

2.4 COMPONENTS

A. The following approved manufacturers, quantities, and model numbers shall form the basis of the system. These are minimum requirements. Installing Contractor shall verify all quantities prior to ordering and installation. Quantities are provided for reference only. Installing Contractor is still responsible to provide a complete and working system without claim for additional payment. All equivalents and alternates must be approved by the Consultant prior to system installation.

B. The Installing Contractor shall furnish all equipment and work as noted or implied on the drawings or specifications. In case of a conflict between the drawings and specification, furnish the equipment and work with the greatest cost impact.

C. Digital Signage and Digital Directory Coaxial Infrastructure

1. Horizontal and Riser Cable (qty as needed): Cable shall be plenum rated RG-6U, 98% or higher RFI shield rating, quadshielded, doublebraided, and have a nominal impedance of 75 Ohms. Cable shall be sweep-tested by its manufacturer, passed and certified as such by its manufacturer and shall be certified as its best grade over its entire rated bandwidth. A written copy of the certification shall be provided to WSU C&IT Computing & Network Services and shall be included with the Submittals and As-built documentation.

   a. Commscope 2227V

2. Cable connectors (qty as needed): Connectors shall be Cable Television Service, FCC Part 76 certified and shall be of a size and type specifically designed for RG-6U Commscope 2227V plenum-rated cable, the trunk taps and the wall jacks. Connectors shall be of a one-piece design. Two-piece connectors shall not be allowed. Connectors shall have a nominal impedance of 75 Ohms.

   a. Thomas & Betts “Snap-n-Seal”

3. Coaxial Jacks and Pass-thru plates (qty as needed): Wall jack connectors shall be type F, 75 Ohm, self-terminating connectors. Mounting plates shall be sized to match the junction box and isolated to not interfere with video signal.

   a. Grayfox Gold #7530

D. DirecTV Coaxial Infrastructure

1. Horizontal and Rizer Cable (qty as needed): Cable shall be plenum rated RG-6U, 98% or higher RFI shield rating, quadshielded, doublebraided, and have a nominal impedance of 75 Ohms. Cable shall be sweep-tested by its manufacturer, passed and certified as such by its manufacturer and shall be certified as its best grade over its entire rated bandwidth. A written copy of the certification shall be provided to WSU C&IT Computing & Network Services and shall be included with the Submittals and As-built documentation.

   a. Commscope 2227V

2. Cable connectors (qty as needed): Connectors shall be Cable Television Service, FCC Part 76 certified and shall be of a size and type specifically designed for RG-6U
Commscope 2227V plenum-rated cable, the trunk taps and the wall jacks. Connectors shall be of a one-piece design. Two-piece connectors shall not be allowed. Connectors shall have a nominal impedance of 75 Ohms.

a. Thomas & Betts “Snap-n-Seal”

3. Coaxial Jacks and Pass-thru plates (qty as needed): Wall jack connectors shall be type F, 75 Ohm, self-terminating connectors. Mounting plates shall be sized to match the junction box and isolated to not interfere with video signal.

a. Grayfox Gold #7530

3. EXECUTION

3.1 GENERAL INSTALLATION (MATERIAL AND WORKMANSHIP)

A. Non-compliance with any of the following so viewed by Owner’s sole discretion shall be cause for rejection of Work by the Owner, and replacement by Installing Contractor to Owner’s satisfaction, and at no added cost to the Owner.

B. Material, workmanship, wire, and wiring methods shall be performed as specified.

C. If, in the opinion of the Installing Contractor, an installation practice is desired or required, which is contrary to these specifications or drawings, a written request for modification shall be made to the Owner and Engineer. Modifications shall not be implemented without the written approval from the Engineer.

D. All materials and labor shall be furnished, whether specifically mentioned or not, to form a complete system operational as per the intentions and description set forth in Part 1. Include the delivery, unloading, placement, fastening to walls, floors, ceiling, or counters, other structures where required, interconnecting wiring of the systems components, equipment alignment, and all other work whether it is necessary to result in complete operational systems.

E. All installation activities shall be in accordance with accepted broadcast and audio engineering practices. All efforts shall be invoked to ensure the owner’s desire that the system have extended life.

F. It shall be the responsibility of the Installing Contractor to cooperate at all times, and to the fullest extent, with all trades and contractors doing work in the building, to the end that lost time, work stoppages, interference, and inefficiencies do not occur. Communicate installation scheduling with the Electrical Contractor, and coordinate with other trades.

G. Installing Contractor bears the responsibility to verify all site conditions and coordinate with the Electrical Contractor to ensure a complete and functional system is provided to the Owner.

H. Verify dimensions of major components to check for entry through doors, ceiling height clearance, and column interference prior to the installation of the equipment.

I. During the installation, and up to the date of final acceptance, the Installing Contractor shall be under obligation to protect his/her finished and unfinished work against damage and loss; such work shall be replaced or repaired at no cost to the Owner.

3.2 SUBCONTRACT
A. The Installing Contractor shall be responsible for the complete and unconditional implementation of each system, even though he may have subcontracted a portion of the installation or had certain manufacturers install their own equipment.

B. Any delay in system commissioning caused by a Subcontractor shall be the responsibility of the Installing Contractor. If such delays cause significant disruption to the successful completion and usage of the project, the Installing Contractor shall be liable for reasonable compensation to the owner.

3.3 PHYSICAL INSTALLATION

A. All equipment not specifically portable shall be held firmly in place and supported by fastenings, brackets, etc., capable of supporting the load with a minimum safety factor of 5 or as approved by the Architect.

B. Boxes, equipment, cabling, rack, etc. shall be installed and secured plumb and square with building lines.

C. At all times during the installation the Installing Contractor shall consider not only the operational efficiency of equipment but also the aesthetics of the space. Questions or conflicts between operation and aesthetics should be directed to the Architect and Owner’s Representative.

3.4 CONDUIT AND CABLE ROUTING

A. Electrical Contractor shall furnish and install all conduit and boxes associated with the audio and video systems as shown on the drawings or as required by the Installing Contractor.

B. Electrical Contractor shall provide all junction boxes for the audio and video systems with appropriate covers.

C. All conduits not specifically identified shall be 3/4”.

D. All conduits below grade shall be PVC or as required by code. All conduits above grade shall be EMT or as required by code. Refer to conduit specification for details.

E. There shall be no more than three (3) 90-degree bends in audio or video conduit between pull points. If a conduit run requires more than two bends or if the conduit run is in excess of 150’ in total length, insert a pull box. If it is not practical to install a pull box in the run due to field conditions, the conduit size shall be increased to the next trade size for each additional 90-degree bend. Offsets shall be considered as equivalent to a 90-degree bend.

F. All conduits to be labeled at the source box with the destination box in a clear and logical manner.

G. Ends of all conduits are to be deburred and bushed.

H. All conduits terminating inside of an audio/video enclosure (e.g. rack) or not terminating in a junction/pull box shall be provided with plastic insulated bushings.

I. Electrical Contractor shall provide a poly pull-line in each conduit.

J. Line voltage conduits shall maintain a minimum of 24” separation from audio or video signal conduits except to cross at 90-degree angles when necessary.

K. The main audio racks, any auxiliary audio rack, and any other audio panel containing electronic
audio system devices, must be isolated or insulated from any metallic conduits. The final connection to these audio racks or panels shall be with PVC, non-metallic flex or any other non-metallic conduit. Or, where shown the cables can enter the rack or panel in a bundle through a bushed opening.

L. Junction boxes and pull boxes in the conduit system do not have to be isolated, only racks or panels with electrical power and electronic audio devices.

M. Electrical power feed to an audio rack or audio panel shall also be via PVC or non-metallic or insulated conduit.

N. All cables shall be laced or tied securely to assure no malfunctions resulting from interference of other trades or routine future maintenance.

3.5 CABLE INSTALLATION

A. All wires and cables shall be marked at every termination and connection point with permanent clear wrap-around number or letter cable markers. There shall be no unmarked cables in the systems. Any unmarked cables found at Contractor Checkout shall be immediately labeled. Failure to label wires can be cause for rejection of work by the Owner and shall be corrected at no additional cost to the owner. Marking codes used on cables shall correspond to codes shown on drawings or be approved by the Owner and Consultant.

B. Cables utilizing molded plastic or solderless insulation displacement connectors shall be unacceptable.

C. All cable installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP (refer to NEC Article 800.53) or be installed in metallic conduit (in compliance with NEC Article 300.22).

D. There shall be no wire splices in conduit.

E. Terminal block, boards, strips, or connectors shall be furnished for all cables, which interface with racks, cabinets, consoles, or equipment modules.

F. All cables shall be grouped according to the signals being carried in order to reduce signal contamination and cross-talk. Separate groups shall be formed for the following cables.

   1. Group one: Power Cables
   2. Group two: Control Cables
   3. Group three: Video Cables
   5. Group five: Line level audio cables.

G. Do not mix signal cables and electrical power cables in the same conduit.

H. Do not tie-wrap or bundle signal cables to an electrical power cable.

I. Power cables, control cables, and high level cables shall be run on the left side of an equipment
rack, as viewed from the rear. All other cables shall be run on the right side of the equipment rack, as viewed from the rear.

J. All inter-rack cabling shall be neatly strapped, dressed, and supported as approved by the Owner or Consultant. Cabling within racks shall be contained in Panduit finger tray and secured to lacer bars when appropriate. Such cables shall remain separated as indicated herein.

K. All cables routed outside of racks and conduit shall be contained in a suitable harness or wire-way to maintain a neat, clean, and finished product.

L. All cables shall be cut to the length dictated by the run. All equipment installed in racks shall have a service loop of appropriate length.

1. For equipment mounted in drawers or slides, the interconnecting cables shall be provided with a service loop of appropriate length to allow for full travel of drawer or slide and enough slack to service and remove any necessary items.

2. For equipment mounted in racks accessible from both front and back, provide a service loop length sufficient to plug and unplug cable from the unit to allow for trouble-shooting and service of equipment.

3. For equipment mounted in racks accessible from the front only, provide a service loop length sufficient to remove the unit from the rack and easily plug and unplug all connectors.

3.6 IDENTIFICATION

A. Except where otherwise specified, label all connectors on plates or panels, switches, controls, and receptacles. Labeling material to have white lettering and to be engraved black plastic laminate with metal backing or engraved black anodized aluminum plates. Minimum plate thickness shall be .125”. Black P-Touch Extra Strength Adhesive labels with white lettering for rack-mounted equipment labels are also acceptable. All labels are to be relatively permanent and shall be done in a professional and orderly manner. Any labels found to be unacceptable upon project inspection shall be remedied by the Installing Contractor without claim for additional payment. All labels shall correspond to the drawings.

B. Identify all wires and cables at every termination and connection point with permanent type markers.

C. Every piece of rack-mounted equipment shall have an engraved or P-Touch label indicating function and schematic label. Provide and install on front panel engraved labels for each item of rack-mounted equipment. Designate function and input and output line(s) or loudspeaker(s) served by labeled equipment. Key all designations to system functional and patch panel diagrams.

3.7 SYSTEM PERFORMANCE, TESTS AND ADJUSTMENTS

A. Acceptance testing: Before Acceptance Tests are scheduled, the Installing Contractor shall perform his own systems checkout. Installing Contractor shall furnish all required test equipment and shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of these specifications and drawings. This work shall include the following:

1. Testing of all inputs, outputs, and tie-lines.
2. Testing of all display devices, equipment configurations, speakers and jacks.
3. Testing of any other wires or components.
4. Test all audio for compliance with the Performance Standards.
5. Check all controls functions, from all controlling points to all controlled devices, for specified operation.

B. Testing Personnel: The Installing Contractor shall have a minimum of two persons knowledgeable as to the systems as installed available for testing and adjustment with the Consultant.
   1. All costs to the Installing Contractor for testing personnel shall be included in the bid.
   2. Installing Contractor shall allow for up to (8) eight hours of testing and adjustments with the Consultant.
   3. Failure of the Installing Contractor to provide adequate personnel or testing equipment causing lost time to the Consultant shall result in the Installing Contractor paying the Consultant’s standard hourly rate for additional time and expenses as necessary.

C. Test Equipment:
   1. All equipment for testing and adjustments to the sound system shall be furnished by the Installing Contractor. Test equipment shall include:
      2. Dual Trace Oscilloscope
      3. High Quality Multi-meter: Fluke or Similar
      4. Sweepable Tone Generator
      5. The Consultant may choose to bring and use some of his own test equipment.
      6. Furnish make, model, and serial number of all test equipment to be used to the Consultant prior to performing any test and adjustments to the system.

D. Noise and RF Pickup:
   1. Set up system for each specified mode of operation.
   2. Check to ensure that system is free of noise, hum, and radio frequency interference.

E. Buzzes, Rattles, Distortion:
   1. Apply high-quality music signal to the system. Adjust the system for frequent peaks at its specified maximum sound pressure level.
   2. Apply sine-wave sweep from 50 to 5,000 Hz at 10 dB below full amplifier power.
   3. In both cases, listen carefully for buzzes, rattles and objectionable distortion.
   4. Correct all causes of such defects. If cause is outside system, promptly notify the Owner indicating cause and suggested corrective procedures.

F. Prior to the consultant commissioning of the system, provide a written report to the consultant
documenting the system performance in each of the areas noted above.

3.8 PURCHASER TRAINING

A. The Installing Contractor shall provide a minimum of six (6) hours (three 2 hour sessions) of on-the-job training sessions for the installed systems for Owner-designated personnel, instructing them in the operation and maintenance of the systems. The training sessions shall take place after the systems are operational, at a time prearranged with the Owner. The training time is to be part of the total of the installation and shall be included in the installation charges.

B. A printed “quick start” guide will be given to each of the training participants. Additionally, the quick start guide will be posted at the tech desk and on the equipment rack. Guides should be laminated.

C. The Installing Contractor shall provide a copy of the software for every component that utilizes an outboard computer for setup and configuration. The Installing Contractor shall demonstrate the usage of each configuration software and train the Owner’s Representative for at least one hour for each software. This training time is to be part of the training time listed in part A above.

D. The Installing Contractor shall instruct the owner in the proper use of all equipment. The Installing Contractor shall have a knowledgeable representative present for the first official use of each system (i.e. production, meeting, event, etc.). Installing Contractor’s Representative shall have sufficient knowledge of systems as installed so as to troubleshoot any problems that may arise during the first usage. Installing Contractor’s Representative shall be present for the entire first usage of the system unless other arrangements are made with the Owner.

E. Furnish and turn over to the owner a digital set of operating/maintenance manuals consisting of:
   1. A numerical index with equipment items listed
   2. Equipment Brochures/Data Sheets
   3. Operating Instructions
   4. Service information and schematic diagrams
   5. System as-built drawings and wiring diagrams
   6. Test and tuning data
   7. List of keys and numbers

3.9 FINAL ACCEPTANCE TESTING AND INSPECTION OF COMPLETED INSTALLATION

A. Upon approval of the Contractor Test Report, the Installing Contractor shall demonstrate operation of each major component in the presence of the Consultant and the Owner's Representative, using each microphone and loudspeaker furnished, all required microphone and loudspeaker positions, and all input, control and amplification equipment. Testing of each video and computer input of the system shall also be performed to verify proper function.

B. After demonstration, assist as required in acceptance tests by representatives of the Owner.

C. A factory-trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect. The demonstration shall be made in the presence of the Owner.
D. The Consultant and the Owner’s Representative will both verify that all of the above items have been completed to satisfaction and that all installation details have been completed before a recommendation of final payment shall be made.

E. The Installing Contractor, at the Installing Contractor’s expense, shall rectify any components not found to function in a satisfactory manner as defined by this specification.

END OF SECTION