
Ankeny Library and Council Chambers

AV Systems

Ankeny, Iowa

City of Ankeny
1250 SW District Drive
Ankeny, IA 50023

PROJECT MANUAL

August 9, 2019

DE PROJECT # 16130A1



100 Court Ave, Suite 100
Des Moines, Ia. 50309
515.309.0722
bmendenhall@opnarchitects.com



8801 Prairie View Lane SW, Suite 200
Cedar Rapids, IA 52404-4850
319.841.1944
marc.foster@designengineers.com

PROJECT MANUAL

Ankeny Library and Council Chambers AV Systems Ankeny, Iowa

PRE-BID WALKTHROUGH:

August 15th, 2019 at 3PM
New Ankeny City Library
1250 SW District Drive
Ankeny, IA. 50023

BIDS DUE:

2:00 p.m., Central Time, August 30th, 2019
OPN Architects
Send electronically to:
Brett Mendenhall
bmendenhall@opnarchitects.com

DESIGN PROFESSIONAL:

OPN Architects and Design Engineers

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Description of Work

The project consists of work on the new Ankeny Library and Council Chambers. The scope of work is to complete the Audio Visual systems in the facility and to provide all accessory systems and support needed to provide a turn key AV system to the City of Ankeny.

Type of Bid

Bids will be received for a single contract including all work as specified.

Bid Opening Time, Date and Location

OPN Architects will receive electronic bids at bmendenhall@opnarchitects.com until **2pm** central time on **August 30th, 2019**. Bids received after this time will not be opened. The bids will be opened and read aloud at that time, or at such time and place as may then be established.

Examination and Procurement of Documents

Electronic sets of Bidding Documents will be provided to the selected bidders from OPN and Design Engineers.

Printed sets of Bidding Documents will not be provided until the bid is completed and a contractor is selected.

Bid Security and Other Bonds

Bid security in the amount of five percent of the Bid must accompany each Bid in accordance with the Instructions to Bidders. The successful bidder shall be required to provide performance and payment Bonds, each in the amount of 100 percent of the Contract Price within ten days after receipt of Notice of Award. No bid may be withdrawn for a period of forty-five (45) calendar days after the date of opening.

Pre-bid Walkthrough

August 15th, 2019 at 3PM
Project site of City Library
1250 SW District Drive
Ankeny, IA. 50023

Owner's Right to Reject Bids

The City of Ankeny reserves the right to reject any and all bids, to waive irregularities and to accept that bid which is deemed in the best interest of the Owner.

The contractor shall be one of the following:

1. Mechdyne, Marshalltown, Iowa (641) 754-4649
2. AVI Systems, Urbandale, Iowa (515) 254-9850
3. SKC Communications, Winterset, Iowa (515) 604-8077
4. Baker Electric, Des Moines, IA (515) 288-6774

Other Requirements

Products and materials incorporated in the Work of the Project are exempt from Iowa sales tax and local option sales tax.

Work required by the proposed contract shall begin upon ISSUANCE OF THE OWNER'S "NOTICE TO PROCEED"; the Work must be completed with all equipment placed in operation on or before the completion date noted on the contractor's bid form, subject to an extension of time which may be granted by the Owner.

END OF SECTION 00 0030

SECTION 00 0100 – INSTRUCTIONS TO BIDDERS

A. General:

1. Types of Bids: Proposals shall be made as lump sum bids for entire project as described in the bidding documents.
2. Time and Place:
 - a. Bids will be received at OPN Architects via electronic submission (email to bmendenhall@opnarchitects.com) until 2PM Central time on August 30th, 2019. Bids received after this time will not be accepted.
 - b. Bids will be privately opened.
3. Documents:
 - a. Selected Bidders will obtain project manuals and drawings from OPN and Design Engineers through Brett Mendenhall at OPN.

B. Bidding Documents:

1. Examination:
 - a. Bidders shall carefully examine the Project Manual, to obtain first-hand knowledge of the project. Contractors will not be given extra payment for conditions which can be determined by examining the documents.
2. Questions:
 - a. Submit all questions to the Design Professional, in writing. Replies will be issued to all prime bidders of record as addenda to the documents and will become part of the contract. The Design Professional and Owner will not be responsible for oral clarification. Questions received less than four (4) days before bid opening cannot be answered.
3. Substitutions:
 - a. No substitution for the materials and equipment described in the contract documents will be considered during the bidding period unless written request has been submitted to OPN or Design Engineers for approval at least ten (10) days prior to the date set for receipt of bids.
 - b. Each such request shall include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation.
 - c. If OPN or Design Engineers, P.C. approves any proposed substitution, such approval shall not be considered official until it is set forth in an addendum. Bidders are cautioned to refrain from including in their bid any substitutions which are not confirmed by written addenda.

C. Bidding Procedures:

1. Preparation of Bids:
 - a. Bids shall be made on unaltered copies of the bid forms furnished by the Design Professional as part of this manual. Fill in all blank spaces and submit original and one copy.
 - b. Bids not signed by individuals making them must have attached thereto a power of attorney evidencing authority to sign bid in the name of the person for whom it is signed.

- c. Bids signed for a co-partnership must be signed by all co-partners or by an attorney-in-fact. If signed by an attorney-in-fact, there must be attached to bid a power of attorney evidencing authority to sign bid.
 - d. Bids signed for a corporation shall be signed with the legal name of the corporation, followed by the name of the state of incorporation and the legal signatures of an officer authorized to bind the corporation to a contract.
 - e. Bids signed for any other legal entity shall have attached thereto evidence of the authority of the person signing.
2. Bid Security:
 - a. Bids must be accompanied by a bid bond or certified check in the amount of not less than five percent (5%) of the maximum value of the bid, including add alternates. Bid security of the three lowest bidders in each category will be retained until contract is awarded or until thirty (30) days after the opening, whichever is shorter. Bid security of all other bidders will be returned promptly after bids are opened and read. If any bidder fails, refuses or neglects to enter into a contract, or provide satisfactory surety bond, the Owner will retain his bid security as liquidated damages, but not as a penalty.
 - b. Bid security shall be made payable to the order of: City of Ankeny.
3. Subcontractors:
 - a. Successful bidder shall furnish to the Design Professional, for approval, a written list of proposed subcontractors and material suppliers within fifteen (15) days after receipt of bids and prior to the execution of the contract.
4. Submission of Bids:
 - a. Bidders shall submit bids in a sealed, opaque envelope, in accordance with the advertisement for Bids. Submit bid security in a separate envelope.
 - b. Identify envelope with:
 - 1) Ankeny Library and Council Chamber Audio Visual Systems
 - 2) Name of Bidder
5. Modification and Withdrawal:
 - a. Bids may not be modified after submittal.
 - b. Bids may be withdrawn at any time prior to bid opening but may not be resubmitted.
 - c. No bid may be withdrawn for a period of thirty (30) days after the bid opening.
6. Disqualification:
 - a. The Owner reserves the right to disqualify bids, before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon the part of the bidder.
7. Governing Laws and Regulations:
 - a. The bidder's attention is directed to the fact that all applicable federal, state and municipal laws and ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract as though therein written out in full.
8. Award and Execution of Contract:
 - a. The contract will be awarded on the basis of low bid.
 - b. By virtue of statutory authority, preference will be given to products and provisions grown and produced within the State of Iowa, and to Iowa domestic labor.

- c. The Owner reserves the right to reject any and all bids, to waive minor informalities in any bid, or to make award in the best interest of the Owner.
- 9. Execution of Contract:
 - a. The Owner reserves the right to accept any bid, in accordance with Code of Iowa, to reject any bid on the basis of bid irregularity or to waive irregularities.
 - b. Each bidder shall be prepared, if so requested by the Owner, to present evidence of his experience, qualifications, and financial responsibility to carry out the terms of the contract.
 - c. Notwithstanding any delay in preparation and execution of the formal contract agreement, each bidder shall be prepared, upon written notice of bid acceptance, to commence work within fourteen (14) days following receipt of official written orders of the Owner to proceed, or on date stipulated in such order.
 - d. Contract form will be the "Standard Form of Agreement between Owner and Contractor", AIA Form A-101.
- 10. Completion Date:
 - a. All bidders shall take into account the Owner's desire that construction be substantially complete on or before December 1, 2019 and to do so, will need to provide all product submittals to the project team as soon as possible upon notice to proceed.

END OF SECTION 00 0100

SECTION 00 0300 – BID FORM

Bids Due at 2:00 P.M., August 30th, 2019

TO: City of Ankeny
410 West First Street Ankeny, Ia. 50023

ATTN: Jennifer Sease, Administrative Services Director

1. The undersigned Bidder, in response to your Advertisement for Bids for construction of the above project, having examined the Drawings, Specifications and other Bidding Documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the proposed Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the proposed Contract Documents, of which this bid is a part.

Bidder acknowledges receipt of the following Addenda which are a part of the Bidding Documents: Numbers _____, _____, _____, _____, _____.

BASE PROPOSAL:

Bidder agrees to perform all the work described in the proposed Contract Documents and shown on the Drawings for the sum of:

_____ DOLLARS (\$_____)

Amount shall be indicated in both words and figures. In case of discrepancy, the amount indicated in words will govern.

2. The undersigned Bidder states that full compliance with the proposed Contract Documents is maintained in this bid.
3. Accompanying this bid is the Bid Security required by the Bidding Documents, the same being subject to forfeiture, in the event of default by the undersigned, in accordance with terms of the Bidding Documents.
4. Bidder understands that the Owner reserves the right to reject any and all bids, waive irregularities or technicalities in any bid, and accept any bid in whole or in part which it deems to be in its best interest.
5. Bidder agrees that this bid shall be good and may not be withdrawn for a period of thirty (30) calendar days after the public opening and reading of the bids.
6. Bidder hereby certifies: (a) that this bid is genuine and is not made in the interest of or on behalf of any undisclosed person, firm or corporation; (b) that Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid; (c) that Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and (d) that Bidder has not sought by collusion to obtain any advantage over any other bidder or over the Owner.

FIRM NAME: _____

BY: _____

TITLE: _____

Date _____ Incorporated _____ Yes _____ No

OFFICIAL ADDRESS _____

Telephone Number _____

FAX Number _____

Federal Tax Identification No. _____

END OF SECTION 00 0300

SECTION 00 0400 – BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____ as Principal, hereinafter called the Principal, a(n) *` _____ duly authorized by law to do business as a construction contractor in the State of Iowa, and _____, a corporation duly authorized to do a surety business under the Laws of the State of Iowa as Surety, hereinafter called the Surety, are held and firmly bound unto the Iowa City Community School District as Obligee, hereinafter called the Obligee, in the penal sum of Dollars (\$ _____), for the payment of _____ which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the principal has submitted a bid for _____.

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this _____ day of _____, 20_____.

(Principal)

(Seal)

(Witness)

(Title)

(Witness)

(Surety)

(Seal)

(Title as Attorney-in-Fact and Iowa Resident Agent)

* One word -- corporation, partnership, or individual -- depending on the nature of the Principal, should be entered in this blank.

END OF SECTION 00 0400

SECTION 00 0500 – AGREEMENT

PART 1 GENERAL

1.01 FORM OF AGREEMENT

- A. American Institute of Architects Document A101-2017, Standard Form of Agreement Between Owner and Contractor, is hereby incorporated by reference in this specification and is available from the Design Professional: OPN Architects. It shall be the Agreement for the Work.

END OF SECTION 00 0500

SECTION 00 0700 – GENERAL AND SUPPLEMENTARY CONDITIONS

A. GENERAL CONDITIONS

1. AIA Document A201 "General Conditions of the Contract for Construction", 2017 Edition, Articles 1 through 14 inclusive, is a part of the construction contracts, and is incorporated herein as fully as if herein set forth.
2. Copies of this document are on file at and available from the Design Professional's office.

B. SUPPLEMENTARY CONDITIONS

The following supplements modify, change, delete from, or add to the "General Conditions of the Contract for Construction". Where any article of the General Conditions is modified or any paragraph, subparagraph or clause thereof is modified or deleted by these supplements, the unaltered provisions of that article, paragraph, subparagraph, or clause shall remain in effect.

MODIFICATION OF ARTICLE 3 - CONTRACTOR

- 3.6 Taxes – Replace with the following:
 - 3.6.1 Iowa Sales Tax Exemption. In accordance with provisions of the Code of Iowa and the Iowa Administrative Rules, "Iowa Construction Sales Tax Exemption Certificates" will be issued for this project. DO NOT include Iowa sales tax or local option sales tax in determining the project bid amount. The successful bidder, within 48 hours of receipt of "Owner's Notice of Intent to Award a Contract", shall provide to the Owner a list of all Subcontractors selected to perform work on this project. The Subcontractor list shall include each firm's name, tax identification number, and address.
 - 3.6.2 Using information provided by the successful bidder, the Owner will apply to the Iowa Department of Revenue and Finance for 1) Authorization Letters and 2) Iowa Construction Sales Tax Exemption Certificates, to be issued to the Contractor and each Subcontractor. These documents may be used by the Contractor and designated Subcontractors to purchase materials and products for this project free of sales/use tax and local option taxes that might otherwise apply. Samples of these documents are attached at the end of these Supplementary Conditions.

MODIFICATIONS IN ARTICLE 4 - ARCHITECT

- 4.1.1 Replace with the following: The Owner shall retain a Design Professional lawfully licensed to practice in the appropriate discipline for the jurisdiction where the Project is located. That person or entity is identified as the Design Professional in the Agreement and is referred to throughout the Contract Documents as if singular in number. All references to Architect in the Contract Documents shall apply to the Design Professional identified in the Agreement.

MODIFICATIONS IN ARTICLE 7 - CHANGES IN THE WORK

- 7.1.4 Add the following sub-paragraph:
"7.1.4 Supporting data used to determine the costs and allowances claimed in Sub-paragraph 7.3.7 must be made available to the Design Professional upon request."

7.3.3.3 Substitute the following:

"3 cost to be determined in a manner agreed upon by the parties, plus the percentage of combined overhead and profit indicated in sub-paragraph 7.3.11."

7.3.7 Line 4:

Replace "set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount." with "indicated in sub-paragraph 7.3.11."

7.3.11 Add the following sub-paragraph:

"7.3.11 The maximum percentage of combined overhead and profit for changes in the work performed by the Contractor shall be 10%. If the changed work is performed by a Subcontractor, a maximum of 10% may be added by that Subcontractor on his work for combined overhead and profit and an additional maximum of 5% may be added by the Contractor for administration and coordination of said Subcontractor work. This paragraph shall apply to the methods set forth in sub-paragraphs 7.3.3.1 and 7.3.3.4 for determining the costs of changed work unless waived in writing by the Owner. The Contractor shall verify compliance of the Subcontractors and shall not sign Change Orders which do not comply with the maximum limits."

MODIFICATIONS OF ARTICLE 9 - PAYMENTS AND COMPLETION

At the end of Subparagraph 9.10.1, add the following:

In accordance with Iowa law, Final Payment (retainage amount) shall not be released until at least thirty-one (31) days after completion and final acceptance by the Owner of all Work required by the Contract.

MODIFICATIONS OF ARTICLE 10 - PROTECTION OF PERSONS & PROPERTY

10.1.1 Add sub-paragraph as follows:

"10.1.1 Contractor shall take all necessary precautions to keep the site and work in compliance with the safety and health regulations for construction issued by the Bureau of Labor Standards of the U.S. Department of Labor as well as the Occupational Safety and Health Standards parts 1910 and 1926 as amended and as enforced by the State of Iowa."

MODIFICATIONS OF ARTICLE 11 - INSURANCE AND BONDS

See Attachment B as part of this document for insurance requirements.

11.1.3 Add the following:

"Certificates shall be ACORD Form 25-S and AIA Document G715, Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S."

11.4.1: Delete this paragraph and substitute the following:

"11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. Bonds shall be subject to approval of Owner. The amount of each bond shall be equal to 100 percent of the Contract Sum."

- 11.4.1.1 The Contractor shall deliver the required bonds to the Owner not later than ten days following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.
- 11.4.1.2 The Contractor shall require the attorney-in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney."

END OF SECTION 00 0700

Attachment A
City of Ankeny
General Terms and Conditions

1. The laws of the State of Iowa, U.S.A., shall govern in connection with the formation, performance and the legal enforcement of any purchase order placed.
2. The firm pricing stated on the bid and purchase order shall not be changed without the approval of the City of Ankeny Finance Department. If mutually agreed between Buyer and Seller, bid prices may be extended an additional twelve (12) months beyond the original expiration date.
3. Unless otherwise agreed between Buyer and Seller, the FOB point on any shipment to the City, in terms of loss or damage, is **Destination**. The Seller must confirm that charges for freight will be included in the price of the goods at the time of the quote/bid.
4. The City is not obligated to keep nor pay for over shipments of products; neither is the City obligated to make payments on goods which are shipped in a lesser quantity than was originally ordered or shipped in partial quantities, particularly if not having a complete shipment precludes the City from performing its work.
5. Payment is authorized by the City Council on the first and third Mondays of the month.
6. The City shall deem to receive goods procured hereunder when such goods have been deposited at the City's assigned place of delivery and all bills of lading or other shipping papers which require signature by the City have been signed.
7. In spite of physical receipt, the City shall deem to accept goods procured hereunder only after actual inspection for conformity or the passage of ten (10) days from receipt, whichever occurs first.
8. Goods are subject to City inspection upon arrival. Goods rejected due to failure to meet specifications, either when shipped or due to defects or damage in transit may be returned for credit and are not to be replaced except with the approval of the City department placing the original order.
9. Any ensuing purchase order is an ACCEPTANCE of your OFFER as stated in your quote/bid. When a purchase order is ACCEPTED as an OFFER TO BUY, you must provide us with a written or verbal acknowledgement of a promised ship date and freight carrier, or advise us that merchandise has shipped or will ship on a particular time and date and the method of shipment.
10. In the event of supplier's failure to deliver when specifically promised and as agreed between Buyer and Seller in terms of quantity, quality, price and other requirements, the City reserves the right to cancel the purchase order, or any part thereof, without prejudice to its other rights. It is further agreed that the City may return all or part of any shipment so made and may charge Seller with any loss or expense as a result of such failure to deliver as promised.
11. The City of Ankeny, Iowa is exempt from sales tax and certain other use taxes. Taxes which appear on invoices and for which the City is not responsible will be deducted from invoices before payment is made, without penalty to the City. Exemption numbers are available from the City of Ankeny Finance Department.
12. The Seller agrees not to refuse to hire, discharge, promote, demote, or to otherwise discriminate in matters of compensation against any person otherwise qualified solely because of race, creed, sex, national origin, ancestry or physical disability.
13. Neither party to this agreement may assign any portion of the agreement without prior written consent of the other party.
14. The supplier expressly warrants that all goods supplied hereunder shall be merchantable within the meaning of Article 2-314(2) of the Uniform Commercial Code in effect on the date of the quote/bid in the State of Iowa. Additionally, the goods shall conform to specifications, drawings, and other descriptions and shall be free from defects in materials and workmanship. All other applicable provisions and remedies of the Uniform Commercial Code relating to both implied and expressed warranties are herewith referred to and made part of these terms and conditions.
15. All parties to this bid and any ensuing purchase agree that the representatives of both Buyer and Seller are, in fact, bona fide and possess full authority to bind said parties.
16. All bid prices shall be shown in US Dollars (\$). All prices must remain firm for the duration of the agreement regardless of the exchange rate. All bid responses must be submitted in English.
17. Each bidder shall submit an original Bid on the forms attached. The bidder shall sign their Bid correctly, and the Bid may be rejected if it shows any omissions, alterations of the form, additions not called for in the Bid, or any irregularities of any kind. The City reserves the right to reject any or all Bids. The City further reserves the right to waive technicalities and formalities in Bids, as well as to accept in whole or in part such Bids where it is deemed advisable in protection of the best interests of the City.

18. In case of a discrepancy between the unit price and the extended price, the unit price shall prevail.
19. Upon request, the results of this bid must be extended to any other City of Ankeny departments.
20. The supplier agrees to protect, defend, indemnify and hold harmless the City of Ankeny and its officers and employees from any and all claims and damages of every kind and nature made, rendered or incurred by or in behalf of every person or corporation whatsoever, including the parties hereto and their employees that may arise, occur, or grow out of any acts, actions, work or other activity done by the supplier, its employees, subcontractors or any independent contractors working under the direction of either the supplier or subcontractor in the performance of this agreement.
21. For PRODUCTS or SERVICES requiring successful Bidder's presence on any City property, the successful Bidder shall, during the term of this agreement and until completion thereof, carry and maintain both Workers Compensation and General Liability Insurance. The successful Bidder shall furnish the City with a copy of the Declaration page (normally page one of your policy) of their insurance policy if requested by the City.
22. All documents submitted with any bid or proposal shall become public documents and subject to Iowa Code Chapter 22, which is otherwise known as the "Iowa Open Records Law". By submitting any document to the City of Ankeny in connection with a bid or proposal, the submitting party recognized this and waives any claim against the City of Ankeny and any of its officers and employees relating to the release of any document or information submitted. Each submitting party shall hold the City of Ankeny and its officers and employees harmless from any claims arising from the release of any document or information made available to the City of Ankeny arising from any bid opportunities.

SECTION 00 0800 – SPECIAL CONDITIONS

PART 1 - EMPLOYMENT PRACTICES

1.01 STATEMENT OF INTENT

- A. It is the intent of the Owner to assure equal employment opportunity in all contract work.
- B. Contractors are required to take affirmative action to ensure that applicants employed or seeking employment with them are treated equally without regard to race, color, creed, religion, national origin, sex, disability, marital status and age.

1.02 ASSURANCE OF COMPLIANCE

- A. Contractor shall submit, with the Bid, an Equal Employment Opportunity Statement for the Owner's approval.
- B. During the course of the Contract, the Owner will monitor the Contractor's compliance with the EEO/Affirmative Action requirements. Noncompliance with the provisions set forth at the time of contract award may result in termination or suspension of the Contract in whole or in part.

END OF SECTION 00 0800

SECTION 00 61 13 - BONDS AND CERTIFICATES

American Institute of Architects Document A312, Performance Bond and Labor and Material Payment Bond, December, 1984, and Document G715–1991, Supplemental Attachment for ACORD Certificate of Insurance 25-S, 2001 Edition, or ACCORD form 25-S, shall be submitted to fulfill the requirements of the Bidding Documents. All submittals shall be on original forms with original signatures.

END OF SECTION 00 6113

Attachment B
City of Ankeny
Insurance Information

INSURANCE REQUIREMENTS

For PRODUCTS or SERVICES requiring Contractor's presence on any Agency property, the Contractor shall, during the term of this agreement and until completion thereof, provide and maintain the coverage set forth in this INSURANCE SECTION.

Workers Compensation Insurance: The Contractor shall carry and maintain during the term of this agreement, workers compensation and employers liability insurance meeting the requirements of the Iowa Workers Compensation Law on all the Contractor's employees carrying out the work involved in this agreement.

General Liability Insurance: The Contractor shall carry and maintain during the term of this agreement, general liability insurance on a per occurrence basis with limits of liability not less than \$2,000,000 per occurrence for Bodily Injury and Property Damage. As a minimum, coverage for Premises, Operations, Products and Completed Operations shall be included. This coverage shall protect the public or any person from injury or property damages sustained by reason of the Contractor or its employees carrying out the work involved in this agreement.

Automobile Liability Insurance: The Contractor shall carry and maintain during the term of this agreement, automobile liability insurance with either a combined limit of at least \$2,000,000 per occurrence for bodily injury and property damage or split limits of at least \$2,000,000 for bodily injury per person per occurrence and \$2,000,000 for property damage per occurrence. Coverage shall include all owned, hired, and non-owned motor vehicles used in the performance of this agreement by the Contractor or its employees.

Subcontractors: In the case of any work sublet, the Contractor shall require subcontractors and independent contractors working under the direction of either the Contractor or a subcontractor to carry and maintain the same workers compensation and liability insurance required of the Contractor.

Qualifying Insurance: The insurance required by this agreement shall be written by non-assessable insurance companies licensed to do business in the State of Iowa and currently rated "B" or better by the A.M. Best Company. All policies shall be written on a per occurrence basis and not a claim made form.

Additional Insured: The City of Ankeny, its officers and employees shall be named as additional insureds without restrictions on the Contractor's, subcontractor's, and independent contractor's liability insurance policies and certificates of insurance.

CERTIFICATE OF INSURANCE REQUIREMENTS

1. An original policy or **Certificate of Insurance** with an Original Penned Signature of the agent writing the policy or certificate must be submitted (Memorandums of Insurance and Stamped or Computer Generated Signatures will not be accepted).
2. The name of the agent signing the certificate must be typed under their Original Penned Signature as well as the business address and phone number of the agent.
3. All addresses on the certificate should list a street address (not a PO Box address).
4. *"The City of Ankeny, its officers and employees, shall be named as additional insured on the contractor's liability policies with regard to (INSERT PROJECT HERE – City of Ankeny, Iowa)"* must be specifically indicated on the certificate in the Description of Operations section.
5. A copy of a power of attorney or some other document showing the agent's authority to sign for the insurance company must be attached to the certificate (a copy of the agents' insurance license will be accepted).
6. The liability limits required by the City are \$2,000,000 (minimum). This must be **claims occurred** general liability coverage.
7. If the policy must be endorsed with respect to including the certificate holder as an additional insured, evidence must be attached to the certificate to indicate that the policy is endorsed.
8. The following address must appear in the Certificate Holder section: City of Ankeny, 410 West First Street, Ankeny IA 50023-1557.

ANY EXCEPTIONS MAY BE CONSIDERED AS AN EVALUATING FACTOR IN AWARDING THIS BID/PROPOSAL

Division 01

General Requirements

Division **01**

SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following:
1. Work covered by the Contract Documents.
 2. Type of the Contract.
 3. Work under other contracts.
 4. Use of premises.
 5. Owner's occupancy requirements.
 6. Work restrictions.
 7. Specification formats and conventions.
- B. Related Sections include the following:
1. Division 01 Section "Multiple Contract Summary" for division of responsibilities for the Work.
 2. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Ankeny Library and Council Chambers AV Systems
1. Project Location: Ankeny Library and Council Chambers
- B. Owner: City of Ankeny
- C. Design Professional: OPN Architects and Design Engineers
- D. The Work consists of the following:
1. The Work includes the installation of a fully functioning AV System for the Ankeny Library and Council Chambers.

1.04 TYPE OF CONTRACT

- A. Project will be constructed under a single prime contract.

1.05 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

- B. Concurrent Work: Owner has awarded separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.
1. Construction of the Ankeny Library and Council Chambers: A separate contract has been awarded to Stahl Construction for the construction of the new facility.

1.06 USE OF PREMISES

- A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
1. Owner Occupancy: Allow for Owner occupancy of Project site.
 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.07 OWNER'S OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
1. Design Professional will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of building.
 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

1.08 WORK RESTRICTIONS

- A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7 a.m. to 5 p.m., Monday through Friday, except otherwise indicated.
1. Weekend Hours: As required to complete. Coordinate with Owner.

2. Early Morning Hours: As required to complete. Coordinate with Owner.
 3. Hours for Utility Shutdowns: None expected.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
- 1.

1.09 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format and CSI/CSC's "MasterFormat" numbering system.
1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
 2. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

END OF SECTION 01 1000

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.03 CHANGES IN THE WORK

- A. Design Professional will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time on "Instruction To Contractor (ITC)" form. If necessary, the description will include supplemental or revised Drawings and Specifications.
1. ITCs issued by Design Professional are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 2. Within 7 days after receipt of ITC, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Design Professional.
1. Include a statement outlining 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 the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.
- C. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 7 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 7 days after such authorization.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.04 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a ITC, Design Professional will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

END OF SECTION 01 2600

SECTION 01 2900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.03 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.04 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Design Professional at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Design Professional.
 - c. Design Professional's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

2. Submit draft of AIA Document G703 Continuation Sheets.
3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment 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 Design Professional and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Progress payments shall be submitted to Design Professional by the tenth day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets as form for Applications for Payment.
- E. Payment Application Forms: Use forms provided by Owner for Applications for Payment. Sample copies are included at end of this Section.
- F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Design Professional will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- G. Transmittal: Submit 2 signed and notarized original copies of each Application for Payment to Design Professional. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. Administrative and supervisory personnel.
 2. Project meetings.
 3. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections include the following:
1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.03 DEFINITIONS

- A. RFI: Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.04 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Preinstallation conferences.
 6. Project closeout activities.
 7. Startup and adjustment of systems.
 8. Project closeout activities.

1.05 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Design Professional for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 2. Sheet Size: At least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
 3. Number of Copies: Submit electronic (pdf) copies of each submittal. Design Professional will return copy with comments.

1.06 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Design Professional of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Design Professional, within three days of the meeting.
- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Design Professional, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
1. Attendees: Authorized representatives of Owner, Design Professional, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for RFIs.
 - f. Procedures for testing and inspecting.
 - g. Procedures for processing Applications for Payment.
 - h. Distribution of the Contract Documents.
 - i. Submittal procedures.

- j. Preparation of Record Documents.
 - k. Use of the premises and existing building.
 - l. Work restrictions.
 - m. Owner's occupancy requirements.
 - n. Responsibility for temporary facilities and controls.
 - o. Construction waste management and recycling.
 - p. Parking availability.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. First aid.
 - t. Security.
 - u. Progress cleaning.
 - v. Working hours.
3. Minutes: Record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at regular intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of Owner and Design Professional, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) RFIs.
 - 16) Status of proposal requests.
 - 17) Pending changes.

- 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
3. Minutes: Record the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.07 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Design Professional.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs: CSI Form 13.2A.
 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
 1. Attachments shall be electronic files in Adobe Acrobat or Bluebeam PDF format.

- E. Design Professional's Action: Design Professional will review each RFI, determine action required, and return it. Allow seven days for Design Professional's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Design Professional's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 2. Design Professional's action may include a request for additional information, in which case Design Professional's time for response will start again.
 3. Design Professional's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Design Professional in writing within 10 days of receipt of the RFI response.
- F. On receipt of Design Professional's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Design Professional within seven days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B.
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Design Professional.
 4. RFI number including RFIs that were dropped and not submitted.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Design Professional's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

END OF SECTION 01 3100

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 01 Section "Quality Requirements" for submitting test and inspection reports.
 - 4. Division 01 Section "Closeout Procedures" for submitting warranties.
 - 5. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 6. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 7. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
 - 8. Divisions 02 through 49 Sections for specific requirements for submittals in those Sections.

1.03 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Design Professional's responsive action.
- B. Informational Submittals: Written information that does not require Design Professional's responsive action. Submittals may be rejected for not complying with requirements.

1.04 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Design Professional reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Submittals Schedule: Comply with requirements in Division 01 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Design Professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Design Professional will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 5 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Design Professional's consultants, Owner, or other parties is indicated, allow 15 days for initial review of each submittal.
 - a. None anticipated.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Design Professional.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Design Professional.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight or otherwise specifically identify deviations from the Contract Documents on submittals.

1.05 ELECTRONIC SUBMITTAL PROCEDURES

- A. Summary:
1. Shop drawing and product data submittals shall be transmitted to Architect in electronic (PDF) format.
 2. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
 3. The electronic submittal process is not intended for color samples, color charts, or physical material samples.

B. Procedures:

1. Submittal Preparation - Contractor may use any or all of the following options:
 - a. Subcontractors and Suppliers provide electronic (PDF) submittals to Contractor via email.
 - b. Subcontractors and Suppliers provide paper submittals to General Contractor who electronically scans and converts to PDF format.
 - c. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.
2. Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.
3. Contractor shall transmit each submittal to Architect via email.
4. Architect / Engineer review comments will be made and emailed back to Contractor.
5. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
6. Submit paper copies of reviewed submittals at project closeout for record purposes in accordance with Section 01 7800 – Closeout Submittals.

C. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.

1.06 CONTRACTOR'S USE OF DESIGN PROFESSIONAL'S CAD FILES

A. General: At Contractor's written request, copies of Design Professional's BIM files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. Submitting signed copy of Design Professionals Terms of Use Agreement. There may be a cost to the Contractor for use of said files.

PART 2 - PRODUCTS

2.01 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Submit electronic submittals directly to extranet specifically established for Project.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.

- e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
 - 3. Format: Submit electronic (pdf) files.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation" for Construction Manager's action.
- F. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."

- H. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

2.02 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
- B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

2.03 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Design Professional.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.01 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Design Professional.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.02 DESIGN PROFESSIONAL'S ACTION

- A. General: Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Action Submittals: Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Design Professional will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. Design Professional will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 3. Requirements for Contractor to provide quality-assurance and -control services required by Design Professional, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 2. Division 01 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 3. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.03 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Design Professional.
- C. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not 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 tradespeople of the corresponding generic name.

1.04 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Design Professional for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Design Professional for a decision before proceeding.

1.05 SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.06 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Design Professional with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.07 QUALITY CONTROL

- A. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 3. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 4. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- F. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.

PART 2 - EXECUTION

2.01 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Design Professional.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Design Professional's reference during normal working hours.

2.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for Division 01 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 4200 - REFERENCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Design Professional's action on Contractor's submittals, applications, and requests, "approved" is limited to Design Professional's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Design Professional. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.03 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-6257
DSCC	Defense Supply Center Columbus (See FS)	
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.nibs.org	(215) 697-6257 (202) 619-8925 (202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
MIL	(See MILSPEC)	
MIL-STD	(See MILSPEC)	
MILSPEC	Military Specification and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-6257
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.04 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118

AHA	American Hardboard Association (Now part of CPA)	
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(505) 522-1437
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300

ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (Now WCSC)	
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.com	(616) 285-3963
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312

CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CEA	Canadian Electricity Association www.canelect.ca	(613) 230-9263
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Cast Stone Institute www.caststone.org	(770) 972-3011
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010

EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association www.esda.org	(315) 339-6937
FIBA	Federation Internationale de Basketball Amateur (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FIVB	Federation Internationale de Volleyball (The International Volleyball Federation) www.fivb.ch	41 21 345 35 35
FMG	FM Global (Formerly: FM - Factory Mutual System) www.fmgglobal.com	(401) 275-3000
FMRC	Factory Mutual Research (Now FMG)	
FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridarroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Now GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700

HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (Now CSA International)	
IBF	International Badminton Federation www.intbadfed.org	(6-03) 9283-7155
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150

ITS	Intertek www.intertek.com	(800) 345-3851 (713) 407-3500
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (804) 314-8955
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(800) 213-7193, ext. 453
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084

NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association (Formerly: National Oak Flooring Manufacturers Association) www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070

NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWWDA	National Wood Window and Door Association (Now WDMA)	
OPL	Omega Point Laboratories, Inc. (Acquired by ITS - Intertek) www.opl.com	(800) 966-5253 (210) 635-8100
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America) www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
RTI	(Formerly: NTRMA - National Tile Roofing Manufacturers Association) (Now TRI)	

SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333

SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(847) 649-5555
TRI	Tile Roofing Institute (Formerly: RTI - Roof Tile Institute) www.tilerroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USAV	USA Volleyball www.usavolleyball.org	(888) 786-5539 (719) 228-6800
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	
WCSC	Window Covering Safety Council (Formerly: WCMA - Window Covering Manufacturers Association) www.windowcoverings.org	(800) 506-4636 (212) 297-2109

WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association) www.wdma.com	(800) 223-2301 (847) 299-5200
WI	Woodwork Institute (Formerly: WIC - Woodwork Institute of California) www.wicnet.org	(916) 372-9943
WIC	Woodwork Institute of California (Now WI)	
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA	BOCA International, Inc. (See ICC)	
IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICBO	International Conference of Building Officials (See ICC)	
ICBO ES	ICBO Evaluation Service, Inc. (See ICC-ES)	
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
SBCCI	Southern Building Code Congress International, Inc. (See ICC)	

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	Department of Commerce www.commerce.gov	(202) 482-2000
DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
DOE	Department of Energy www.energy.gov	(202) 586-9220
EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540

SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation www.dca.ca.gov/bhfti	(800) 952-5210 (916) 574-2041
CPUC	California Public Utilities Commission www.cpuc.ca.gov	(415) 703-2782
TFS	Texas Forest Service Forest Resource Development http://txforests-service.tamu.edu	(936) 639-8180

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 4200

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
1. Division 01 Section "References" for applicable industry standards for products specified.
 2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 3. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.03 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.04 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Design Professionals and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 2. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation 7 days of receipt of a request for substitution. Design Professional will notify Contractor of acceptance or rejection of proposed substitution within 7 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Design Professional's Action: If necessary, Design Professional will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Design Professional will notify Contractor of approval or rejection of proposed comparable product request 7 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Design Professional will determine which products shall be used.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.
 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.07 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Design Professional will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Design Professional's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Design Professional's sample. Design Professional's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.
10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Design Professional will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Design Professional will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.02 PRODUCT SUBSTITUTIONS

- A. Timing: Design Professional will consider requests for substitution if received within 7 days after Notice of Award. Requests received after that time may be considered or rejected at discretion of Design Professional.
- B. Conditions: Design Professional will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Design Professional for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.

6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.03 COMPARABLE PRODUCTS

A. Conditions: Design Professional will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Design Professional will return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Design Professionals and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 7300 – EXECUTION

GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
1. Construction layout.
 2. Field engineering and surveying.
 3. General installation of products.
 4. Coordination of Owner-installed products.
 5. Progress cleaning.
 6. Starting and adjusting.
 7. Protection of installed construction.
 8. Correction of the Work.
- B. Related Sections include the following:
1. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 2. Division 01 Section "Submittal Procedures" for submitting surveys.
 3. Division 01 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 4. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.03 SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements are in compliance with contract documents.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- C. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.04 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 1 - PRODUCTS (Not Used)

PART 2 - EXECUTION

3.01 EXAMINATION

- A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 - 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 - 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Design Professional. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Design Professional promptly.

3.04 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

- C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.05 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.06 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- K. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- L. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- M. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- N. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- O. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- P. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- Q. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.07 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.08 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.09 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

SECTION 01 7329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Divisions 2 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 2. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.03 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 1. Primary operational systems and equipment.
 - 2. Air or smoke barriers.
 - 3. Fire-suppression systems.
 - 4. Mechanical systems piping and ducts.
 - 5. Control systems.
 - 6. Communication systems.
 - 7. Conveying systems.
 - 8. Electrical wiring systems.
 - 9. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 1. Water, moisture, or vapor barriers.
 - 2. Membranes and flashings.
 - 3. Exterior curtain-wall construction.
 - 4. Equipment supports.
 - 5. Piping, ductwork, vessels, and equipment.

6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Design Professional's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.05 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

3.03 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 7329

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Warranties.
 3. Final cleaning.
- B. Related Sections include the following:
1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 2. Division 01 Section "Execution" for progress cleaning of Project site.
 3. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 6. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.03 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs [**and photographic negatives**], damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.

10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Design Professional will either proceed with inspection or notify Contractor of unfulfilled requirements. Design Professional will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Design Professional, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.04 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit certified copy of Design Professional's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Design Professional. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Design Professional will either proceed with inspection or notify Contractor of unfulfilled requirements. Design Professional will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.05 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Design Professional for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within [15] <Insert number> days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - c. Sweep concrete floors broom clean in unoccupied spaces.
 - d. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - e. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - f. Remove labels that are not permanent.

- g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - i. Replace parts subject to unusual operating conditions.
 - j. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01 7700

SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
1. Operation and maintenance documentation directory.
 2. Emergency manuals.
 3. Operation manuals for systems, subsystems, and equipment.
 4. Maintenance manuals for the care and maintenance of equipment and system.
- B. Related Sections include the following:
1. Division 01 Section "Multiple Contract Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
 2. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 3. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
 4. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
 5. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.03 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.04 SUBMITTALS

- A. Initial Submittal: Submit 1 draft copies of each manual at least 7 days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory.
1. Correct or modify each manual to comply with Design Professional's comments. Submit 3 copies of each corrected manual 15 days of receipt of Design Professional's comments.

1.05 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.01 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.02 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Design Professional.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.03 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.

6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.04 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.05 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard printed maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.01 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."
- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7823

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
1. Demonstration of operation of systems, subsystems, and equipment.
 2. Training in operation and maintenance of systems, subsystems, and equipment.
 3. Demonstration and training videotapes.
- B. Related Sections include the following:
1. Division 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
 2. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.
- C. Allowances: Furnish demonstration and training instruction time under the Demonstration and Training Allowance as specified in Division 01 Section "Allowances."
- D. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.03 SUBMITTALS

- A. Attendance Record: For each training module, submit list of participants and length of instruction time.
- B. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.04 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Design Professional.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:
 - 1. Audio Visual System
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project Record Documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
 - 4. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.

5. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
6. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
7. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Design Professional will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 1. Schedule training with Owner 7 days in advance.

END OF SECTION 01 7900

Division 26

Electrical

SECTION 26 0010 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Refer to Division 00 - Procurement and Contracting Requirements and Division 01 - General Requirements, which all apply to work under this section.

1.02 DESCRIPTION OF WORK

- A. Work shall include furnishing of all systems, equipment and material specified in this division and as called for on the electrical drawings, to include supervision, operations, methods and labor for the fabrication, installation, start-up and tests for the complete electrical installation.
- B. All elements of the construction shall be performed by workmen skilled in the particular craft involved, and regularly employed in that particular craft.
- C. All work shall be performed in a neat, workmanlike manner in keeping with the highest standards of the craft.

1.03 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
 - 1. National Electrical Code
 - 2. National Fire Protection Association
 - 3. National Electrical Manufacturers Association
 - 4. Standards of Institute of Electrical and Electronic Engineers
 - 5. International Building Code
 - 6. Occupational Safety and Health Act
 - 7. Iowa Administrative Code
 - 8. NECA Standards
 - 9. Americans With Disabilities Act (ADA)
- B. All Contractors shall familiarize themselves with all codes and standards applicable to their work and shall notify Design Professional of any discrepancies between the design and applicable code requirements so that any conflicts can be resolved. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.

1.04 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Contractor shall comply with the rules and regulations of the local utility companies. He shall check with each utility company providing service to this project and determine or verify their requirements regarding incoming services.
- B. Meters for incoming services shall be selected based on the project requirements. Any questions concerning this shall be referred to Design Professional prior to bidding. Contractor shall provide the appropriate meter and associated materials if not furnished by the utility company.
- C. Secure all required permits and pay for all inspections, licenses and fees required in connection with the electrical work including State of Iowa Electrical Inspections. Contractor shall post all bonds and obtain all licenses required by the State, City, County and Utility.

- D. Contractor shall make all arrangements with each utility company and pay all service charges associated with new service.

1.05 ELECTRICAL DRAWINGS

- A. The electrical drawings indicate in general the building arrangement only. Contractor shall examine construction drawings to become familiar with the specific type of building construction, i.e. type of structural system, floors, walls, ceilings, room finishes and elevations.
- B. Drawings for the electrical work are in part diagrammatic, and are intended to convey the scope of the work and to indicate in general the location of equipment.
- C. Contractor shall layout his own work and shall be responsible for determining the exact locations for equipment and rough-ins and the exact routing of conduits and raceway so as to best fit the layout of the work.
- D. Contractor shall take his own field measurements for verifying locations and dimensions; scaling of the drawings will not be sufficient for laying out the work.
- E. Because of the scale of the drawings, certain basic items such as couplings, pull or splice boxes may not be shown, but where such items are required by code or by other sections of the specifications or where they are required for proper installation of the work, such items shall be furnished and installed.

1.06 ACTIVE SERVICES

- A. Contractor shall be responsible for verifying exact locations of all existing services prior to beginning work in that area.
- B. Existing active services, i.e., water, gas, sewer, electric, when encountered, shall be protected against damage. Do not prevent or disturb operation of active services which are to remain.

1.07 SITE INSPECTION

- A. Contractor shall inspect the site prior to submitting bid for work to familiarize himself with the conditions of the site which will affect his work and shall verify points of connection with utilities, routing of outside conduit to include required clearances from any existing structures, trees or other obstacles.
- B. Extra payment will not be allowed for changes in the work required because of Contractor's failure to make this inspection.

1.08 COORDINATION AND COOPERATION

- A. It shall be Contractor's responsibility to schedule and coordinate his work with the schedule of the General Contractor so as to progress the work expeditiously, and to avoid unnecessary delays.
- B. Contractor shall fully examine the drawings and specifications for other trades and shall coordinate the installation of his work with the work of the other contractors. Contractor shall consult and cooperate with the other contractors for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment and the building. The Design Professional reserves the right to determine space priority of the contractors in the event of interference between piping, conduit, ducts and equipment of the various contractors.

- C. Conflicts between the drawings and the specifications or between the requirements set forth for the various contractors shall be called to the attention of the Design Professional. If clarification is not asked for prior to the taking of bids, it will be assumed that none is required and that the Contractor is in agreement with the drawings and specifications as issued. If clarification is required after the contract is awarded, such clarification will be made by the Design Professional and his decision will be final.
- D. Special care shall be taken for protection for all equipment. All equipment and material shall be completely protected from weather elements, painting, plaster, etc., until the project is substantially completed. Damage from rust, paint, scratches, etc., shall be repaired as required to restore equipment to original condition.
- E. Protection of all equipment during the painting of the building shall be the responsibility of the Painting Contractor, but this shall not relieve Contractor of the responsibility for checking to assure that adequate protection is being provided. Refer to Division 09 for painting protection.
- F. Where the final installation or connection of equipment in the building requires the contractor to work in areas previously finished by the General Contractor, the Electrical Contractor shall be responsible that such areas are protected and are not marred, soiled or otherwise damaged during the course of such work. Electrical Contractor shall arrange with the General Contractor for patching and refinishing of such areas which may be damaged in this respect.

1.09 OPENINGS, CUTTING AND PATCHING

- A. Refer to Division 1 for additional cutting and patching information.
- B. Conduits and sleeves passing through all fire or smoke rated floors, roofs, walls, and partitions shall be provided with firestopping. Space between wall/floor and conduit or sleeve shall be sealed with UL listed intumescent fire barrier material equivalent to rating of wall/floor. Where conduit or sleeves pass through floors, roofs, walls and partitions that are not fire or smoke rated, penetrations shall be sealed with grout or caulk.
- C. New structure:
 - 1. Contractor will coordinate the placing of openings and lintels in the new structure as required for the installation of the electrical work with the General Contractor.
 - 2. Contractor shall furnish to General Contractor the accurate locations and sizes for required openings, but this shall not relieve Contractor of the responsibility of checking to assure that proper size openings are provided. When additional cutting and patching is required due to Contractor's failure to coordinate this work, Contractor shall make arrangements for the cutting, patching, and painting required.
- D. Conduits and wireways passing through all fire or smoke rated floors, roofs, walls, and partitions shall be provided with firestopping. Space between wall/floor and conduits, sleeves and/or wireways, shall be sealed with UL listed intumescent fire barrier material equivalent to rating of wall/floor. Where conduits, sleeves and/or wireways pass through floors, roofs, walls and partitions that are not fire or smoke rated, penetrations shall be sealed with grout or caulk.
- E. For exterior walls below grade, sleeves shall be cast iron. Space between sleeve and conduit shall be sealed with modular mechanical rubber links tightened with bolts as made by Thunderline Corporation, Wayne, Michigan 48184. Waterproofing of conduit penetrations in exterior walls shall be coordinated with waterproofing contractor.

1.10 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be the standard product of a reputable U.S.A. manufacturer regularly engaged in the manufacture of the specified item unless authorized in writing by Design Professional. Where more than one unit is required of the same system, they shall be furnished by the same manufacturer except where specified otherwise.
- B. All material and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. The equipment specifications cannot deal individually with any minute items such as parts, controls, devices, etc., which may be required to produce the equipment performance and function as specified, or as required to meet the equipment guarantees. Such items when required shall be furnished as part of the equipment, whether or not specifically called for.

1.11 SUBMITTALS

- A. Contractor shall furnish, to the Design Professional, complete sets of shop drawings and other submittal data. Contractor shall review and sign shop drawings before submittal. Refer to Division 01 specifications for additional requirements.
- B. Shop drawings shall be bound into sets and cover related items for a complete system as much as practical and shall be identified with symbols or "plan marks" used on drawings. Incomplete, piecemeal or unbound submittals will be rejected.
- C. Submittals required by the various sections of the Project Manual include, but are not necessarily limited to those identified in the submittal schedule below.
- D. After award of contract, the contractor shall provide a completed submittal schedule including dates that the submittals will be to the Design Professional for review.
- E. Submit required information on the following items:

SPEC SECTION	EQUIPMENT	DETAIL DWGS	PROD DATA	SAMPLES	INSTALL METHODS	O & M MANUAL	CERTIFICATE OF SYSTEM DEMON- STRATION	OTHER (SEE NOTES)
26 2726	Wiring Devices		X			X		

- F. Design Professional will review shop drawings solely to assist contractors in correctly interpreting the plans and specifications.
- G. Contract requirements cannot be changed by shop drawings which differ from contract drawings and specifications.

1.12 SUBSTITUTIONS

- A. Refer to Divisions 00 and 01. Requests shall clearly describe the equipment for which approval is being requested. Include all data necessary to demonstrate that equipment's capacities, features and performance are equivalent. between specified equipment and equipment for which approval is being requested. If the equipment is acceptable, Design Professional will approve it in an addendum. Design Professional will, under no circumstances, be required to prove that an item proposed for substitution is or is not of equal quality to the specified item.

- B. Where substitutions are approved, Contractor assumes all responsibility for physical dimensions and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of the substitution.

1.13 ACCEPTABLE MANUFACTURERS

In most cases, equipment specifications are based on a specific manufacturer's type, style, dimensional data, catalog number, etc. Listed with the base specification, either in the manual or on the plan schedules are acceptable manufacturers approved to bid products of equal quality. These manufacturers are encouraged to submit to Design Professional at least 8 days prior to the bid due date drawings and catalog numbers of products to be bid as equals.

Manufacturers, who do not submit prior to bidding, run the risk of having the product rejected at time of shop drawing submittal. Extra costs associated with replacing the rejected product shall be the responsibility of the Contractor and/or the manufacturer.

- A. If Contractor chooses to use a manufacturer listed as an equal, it shall be his responsibility to assure that the manufacturer has complied with the requirements in 'A' above. Contractor shall assume all responsibility for physical dimensions, operating characteristics, and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of using the alternate manufacturer.
- B. Where a model or catalog number is provided, it may not be inclusive of all product requirements. Refer to additional requirements provided on the plans or in the specifications as required. Similarly, there may be additional requirements included in the model or catalog number that are not specifically stated. These requirements shall also be met.

1.14 GUARANTEE

- A. The entire electrical system including all sub-systems shall be guaranteed against defect in materials and installation for a minimum of one year from substantial completion or beneficial occupancy whichever occurs earlier. Any malfunctions which occur within the guarantee period shall be promptly corrected without cost to the Owner. This guarantee shall not limit or void any manufacturer's express or implied warranties.

1.15 CHANGES IN THE WORK

- A. Refer to Divisions 00 and 01.

1.16 COMPLETION

- A. Systems, at time of completion, shall be complete, efficiently operating, non-hazardous and ready for normal use by the Owner.
- B. When all the electrical work is complete Contractor shall thoroughly clean all material and equipment installed as a part of this contract and leave all equipment and material in new condition.
- C. Contractor shall clean up and remove from the site all debris, excess material and equipment left during the progress of this contract at job completion.

1.17 TEMPORARY UTILITIES

- A. Refer to Specification Division 1 for specific requirements concerning temporary utilities.

END OF SECTION 26 0010

SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Contractor shall furnish all material, tools, labor and supervision necessary to install all wiring systems.
- B. This section describes the basic materials and methods of installation for general wiring systems of 600 volts and less. Wiring for a higher voltage rating, if required, shall be as specified in other sections or called for on the drawings.

1.03 QUALITY ASSURANCE

- A. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wire, cable and connectors.
- B. UL Compliance: Comply with UL standards pertaining to wire, cable and connectors.
- C. UL Labels: Provide electrical wires, cables and connectors which have been UL-listed and labeled.
- D. NEMA/ICEA Compliance: Comply with applicable portions of NEMA/Insulated Cable Engineers Association standards pertaining to materials, construction and testing of wire and cable.
- E. ANSI/ASTM: Comply with applicable portions of ANSI/ASTM standards pertaining to construction of wire and cable.
- F. The materials used for wiring systems shall be the products of a manufacturer regularly engaged in the manufacturing of the specified material.

PART 2 - PRODUCTS

2.01 WIRE AND CABLE

- A. All wire and cable for power, lighting, control and signal circuits shall have copper conductors of not less than 98% conductivity and shall be insulated to 600 V. Conductor sizes #10 AWG and smaller shall be solid, conductor sizes #8 AWG and larger shall be stranded.
- B. Minimum size conductors shall be #12 AWG for power and lighting.
- C. Type of wire and cable for various applications shall be as follows:
 - 1. Type THWN, or XHHW (75 deg. C) - use for branch circuits, panel and equipment feeders in wet and dry locations.
 - 2. Type THHN, or XHHW (90 deg. C) - use for branch circuits, panel and equipment feeders in dry locations only. Use where lighting branch circuit conductors are routed through fluorescent fixture channels.

- D. For all vibration type installations (i.e. motors, etc), provide stranded type conductors.

2.02 CONDUCTOR COLOR CODING

- A. Wiring systems shall be color coded. Conductor insulation shall be colored in sizes up through #8 AWG, conductors #6 AWG and larger shall have black insulation and shall be phase color coded with one-half inch band of colored tape at all junctions and terminations. Colors shall be assigned to each conductor as described below and carried throughout all main and branch circuit distribution. When necessary to use tape, use colored tape on black wire. Do not use colored tape on colored wire.

120/208V.Y

Phase 'A' Conductor	Black
Phase 'B' Conductor	Red
Phase 'C' Conductor	Blue
Neutral Conductor	White
Grounding Conductor	Green

2.03 CONNECTORS

- A. In-line splices and taps for conductor sizes #8 AWG and smaller, use 3M Co. "Scotchlock" vinyl insulated spring connectors, or equal Ideal "wingnut" or Thomas & Betts. Wago wire nuts are also acceptable.
- B. Connectors for conductors No. 6 and larger shall be of compression or split-bolt types, National Electric, Thomas & Betts, Blackburn or Burndy mechanical connectors. Fill connector voids with electrical insulation putty, follow with 3-M Scotch tape #33, minimum 2 layers.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Wire shall not be installed in the conduit system until the building is enclosed and masonry work is completed.
- B. Conduit shall be swabbed free of moisture and debris prior to pulling in wiring. Pull mouse through conduits prior to pulling conductors.

3.02 INSTALLATION

- A. All cable for major feeders shall be continuous from origin to termination, unless otherwise indicated.
- B. Splices in branch circuit wires shall be made only in accessible junction boxes.
- C. All power feeder cable shall be pulled with the use of approved pulling compound or powder. Compound must not deteriorate conductor or insulation.
- D. Use pulling means, including fish tape, cable or rope which cannot damage raceway.

- E. Install exposed cable, parallel and perpendicular to surfaces or exposed structural members and follow surface contours, where possible.
- F. Keep conductor splices to a minimum.
- G. The continuity of circuit conductors shall not be dependant on service connections such as lamp holders, receptacles, etc., where the removal of such devices would interrupt the continuity.
- H. Provide separate green ground conductor throughout entire electrical system.
- I. All branch circuits shall have dedicated neutrals.

3.03 FIELD QUALITY CONTROL

- A. Prior to energizing system, test cable and wire for continuity of circuitry, and also for short circuits. Correct malfunctions when detected.
- B. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

END OF SECTION 26 0519

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of grounding work is indicated by drawings and shall comply with NEC.
- B. Applications of grounding work in this section include the following:
1. Enclosures.
 2. Equipment.
- C. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.

1.03 QUALITY ASSURANCE

- A. NEC Compliance: Comply with NEC requirements as applicable to materials and installation of electrical grounding systems, associated equipment and wiring. Provide grounding products which are UL-listed and labeled.
- B. UL Compliance: Comply with applicable requirements of UL Standards Nos. 467 and 869 pertaining to electrical grounding and bonding.
- C. IEEE Compliance: Comply with applicable requirements of IEEE Standard 142 and 241 pertaining to electrical grounding.

PART 2 - PRODUCTS

2.01 GROUNDING SYSTEMS

- A. Materials and Components
1. General: Except as otherwise indicated, provide electrical grounding systems indicated; with assembly of materials, including, but not limited to, cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, surge arresters, and additional accessories needed for complete installation. Where more than one type unit meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products complying with NEC, UL, IEEE, and established industry standards for applications indicated.
 2. Raceways: Provide raceways, and electrical boxes and fittings complying with Division 26, Section 26 05 33 – Raceway and Boxes for Electrical Systems.
 3. Conductors: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC.

4. Bonding Plates, Connectors, Terminals and Clamps: Provide electrical bonding plates, connectors, terminals, lugs and clamps as recommended by bonding plate, connector, terminal and clamp manufacturers for indicated applications.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL GROUNDING

- A. General: Install electrical grounding systems where shown, in accordance with applicable portions of NEC, with NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure that products comply with requirements and serve intended functions.
- B. Coordinate with other electrical work as necessary to interface installation of electrical grounding system with other work.
- C. Install bonding jumpers with ground clamps on water meter piping to electrically bypass water meters.
- D. Install clamp-on connectors only on thoroughly cleaned metal contact surfaces, to ensure electrical conductivity and circuit integrity.
- E. Provide separate green ground conductor throughout entire electrical system sized as required by the NEC.

3.02 FIELD QUALITY CONTROL

- A. Upon completion of installation of electrical grounding system, test ground resistance with earth test megger. Results shall be submitted to the Design Professional on a report form similar to that which follows:

EARTH RESISTANCE
FIELD REPORT

PROJECT: _____

JOB NUMBER: _____

PAGE _____

OWNER: _____

DATE OF TEST: _____ CONDITIONS: _____

TEST LOCATION: _____

TEST METHODS: _____

TEST INSTRUMENT: _____

SOIL RESISTIVITY/TYPE: _____

COMMENTS (If applicable): _____

TESTING RESULTS:

Earth Resistance Testing:
Description of systems tested _____

Resistance
to earth

Test No.

A) _____

B) _____

C) _____

D) _____

E) _____

COMPLETED BY: _____ COPY TO: _____

COMPANY: _____

- B. Where tests show resistance to ground is over 3 ohms, take appropriate action to reduce resistance to 3 ohms or less by driving additional ground rods or by chemically treating soil encircling ground rod.
 - 1. Retest to demonstrate compliance.
- C. Medium Voltage System Grounds:
 - 1. Test entire ground system for satisfactory continuity.
 - 2. Subject completed system to megger test at each pull point, each building, and at switchyard to ensure ground does not exceed 5 ohms.
 - 3. Tests may be accomplished by Triangulation Method.

END OF SECTION 26 0526

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Provide materials, labor and supervision as necessary to provide hangers and supports for conduit, fixtures and equipment.

1.03 QUALITY ASSURANCE

- A. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical supporting devices.
- B. ANSI/NEMA Compliance: Comply with applicable requirements of ANSI/NEMA Std. Pub. No. FB 1, "Fittings and Supports for Conduit and Cable Assemblies".
- C. NECA Compliance: Comply with National Electrical Contractors Association's "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.
- D. UL Compliance: Provide electrical components which are UL-listed and labeled.

PART 2 - PRODUCTS

2.01 MANUFACTURED SUPPORTING DEVICES

- A. General: Provide supporting devices; complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation; and as herein specified. Where more than one type of device meets indicated requirements, selection is Installer's option.
- B. Conduit Cable Supports: Provide cable supports with insulating wedging plug for non-armored type electrical cables in risers; construct for rigid metal conduit; type wire as indicated; construct body of malleable iron casting with hot dip galvanized finish.
- C. U-Channel Strut Systems: Provide U-channel strut system for supporting electrical equipment, 16-gauge hot dip galvanized steel, of types and sizes indicated; construct with 9/16" dia. holes, 8" o.c. on top surface, with standard green finish, and with the following fittings which mate and match with U-channel:
 - 1. Fixture hangers.
 - 2. Channel hangers.
 - 3. End caps.
 - 4. Beam clamps.
 - 5. Wiring stud.
 - 6. Thinwall conduit clamps.
 - 7. Rigid conduit clamps.
 - 8. Conduit hangers.
 - 9. U-bolts.

- D. Manufacturer: Subject to compliance with requirements, provide channel systems of one of the following:
1. B-Line Systems, Inc.
 2. Thomas & Betts, Superstrut
 3. Unistrut Div.; Tyco International
 4. Globestrut

PART 3 - EXECUTION

3.01 INSTALLATION OF SUPPORTING DEVICES

- A. Install hangers, anchors, sleeves and seals as indicated, in accordance with manufacturer's written instructions and with recognized industry practices to insure supporting devices comply with requirements.
- B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.
- C. Conduit hangers and support devices shall be approved type for the method of supporting required. All hangers and supports shall have galvanized finish or other approved corrosion resistance finish. In general, hangers and supports shall be as follows:
1. Where single or multiple run of conduit is routed on surface of structure; use conduit clamps mounted on U-channel strut so as to maintain not less than 1" clearance between conduit and structure.
 2. Where single run of conduit is suspended from overhead; use split ring conduit clamp suspended by 3/8" steel drop rod.
 3. Where multiple parallel runs of conduit are suspended from overhead; use split ring conduit clamps uniformly spaced and supported on trapeze hangers fabricated of U-channel strut, suspended by not less than two steel drop rods.
 4. Where circuit voltage is above 600 volts, conduit clamps shall be provided with insulating bushings of dielectric strength as required.
 5. Where conduit is buried in concrete floor topping; anchor conduit to structural floor with one hole jiffy clamps.
 6. Maximum hanger and support spacing shall be in accordance with NEC.
- D. Hangers and supports shall be anchored to structure as follows:
1. Hangers and supports anchored to poured concrete, use malleable iron or steel concrete inserts attached to concrete forms.
 2. Hangers or supports anchored to precast concrete, use self-drilling expansion shields. Expansion shields may be used where concrete inserts have been missed or additional support is required in poured concrete.
 3. Hanger or supports anchored to structural steel, use beam clamps and/or steel channels as required by structural system.
 4. Hangers or supports anchored to metal deck, use spring clips or approved welding pins. Maximum permissible load on each hanger shall not exceed 50 pounds.

5. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls.
 6. Use sheet metal screws in sheet metal studs and wood screws in wood construction.
- E. The following is not permitted:
1. Attaching supports and hangers to piping, ductwork, mechanical equipment, or conduit.
 2. Use of powder-actuated anchors.
 3. Drilling of structural steel members.
- F. Fixtures on plastered or acoustical ceilings shall not be supported directly on ceiling tile. Provide metal bar hangers or U-channel strut attached to ceiling supports.
- G. Where disconnect switches and panels cannot be mounted on wall, provide support racks fabricated of structural steel or U-channel strut.
- H. Provide concrete bases and pads for transformers, switchgear, free standing panels, generators, outdoor lighting poles and other equipment requiring bases, except where drawings indicate that such bases and pads are to be furnished by the General Contractor. Furnish all equipment anchor bolts and installation for their proper and accurate location. All concrete work and reinforcing shall comply with General Specifications.

END OF SECTION 26 0529

SECTION 26 0533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Contractor shall furnish all materials, tools labor and supervision necessary to fabricate and install complete conduit systems.
- B. Conduit systems shall be provided for all wiring, except where the drawings or other sections of the specifications indicate that certain wiring may be installed in cable trays, surface raceway, underfloor raceway, wireways and/or auxiliary gutters.
- C. Types of raceways in this section include the following:
1. Electrical metallic tubing.
 2. Flexible metal conduit.
 3. Liquid-tight flexible metal conduit.
 4. MC cable.
- D. Contractor shall furnish all material, tools, labor and supervision necessary to install electrical boxes and fittings as required by drawings and specifications.
- E. Types of electrical boxes and fittings in this section include the following:
1. Outlet boxes.
 2. Junction boxes.
 3. Pull boxes.
- F. Telecommunications Raceway Requirements:
1. The term "telecommunications" includes all low voltage technology systems including voice and data, access control, video surveillance, intrusion detection, audio video, induction loop, paging, intercom, nurse call, school bell and/or clock systems. The term does not include fire alarm system, which is addressed separately in the plans and specifications.
 2. Contractor shall provide and install telecommunications boxes and conduits, including wall sleeves unless otherwise noted.
 3. Below grade building entrance conduits within the building footprint shall be schedule 40 electrical PVC unless otherwise noted. Long sweep ninety-degree elbows for under building footprint conduits shall be fiberglass sweeps with PVC schedule 40 conduit connectors built into the ends of the sweeps. Sweeps of 4" diameter shall be 36" minimum radius.
 4. Below grade conduits for low voltage system cabling are not acceptable unless specifically directed. Below grade entrance conduits and floor boxes in slab on grade are exceptions to this rule.
 5. Underground conduits outside the building footprint shall be continuous orange HDPE (high density polyethylene) with 1250 pound braided mule tape used as pull string unless otherwise noted. Round pull string or other rope is not acceptable for pulling due to risk of raceway damage. HDPE manufacturer approved water proof couplers shall be used for conduit type transition. HDPE to HDPE connection shall be hot fusion splice.

6. HDPE shall be minimum SDR 17 wall thickness for 2" diameter and smaller. The wall thickness shall be minimum SDR 11 for sizes larger than 2" diameter.
7. All below grade conduits shall be plugged at each end during construction to keep water, mud, rodents, etc., out.
8. All below grade entrance conduits shall be plugged on each end with removable mechanical plugs to keep water from entering the building for the life of the building. These plugs shall be installed inside the building above slab, and also at the first hand-hole outside the building (or where the conduits terminate underground). These plugs shall also seal around the utility entrance cables, including in and around all sub-ducts for a complete water tight seal. These mechanical plugs shall be as found on www.innerduct.com or engineer approved equivalent. Coordinate with the utility to determine size of cables for the plug inserts required. This work shall be completed before the Owner occupies the building.
9. All below grade exterior conduits shall have a tracer wire with adequate slack loop at each end for owner to conveniently connect and trace. All tracer wires shall protrude from closed hand holes so tracing may be accomplished without lifting the hand hole lid.
10. Interior building, above grade conduits and sleeves shall be EMT unless otherwise noted. PVC is never acceptable above grade.
11. All interior conduits shall have bushings installed during conduit installation. Completed individual installations shall have bushings installed same business day.
12. All interior conduits shall have pull strings, except sleeves which are less than 4' long. EMT conduits shall receive standard round cable pull string (multi-strand plastic twine type).
13. Minimum interior conduit size for all information jacks (voice data cabling) shall be 1" unless otherwise noted.
14. Minimum interior conduit size for audiovisual shall be 1" unless otherwise noted. Junction (pull) boxes shall be added at a maximum of 100' of raceway distance, and also for a maximum of 180 degrees of bend radius.
15. Minimum interior conduit size for video surveillance, intrusion detection, paging, intercom, nurse call, school bells and/or clock systems shall be 3/4" unless otherwise noted.
16. Access control system conduit sizes at the door location shall be per the access control detail found on the drawings. The conduit from the door location to the access control head end which contains all conductors needed for all access control functions at that door (may be individual conductors but is often one large composite cable) shall be minimum 3/4".
17. Boxes for all low voltage systems in stud walls shall be metallic 5"x5"x2.875" with single gang mud ring unless otherwise noted.
18. Boxes in masonry walls shall be minimum 3.5" deep. single gang, unless otherwise noted.
19. Wiremold surface raceway for all low voltage systems shall be minimum V2400 unless noted otherwise.
20. Wiremold surface boxes for all low voltage shall be minimum 2.5" deep single gang, unless otherwise noted.
21. Conduits inside walls which feed the low voltage side of dual compartment Wiremold shall be minimum 1.25"
22. Contractor shall provide and install hand holes for cable pulling in buried raceway at a maximum interval of 500'.

1.03 QUALITY ASSURANCE

- A. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.
- B. UL Compliance and Labeling: Comply with provisions of UL safety standards pertaining to electrical raceway systems; and provide products and components which have been UL-listed and labeled.

- C. NEC Compliance: Comply with requirements as applicable to construction and installation of raceway systems.
- D. The materials used in the fabrication of the raceway system shall be products of a manufacturer regularly engaged in the manufacturing of the specified material.
- E. NEC compliance: Comply with NEC as applicable to construction and installation of electrical wiring boxes and fittings.
- F. UL Compliance: Provide electrical boxes and fittings which have been UL-listed and labeled.
- G. ANSI/NEMA Standards Compliance: Comply with ANSI C 134.1 (NEMA Standards Pub No. OS 1) as applicable to sheet-steel outlet boxes, covers and box supports.

PART 2 - PRODUCTS

2.01 RACEWAYS

- A. General: Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with applicable portions of NEC for raceways. Conduit shall be used where concealed in permanent wall construction or in ceiling plenums. Surface raceway shall be used where exposed in finished regularly occupied areas.
- B. Electrical Metallic Tubing: Thin wall, electrically welded cold rolled steel conduit, galvanized inside and out by electro galvanized process. Baked clear elastic enamel coating in and out. Use for installations in stud walls, masonry walls, above suspended ceilings and where exposed. Size limited to 2 1/2" and smaller.
- C. Flexible Metal Conduit: Formed of one continuous length of spirally wound electro galvanized steel strip. Use for final connections to all motor operated equipment such as unit heaters, fans, air handling units, pumps, generators, generator enclosures and connections to dry type transformer, connections from junction boxes to lighting fixtures in accessible ceiling, and for wiring within casework and millwork.
- D. Liquidtight Flexible Metal Conduit: Formed of one continuous length of spirally wound steel strip, with water and oil tight neoprene jacket. Use for final connection to equipment listed in paragraph "D" above when located in wet areas.
- E. MC cable will not be allowed except for fixture whips less than 6' long.
- F. Type MC Cable: Type MC cable meets or exceeds all applicable ASTM Specifications, UL Standard for Safety 1569, UL Standard for Safety 1581, UL Standard for Safety 83, Federal Specification A-A-59544 and requirements of the National Electrical Code (NFPA 70).
 - 1. Type MC cable is constructed with copper conductors that are soft annealed copper, insulated with heat and moisture resistant lead-free polyvinyl chloride (PVC) over which a nylon (polyamide) or UL listed equivalent jacket is applied (Type THHN and THWN). The assembly is wrapped with polypropylene tape, and covered with interlocking aluminum armor.
 - 2. Cable shall be UL listed type MC, suitable for operation at 600 volts in all installations as specified by the National Electrical Code.
 - 3. MC cable shall contain a copper equipment ground conductor equal in size with the branch circuit conductors, with green insulation.
 - 4. Type MC cable is prohibited for feeders or branch circuits over 30 amps.

2.02 CONDUIT FITTINGS

- A. Metallic Tubing Fittings: Compression type galvanized malleable iron or steel, water and concrete tight where exposed to wet locations or imbedded in concrete. Steel set screw type acceptable in all dry location applications.
- B. Flexible Metal Conduit Fittings: External squeeze or set screw type galvanized malleable iron or steel with nylon insulated throats. Internal screw type fittings are not allowed.
- C. Liquidtight Flexible Conduit Fittings: Galvanized malleable iron or steel, with watertight gaskets, "O" ring and retainer, and nylon insulated throats.
- D. Condulet Fittings: Exposed conduit fittings shall be condulet type for all sharp turns, tees, etc.
- E. Surface Metal Raceway Fittings: Provide types that match and mate to raceways provided.
- F. Observe National Electrical Code requirements for insulated bushings on 1-1/4 inch and larger conduits. Double locknuts and fibre bushings with threads fully engaged are required. 1-1/4 inch and larger EMT connectors, if used, must also accommodate insulated bushings with threads fully engaged. T & B "Insuline" or Appleton insulated throat connectors are acceptable in lieu of separate bushings.

2.03 WALL OUTLET BOXES

- A. General: Boxes shall be Racor, Steel City, Appleton or equal, catalog numbers based on Racor, unless otherwise indicated. In general, the type of boxes shall be as follows:
 - 1. In Stud Walls: For single outlet use 4" square by 1-1/2" deep box #192. Boxes to be provided with raised covers of depth as required for thickness of wall materials.
 - 2. In Masonry and Poured Concrete Walls: Use 3-3/4" high by 2-1/2" and/or 3-1/2" deep masonry boxes #691 through #699 and/or #960 through #969.
 - 3. Surface Mounted Wall Outlets for conduit: Use 4" square by 1-1/2" deep box #192 with raised cover.
 - 4. Surface Mounted Wall Outlets for surface metal raceway: Use single gang boxes 1-1/2" deep Wiremold #V57xx series.
 - 5. Suspended Ceiling: Use octagon boxes, depth as required for application, securely fastened to structure.
 - 6. Outlets Installed Outdoors or in Wet Locations: Use Bell Product 200 Series outlet box.

2.04 PULL BOXES, JUNCTION BOXES & GUTTERS

- A. Construction, sizes and installation of pull boxes, junction boxes and gutters shall comply with NEC, Article 314.
- B. Pull and junction boxes not specifically described in NEC, Article 314, shall be fabricated of heavy gauge galvanized steel with screw or hinged covers, and equipped with corrosion resistant screws and hardware.

- C. Pull and junction boxes for installation in poured concrete floors shall be flush type, cast iron, with watertight gasketed covers. Boxes for installation in floors with tile or carpet floor covering shall have recessed covers to accommodate the floor covering.
- D. Gutters shall be constructed as a complete assembly of raceway including, but not necessarily limited to, couplings, offsets, elbows, expansion joints, adapters, hold down straps, end caps, and other components and accessories as needed for complete system. Gutters shall have hinged covers. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements.
- E. Pull boxes, junction boxes and gutters for outdoor installation shall be raintight.

PART 3 - EXECUTION

3.01 INSTALLATION OF RACEWAY

- A. In general, all horizontal runs of branch circuit conduit shall be installed in ceiling plenum. Raceway for convenience outlets, wall mounted fixtures and other wall outlets shall be routed overhead and dropped through wall to the outlet. Branch circuit raceway shall not be installed in or below concrete floor slabs except where conditions will not permit the raceway to be installed overhead. Conduit shall be used where concealed in permanent wall construction or in ceiling plenums. Surface raceway shall be used where exposed in finished regularly occupied areas where walls are existing.
- B. Feeder conduits to panelboards, motor control centers and other major loads may be installed in fill below concrete slabs on grade.
- C. Conduits that are run in fill below concrete slabs on grade shall be installed so as not to interfere with welded wire mesh (wwm), vapor barrier, or concrete placement.
- D. Generally, all conduit shall be concealed, except in crawl spaces, tunnels, shafts, mechanical equipment rooms, and at connection to surface panels and free standing equipment, and as otherwise noted.
- E. Exposed conduit and conduit concealed in ceiling space shall be routed in lines parallel to building construction.
- F. All conduit runs above suspended acoustical ceilings shall be routed so as not to interfere with tile panel removals with 4'0" to 6'0" flexible conduit drops from an independent junction box, accessible from below the ceiling, to ceiling mounted equipment.
- G. Minimum size conduit shall be 1/2" trade size except all home runs to panels shall be minimum 3/4". Minimum size surface raceway shall be V500. Where specified size is not called for on drawings or in the specifications, conduit shall be sized per NEC.
- H. Install the conduit system mechanically and electrically continuous from outlet to outlet and to all cabinets, junction or pull boxes. Conduit shall enter and be secured to all cabinets and boxes in such a manner that all parts of the system will have electrical continuity.
- I. Support conduit raceway systems in accordance with requirements as set forth in the National Electric Code.

3.02 INSTALLATION OF BOXES AND FITTINGS

- A. Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

- B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

3.03 OUTLET BOX INSTALLATION

- A. Outlet boxes shall be installed for all fixtures, switches, receptacles and other devices.
- B. Approximate locations of outlets are shown on the plans, but each outlet location as shown shall be checked by Contractor before installing the outlet box.
- C. Wall boxes installed flush in common wall shall not be back-to-back or through-wall type. Boxes located on opposite sides of a common wall that are closely connected by conduit shall have the conduit openings plugged with duct seal.
- D. Install boxes and conduit bodies in those locations to ensure ready accessibility of electrical wiring.
- E. Outlet boxes shall be installed plumb and square with wall face and with front of box or cover located within 1/8" of face of finish wall. Boxes in masonry shall be set with bottom or top of the box tight to the masonry unit.

3.04 PULL BOX, JUNCTION BOX & GUTTER INSTALLATION

- A. Install pull boxes, junction boxes and auxiliary wiring gutters where indicated on drawings and where required to facilitate installation of the wiring.
- B. For concealed conduit, install boxes flush with ceiling or wall, with covers accessible and easily removable. Where flush boxes are installed in finish ceilings or walls, provide cover which shall exceed the box face dimensions by a sufficient amount to allow no gap between box and finished material.
- C. Boxes shall not be located in finished, occupied rooms, without prior approval of Design Professional.

END OF SECTION 26 0533

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Contractor shall provide identification for wiring systems and equipment as called for in this section.
- B. Types of electrical identification specified in this section include the following:
1. Conduit color banding.
 2. Cable conductor identification.
 3. Equipment/system identification signs.

1.03 QUALITY ASSURANCE

- A. UL Compliance: Comply with applicable portions of UL safety standards pertaining to electrical marking and labeling identification systems.
- B. NEC Compliance: Comply with NEC as applicable to installation of identifying labels and markers for wiring and equipment.

PART 2 - PRODUCTS

2.01 ELECTRICAL IDENTIFICATION MATERIALS

- A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.
- B. Color-Coded Conduit Markers
1. General: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet conduit markers, extending 360 degrees around conduits; designed for attachment to conduit by adhesive, adhesive lap joint of marker, matching adhesive plastic tape at each end of marker, or pretensioned snap-on. Except as otherwise indicated, provide lettering which indicates voltage, [panel and circuit] of conductor(s) in conduit.
 2. Colors:
 - a. 120/208 volt: gray/silver
 - b. Division 27 systems: purple**
 - c. Division 28 systems excluding fire alarm: purple**

* Factory painted conduit required

**Factory painted conduit optional.

3. For conduits above ceilings, spray painting of boxes and portions of conduit is acceptable in lieu of banding. For exposed conduits in finished spaces, refer to architectural for paint to match room finish.
4. For branch circuits, mark panel name and circuit numbers on all junction/pull boxes.

C. Cable/Conductor Identification Bands

1. General: Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification.

D. Self-Adhesive Tape for Receptacle Circuit Identification

1. General: Provide self-adhesive or pressure-sensitive, pre-printed, flexible vinyl tape for panel name and circuit number.

PART 3 - EXECUTION

3.01 APPLICATION AND INSTALLATION

A. General Installation Requirements

1. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

B. Conduit Identification

1. Conduit above accessible ceiling spaces shall be identified per 2.01 B.
2. Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by a color-coded method, apply color-coded identification on electrical conduit in a manner similar to piping identification.
3. Identify junction and pullboxes of systems with stencil lettering for panel and circuit numbers or system type.

C. Cable/Conductor Identification

1. General: Apply cable/conductor identification on each cable and conductor in each box/enclosure/cabinet where wires of more than one circuit or communication/signal system are present, except where another form of identification (such as color-coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents and similar previously established identification for project electrical work.

D. Equipment/System Identification

1. General: Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for each unit of the following categories of electrical work.
 - a. Panelboards, electrical cabinets and enclosures.

END OF SECTION 26 0553

SECTION 26 2726 - WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED WORK

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 26 0010 - Electrical General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. Provide materials, equipment, labor and supervision necessary to install wiring devices as required by the drawings and this section.

1.03 QUALITY ASSURANCE

- A. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wiring devices.
- B. UL Compliance and Labeling: Provide electrical wiring devices which have been UL-listed and labeled.
- C. NEMA Compliance: Comply with NEMA standards for general- and specific-purpose wiring devices.

1.04 SUBMITTALS

- A. Submit manufacturer's name and product data literature for each type of wiring device required.

PART 2 - PRODUCTS

2.01 SWITCHES AND RECEPTACLES

- A. All switches and receptacles shall be "specification grade", side and back wired, except where higher grade is called for on the plans. Acceptable manufacturers are as follows, with catalog numbers based on Hubbell, Inc.:
 - 1. Hubbell, Inc.
 - 2. Pass & Seymour
 - 3. Leviton
- B. Color of switches, receptacles and coverplates shall be determined at the time of shop drawing review.
- C. Receptacles shall be as follows:
 - 1. Duplex receptacles - 2 pole, 3 wire grounding type, back and side wired, 15 amp, 125 volt, NEMA 5-15R (unless noted otherwise on drawings). Face material shall be thermoplastic. Acceptable manufacturer's catalog numbers: P&S 5252, Hubbell 5252, Leviton 5252. Wherever a duplex receptacle is shown outdoors, provide Hubbell 5262_WR or equivalent.
 - 2. Receptacles for power and special purpose outlets shall have characteristics and NEMA configurations as per electrical symbols listed on drawings.

3. Ground fault interrupting receptacles (GFI) shall be duplex with test and reset buttons, equal to Hubbell GF5252 series.
4. Surge suppression outlets indicated as TVSS on drawings shall be equal to Hubbell 5252-IS.

2.01 WIRING DEVICE ACCESSORIES

A. Cover Plates:

1. Smooth High-Impact Thermo plastic, Hubbell NP Series or equal.
2. Provide plates for all switches, receptacles, TV outlets, other outlets and blank plates for unused outlets.
3. Plates for surface outlets shall be of the raised cover type utilizing 4" square boxes.

PART 3 - EXECUTION

3.01 INSTALLATION OF WIRING DEVICES

- A. Install wiring devices as indicated on the drawings and as called for below.
- B. Switched duplex receptacles shall be wired so that only the top receptacle is switched; the remaining receptacle shall be unswitched.
- C. All GFI type receptacles shall be installed where GFI notation is shown on plans. No downstream protection of receptacles will be allowed from load side of other GFI type receptacles.
- D. Prior to roughing-in outlet boxes, Contractor shall verify from general construction drawings, door swings, type of wall finishes and locations for counters and work benches.

END OF SECTION 26 2726

Division 27

Communications

SECTION 27 0010 - TELECOMMUNICATIONS GENERAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL

- A. Refer to Bidding Information, conditions of the Contract and Division I, General Requirements, which all apply to work under this section.

1.02 DESCRIPTION OF WORK

- A. This section applies to all work under the telecommunications contract. This shall include, but not necessarily be limited to, the following:
1. Pre-Register Project with structured cabling plant manufacturer if applicable.
 2. Furnish and install a complete voice and data-wiring infrastructure.
 3. Furnish, install, and terminate all UTP cable and fiber as applicable and per drawings.
 4. Furnish and install all wall plates, jacks, patch panels, and patch cords as required and as indicated.
 5. Furnish and install any cabinets, racks and ladder rack as required and as indicated.
 6. Furnish any other material required to form a complete system.
 7. Perform permanent link testing (100% of links) and certification of all components.
 8. Furnish test results of all cabling to the owner on disk and paper format, listed by each closet, then by workstation ID.
 9. Provide Owner As-builts in the form of one electronic copy and two hard copies of a labeled map of the building(s) showing the structured cabling plant.
 10. Adhere and comply with all requirements of the Contractor Agreement for the structured cabling plant manufacturer to be used.
 11. Provide Owner training and testing documentation.
- B. The work shall include all materials, equipment and labor required for complete and properly functioning telecommunications systems.
- C. All elements of the construction shall be performed by workmen skilled in the particular craft involved, and regularly employed in that particular craft.
- D. All work shall be performed in a neat, workmanlike manner in keeping with the highest standards of the craft.

1.03 CODES AND STANDARDS

- A. All work shall be done in accordance with the applicable portion of the following codes and standards:
1. National Electrical Code
 2. Local Electrical Code
 3. National Fire Protection Association
 4. National Electrical Manufacturers Association
 5. Standards of Institute of Electrical and Electronic Engineers
 6. Applicable Building Codes
 7. Occupational Safety and Health Act
 8. Iowa Administrative Codes
 9. ANSI TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
 10. ANSI TIA-526-14-C Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant

11. ANSI TIA-568-D.0 Generic Telecommunications Cabling for Customer Premises
 12. ANSI TIA-568-D.1 Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
 13. ANSI TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 14. ANSI TIA-568-C.3 Optical Fiber Cabling Components Standard
 15. ANSI TIA-568-C.4 Broadband Coaxial Cabling and Components Standard
 16. ANSI TIA-569-D Telecommunications Pathways and Spaces
 17. ANSI TIA-570-C Residential Telecommunications Infrastructure Standard
 18. ANSI TIA-598-D Optical Fiber Cable Color Coding
 19. ANSI TIA-606-B Administration Standard for Commercial Telecommunications Infrastructure
 20. ANSI TIA-607-B Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications
 21. ANSI TIA-758-B Customer-owned Outside Plant Telecommunications Infrastructure Standard
 22. National Fire Protection Agency (NFPA - 70), National Electrical Code (NEC)
- B. All Contractors shall familiarize themselves with all codes and standards applicable to their work. No extra compensation will be allowed for corrections or changes in the work required due to failure to comply with the applicable codes and standards. Where two or more codes or standards are in conflict, that requiring the highest order of workmanship shall take precedence, but such questions shall be referred to Design Professional for final decision.

1.04 REQUIREMENTS & FEES OF REGULATORY AGENCIES

- A. Contractor shall comply with the rules and regulations of the local serving utility companies and shall check with each utility company providing service to this project and determine or verify their requirements regarding incoming services.
- B. Secure and pay for all permits, licenses, fees and inspections.

1.05 DRAWINGS

- A. Drawings for the work are in part diagrammatic, and are intended to convey the scope of the work and to indicate in general the location of equipment.
- B. Contractor shall layout his own work and shall be responsible for determining the exact quantities and locations for equipment.
- C. Contractor shall take own field measurements for verifying locations and dimensions; scaling of the drawings will not be sufficient for laying out the work.
- D. Because of the scale of the drawings, certain basic items for a complete installation are not shown, but where such items are required by code (or referenced standards) where they are required for proper installation and operation of the work, such items shall be furnished and installed.

1.06 ACTIVE SERVICES

- A. Contractor shall be responsible for verifying exact locations of all existing services prior to beginning work in that area.
- B. When active services are encountered which require relocation, Contractor shall make request to authorities with jurisdiction for determination of procedures.

- C. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the authorities having jurisdiction.

1.07 SITE INSPECTION

- A. Contractor shall inspect the site prior to submitting bid for work to become familiar with the conditions of the site which will affect the work and shall verify points of connection with utilities and/or existing system wiring.
- B. Extra payment will not be allowed for changes in the work required because of Contractor's failure to make this inspection.

1.08 COORDINATION AND COOPERATION

- A. It shall be Contractor's responsibility to schedule and coordinate work with the schedule of General Contractor so as to progress the work expeditiously, and to avoid unnecessary delays.
- B. Contractor shall fully examine the drawings and specifications for other trades and shall coordinate the installation of his work with the work of the other contractors. Contractor shall consult and cooperate with the other contractors for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment and the building. The Design Professional reserves the right to determine space priority of the contractors in the event of interference between piping, conduit, ducts and equipment of the various contractors.
- C. Drawings and specifications are intended to be complimentary. Any work shown in either of them, whether in the other or not, shall be executed according to the true intent and meaning thereof, the same as if set forth in all. Conflicts between the drawings and the specifications, or between the requirements set forth for the various contractors, shall be called to the attention of the Design Professional. If clarification is not asked for prior to the taking of bids, it will be assumed that none is required and that Contractor is in agreement with the drawings and specifications as issued. If clarification is required after the contract is awarded, such clarification will be made by Design Professional and his/her decision will be final.
- D. Special care shall be taken for protection for all equipment. All equipment and material shall be completely protected from weather elements, painting, plaster, etc., until the project is substantially completed. Damage from rust, paint, scratches, etc., shall be repaired as required to restore equipment to original condition.
- E. Protection of all equipment during the painting of the building shall be the responsibility of the Painting Contractor, but this shall not relieve Contractor of the responsibility for checking to assure that adequate protection is being provided.
- F. Where the final installation or connection of equipment in the building requires Contractor to work in areas previously finished by Owner, the Contractor shall be responsible that such areas are protected and are not marred, soiled or otherwise damaged during the course of such work. Contractor shall be responsible for patching and refinishing of such areas which may be damaged in this respect.
- G. Where two or more specified items/systems in the specifications and/or the drawings are in conflict, that requiring the highest order of workmanship and the most financially expensive products shall take precedence. Such questions shall be referred to the Design Professional for final decision.

1.09 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be the standard product of a reputable manufacturer regularly engaged in the manufacture of the specified item unless authorized in writing by Design Professional. Where more than one unit is required of the same items, they shall be furnished by the same manufacturer except where specified otherwise.
- B. All material and equipment shall be installed in strict accordance with the manufacturer's recommendations.
- C. The equipment specifications cannot deal individually with any minute items such as parts, controls, devices, etc., which may be required to produce the equipment performance and function as specified, or as required to meet the equipment guarantees. Such items when required shall be furnished as part of the equipment, whether or not specifically called for.

1.10 SUBMITTALS

- A. Contractor shall furnish, to the Design Professional, complete sets of submittals. Contractor shall review and sign submittals before submitting. Contractor shall provide submittals via electronic process (.PDF format) unless otherwise instructed. Refer to Division 01 specifications for additional requirements.
- B. Submittals shall be bound into sets per specification section (not division). The content of the submittal shall cover related items for a complete system as much as practical and items shall be identified with symbols or "plan marks" used on drawings whenever possible. Incomplete, piecemeal or unbound submittals will be rejected.
- C. Each submittal shall include a cover sheet providing the Approved Contractors company name, address, phone number and contact person (person to contact if there are questions about the submittal). The cover sheet shall also have adequate white space for the design professional review stamp as well as up-stream contractor stamps. The company providing the submittal shall be the same as that which meets the APPROVED CONTRACTOR requirements paragraph found later in this specification section (submittals without this identifying contractor information on the cover page will be rejected to ensure the Approved Contractor process is being followed).
- D. Design Professional will review submittals solely to assist contractors in correctly interpreting the plans and specifications.
- E. Contract requirements cannot be changed by submittals. Contract documents remain in force even if equipment is submitted which differs from contract drawings and specifications and that submittal is stamped as reviewed (or any other stamp verbiage).
- F. Submittals required by the various sections of the Project Manual include, but are not necessarily limited to those identified in the submittal schedule below.
- G. After award of contract, the contractor shall provide a completed submittal schedule including dates that the submittals will be to the Design Professional for review.

- H. Submit required information on all items in the project for the following systems (see table). Submittals shall be sorted and separately identified per specification section listed below.

SPEC SECTION	EQUIPMENT	DETAIL DWGS	PROD DATA	SAMPLES	INSTALL METHODS	O & M MANUAL	CERTIFICATE OF SYSTEM DEMONSTRATION	OTHER (SEE NOTES)
27 00 10	Contractor Certifications					X		Note 1
27 00 10	Manufacturer Certification					X		Note 2
27 00 10	UTP No-Paint Notification					X		Note 7
27 11 00	UTP Cabling/Equipment		X			X	X	Note 6
27 11 00	Coaxial Cable/Equipment		X			X	X	Note 6
27 11 00	As-Builts at Closeout							Note 3
27 12 00	Tester, UTP/Fiber		X			X		Note 4
27 12 00	Test Report at Closeout					X		Note 5
27 40 00	Audiovisual System		X			X	X	

Notes:

1. Division 27 Contractor shall submit copies of the Contractor Certifications under section 27 0010 (BICSI or IBEW/NECA Certifications) showing compliance with the specification. See Approved Contractors paragraph for details.
2. Division 27 Contractor shall submit Manufacturer Certification under section 27 00 10. See Approved Contractors paragraph in this section for details, and further requirements listed in Cabling and Equipment specification section.
3. Division 27 Contractor shall submit As-Builts as specified in Cabling and Equipment section.
4. Division 27 Contractor shall submit product information on UTP Tester and Fiber Tester. See testers specified in Testing and Documentation section.
5. Division 27 Contractor shall submit Test Report as specified in Testing and Documentation section.
6. Grounding and Bonding or Cabling and Equipment section submittals will not be opened or reviewed by the Design Professional until the Division 27 00 10 Contractor Certifications (see Note 1) and Division 27 Manufacturer Certifications (see Note 2) have been received and found to be acceptable by the Design Professional.
7. Division 27 Contractor shall submit the "Do Not Paint The UTP" written notification (addressed to the General Contractor) for review by the Design Professional. This written notification is specified in the Telecommunications Cabling and Equipment section. The submittal process may be used as the vehicle to inform the General Contractor of the "Do Not Paint The UTP" requirement (and the mandatory corrections required if this were to happen, outlined in the Telecommunications Cabling and Equipment section) if the General Contractor acknowledges receipt of the written notification.

1.11 OPERATION AND MAINTENANCE MANUALS

- A. Operation and maintenance manuals shall be submitted to the Design Professional in duplicate upon completion of the job. Refer to Division 01 specifications for additional information.

- B. Submit manuals shall be bound in a three ring hard-backed binder. Front cover and spine of each binder shall have the following lettering done:

OPERATION
AND
MAINTENANCE
MANUAL
FOR
TELECOMMUNICATIONS SYSTEMS

(PROJECT NAME)
(LOCATION)
(DATE)

SUBMITTED BY
(NAME, ADDRESS AND PHONE NUMBER OF CONTRACTOR)

- C. Provide a master index at the beginning of manual showing items included. Each section shall contain the following information for equipment furnished under this contract:

1. Equipment and system warranties and guarantees.
2. Installation instructions.
3. Operating instructions.
4. Maintenance instructions.
5. Spare parts identification and ordering list.
6. Local service organization, address, contact and phone number.
7. Submittals with reviewed stamp of Design Professional and Contractor shall be included, if applicable, along with the items listed above.

1.12 TESTS AND DEMONSTRATIONS

- A. All systems shall be tested by Contractor and placed in proper working order prior to demonstrating systems to Owner.

1.13 TRAINING AND DEMONSTRATIONS

- A. Prior to acceptance of the telecommunications installation, the Contractor shall provide to Owner, or his designated representatives, all comprehensive training on essential features and functions of all systems installed, and shall instruct Owner in the proper operation and maintenance of such systems.

1. Provide adequate notice to Owner as to when instruction will be conducted so appropriate personnel can be present.
2. Prepare the instruction format for a minimum of four Owner Representatives.

- B. Equipment training:

1. Manufacturer's representatives shall provide instruction on each major piece of equipment. Contractor shall provide instruction on all other equipment.
2. Training sessions shall use the printed installation, operation and maintenance instruction materials included in the O&M manuals and emphasize preventative maintenance and safe operating procedures.
3. Training shall be performed by qualified factory trained technicians.
4. Contractor shall attend all sessions performed by the manufacturer's representative and shall add to each session any special information relating to the details of installation of the equipment as it might impact the operation and maintenance.

5. Equipment training shall occur as soon as possible after start up of the equipment and shall include hands-on operation. Training shall be provided for equipment listed in the table below.

C. System training:

1. Training sessions shall include hands-on demonstrations of system wide start-up, operation in all possible modes, shut-down and emergency procedures.

D. The following are minimum requirements for Owner instruction:

Section	Description	Hrs. on Site	Presented By	Others Present	Remarks
27 11 00	Cabling and Equipment	2	Contractor		
27 40 00	Audiovisual System	8	Contractor		

- E. Each Contractor shall submit a certificate (in the project closeout submittals), signed by Owner stating the date, time and persons instructed and that the instruction has been completed to Owner's satisfaction. An example of a certificate form is as follows:

CERTIFICATE OF SYSTEM DEMONSTRATION

This document is to certify that the contractor has demonstrated the hereafter listed systems to Owner's representatives in accordance with the Contract documents and that the instruction has been completed to the Owner's satisfaction.

- A. Project:
- B. System(s):
- C. Contractor's representatives giving instruction and demonstration:

Contractor: _____

NAMES	DATE	HOURS

- D. Owner's representatives receiving instruction:

Owner: _____

NAMES	DATE	HOURS

Acknowledgement of demonstration:

- E. Contractor's Representative:

signature

date

Owner's Representative:

signature

date

1.14 PERMITS, FEES, ETC.

- A. Secure all required permits and pay for all inspections required in connection with the telecommunication systems work. Contractor shall post all bonds and obtain all licenses required by the State, City, County, and Federal Agencies.

1.15 SUBSTITUTIONS

- A. To obtain approval to use unspecified equipment, Bidding Contractors (not equipment supplier, manufacturers, etc.) shall submit written requests to Design Professional at least 10 days prior to bid due date. Requests shall clearly describe the equipment for which approval is being requested. Include all data necessary to demonstrate that equipment's capacities, features and performance are equivalent to include a cost comparison between specified equipment and equipment for which approval is being requested. If the equipment is acceptable, Design Professional will approve it in an addenda. The Design Professional will, under no circumstances, be required to prove that an item proposed for substitution is or is not of equal quality to the specified item.
- B. Where substitutions are approved, Contractor assumes all responsibility for physical dimensions and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of the substitution.

1.16 APPROVED CONTRACTORS

- A. **MANUFACTURER CERTIFICATION:** Contractor shall be a manufacturer certified installer for the structured cabling plant. A copy of the current annual manufacturer certification shall be provided with 27 0010 submittals. Contractor is responsible for workmanship and installation practices in accordance with the manufacturer requirements and shall be authorized to provide an extended Manufacturer's Product Warranty with his installation. The specific warranty program that is acceptable for each solution is listed with the connectivity solution in specification section 27 1100 TELECOMMUNICATIONS SYSTEMS CABLING AND EQUIPMENT. Contractors shall provide proof upon request that they have maintained the Manufacturers Certification in good standing for at least six months prior to the overall project bid. Temporary or short term certifications (less than the standard 12 month annual certification described above) or case-by-case certifications are not acceptable.
- B. **CONTRACTOR CERTIFICATION:** Contractor shall meet one of the following two paragraphs and provide appropriate documentation in the 27 0010 submittals:
1. Contractor shall have BICSI Registered Installers and Technicians on staff and assign them to this project. The project shall be staffed at all times by Installers and Technicians who, in the role of lead craft-persons, will be able to provide leadership and technical resources for the remaining craft-persons on the project. A minimum of 30 percent of personnel shall be BICSI registered telecommunications installers. Of that number 15 percent shall be registered at the Technician Level, at least 40 percent shall be registered at the Installer Level 2, and the balance shall be registered at the Installer Level 1. Contractor shall provide BICSI certifications showing employee name, level, and expiration date. BICSI certificate for the highest level attained shall be submitted.
 2. Contractor shall have employees on staff and assigned to the project that are currently indentured in or have successfully completed the IBEW/NECA three-year Telecommunications Installer/Technician registered apprenticeship program. Contractor shall maintain a ratio of 1 Technician to 1 indentured Apprentice. Contractor shall provide documentation verifying the indentured status of Apprentices, and the Department of Labor Certificates of Completion for the Installer/Technicians.

- C. Contractor pulling the telecommunications cabling (if different from the prime Telecommunications Contractor) shall meet all the same BICSI or IBEW/NECA requirements, and requirements of this specification, as the prime Telecommunications Contractor.
- D. Contractor shall be located within 125 miles of the construction site to establish a potential two hour response time for ongoing customer needs after construction completion.

1.17 ACCEPTABLE MANUFACTURERS

- A. In most cases, equipment specifications are based on a specific manufacturer's type, style, dimensional data, catalog number, etc. Listed with the base specification, either in the manual or on the drawing schedules, are acceptable manufacturers approved to bid products of equal quality. These manufacturers are encouraged to submit to Design Professional at least 8 days prior to the bid due date drawings and catalog numbers of products to be bid as equals.
- B. Manufacturers, who do not submit prior to bidding, run the risk of having the product rejected at time of shop drawing submittal. Extra costs associated with replacing the rejected product shall be the responsibility of Contractor and/or the manufacturer.
- C. If Contractor chooses to use a manufacturer listed as an equal, it shall be his responsibility to assure that the manufacturer has complied with the requirements in 'A' above. Contractor shall assume all responsibility for physical dimensions, operating characteristics, and all other resulting changes. This responsibility extends to cover all extra work necessitated by other trades as a result of using the alternate manufacturer.
- D. Where a model or catalog number is provided, it may not be inclusive of all product requirements. Refer to additional requirements provided on the plans or in the specifications as required. Similarly, there may be additional requirements included in the model or catalog number that are not specifically stated. These requirements shall also be met.

1.18 QUALITY ASSURANCE

- A. Contractor shall be a company specializing in telecommunication cable and/or accessories with a minimum of five years documented experience in installation of cable and/or accessories similar to those specified below.

1.19 WARRANTY AND SERVICES

- A. The entire telecommunications system including all sub-systems shall be guaranteed against defect in materials and installation for a minimum of one year. Any malfunctions which occur within the guarantee period shall be promptly corrected without cost to Owner. This guarantee shall not limit or void any manufacturer's express or implied warranties.
- B. A Manufacturer Product Warranty shall be provided which warrants functionality of all components used in the system for 20 years from the date of registration. The Manufacturers Product Warranty shall warrant the installed horizontal and/or backbone copper, and both the horizontal and the backbone optical fiber portions of the cabling system.
- C. Continuing Maintenance: The contractor shall furnish an hourly rate with the proposal submittal, which shall be valid for a period of one year from the date of acceptance. This rate will be used when cabling support is required to affect moves, adds, and changes to the system (MACs). MACs performed by an approved Contractor shall be added to the warranty.

- D. Final Acceptance & System Certification: Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate registering the installation.

1.20 CHANGES IN THE WORK

- A. A Contract Change Order is a written order to Contractor signed by Owner and Contractor, issued after the execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Contract Change Order.
- B. Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, with the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Contract Change Order and shall be performed under the applicable conditions of the Contract Documents.
- C. The cost or credit to Owner resulting from a change in the Work shall be determined by mutual acceptance of a lump sum properly itemized and supported by sufficient substantial data to permit evaluation. Change Orders shall be submitted with each item listed individually with a material cost and labor unit extension. Overhead and profit, as mutually agreed upon between Owner and Contractor shall be added to material and labor cost figures.
- D. It shall be the responsibility of Contractor before proceeding with any change to satisfy himself that the change has been properly authorized on behalf of Owner.

1.21 GROUNDING AND BONDING OF SYSTEMS

- A. All low voltage systems shall be subject to the Telecommunications Grounding and Bonding specification section 27 10 00. For those systems which may require a specialized sub-contractor, the sub-contractor providing and installing systems shall also be responsible for grounding and bonding per this specification.

1.22 COMPLETION

- A. Systems, at time of completion, shall be complete, efficiently operating, non-hazardous and ready for normal use by Owner.
- B. When all the work is complete Contractor shall thoroughly clean all material and equipment installed as a part of this contract and leave all equipment and material in new condition.
- C. Contractor shall clean up and remove from the site all debris, excess material and equipment left during the progress of this contract at job completion.

END OF SECTION 27 0010

SECTION 27 1100 - TELECOMMUNICATIONS CABLING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 - Procurement and Contracting Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this structured cabling system in compliance with the specifications and drawings. Contractor will provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.

1.03 SUBMITTALS

- A. Manufacturer and Contractor Certifications are required submittals in the division 27 General Provisions specifications section. The Manufacturer Certification is based on the material information listed below in the Acceptable Manufacturers paragraph.
- B. Submittal data for cabling and components shall consist of catalog cuts showing technical data necessary to evaluate the materials.

1.04 WORK BY OTHERS

- A. In general, the following is provided or is of note:
1. Electrical Contractor will provide field device back boxes and conduit paths for use by the Telecom or other division 27 Contractor.
 2. The project painter may not be aware that ANY paint overspray (or direct application) of paint of any type (latex, oil based and ALL other paint types) to the UTP (unshielded twisted pair, generally called data cabling) voids the manufacturer's warranty and violates this specification. Paint may not be chemically or physically removed in any way once applied to the data cabling. Any cabling with paint overspray shall be fully replaced (no splicing therefore the entire run).

1.05 FIRESTOPPING

- A. Contractor shall be responsible for fire stopping all conduit sleeves (internally only) and cable tray where required to maintain integrity of fire and/or smoke walls. The Contractor shall review architectural drawings to determine which walls have a fire and/or smoke rating. Any rating other than "non-rated" shall constitute a wall that requires fire stopping in all penetrations/openings.
- B. Acceptable Manufacturers:
1. Specified Technologies Inc. Series SSP Putty.

PART 2 - PRODUCTS

2.01 COPPER UTP CABLE AND CONNECTIVITY PRODUCTS

- A. Cabling and connectivity products (devices, cover plates, patch panels, insulation displacement connectors, etc.) must be part of a matched solution, provided by manufacturers that have been tested together and provide a fully certified end to end system.
- B. Acceptable Manufacturers:
1. CommScope Systimax Cat6 UTP connectivity (angled, modular patch panels) w/ CommScope Systimax GigaSPEED XL Cat6 cable, with Systimax 20 year product and performance warranty.
- C. Cable Jacket Rating:
1. Plenum
- D. Additional Cabling and Connectivity Requirements:
1. Furnish and install cable between telecommunications room and field device locations as noted on the drawings.
 2. Each field jack shall have a dedicated cable.
 3. Provide cable terminations at telecommunications room.
 4. Provide terminations at all field locations with an 8 pin, 8 conductor (RJ45 type) modular jack and flush wall plate per drawings.
 5. Terminate using T568B wiring schematic unless noted otherwise.
 6. Provide thermoplastic wall faceplates from the same connectivity manufacturer per location requirements for all field devices. Faceplate shall match electrical receptacle faceplates (if stainless steel, then match with stainless steel, if thermoplastic, then match with same color thermoplastic). Verify color/material before submittal time with Design Professional and include faceplate color/material choice in submittals.
 7. Removable snap on colored icons shall be used to distinguish jacks meant for voice service and data service. For thermoplastic faceplate projects, all jacks shall be the same color as the thermoplastic faceplate unless specifically instructed otherwise (ask Design Professional about jack color for stainless steel faceplate projects – all jacks shall be the same color [only one color] unless specifically instructed otherwise by the Design Professional). Provide at least 100 extra snap-on voice icons and at least 100 extra snap-on data icons to Owner. Contractor shall ask the Owner what two colors they want for voice and data icons respectively.
 8. Configure faceplates as required for individual field locations per drawings.
 9. Blanks shall be installed in all empty jack locations.
 10. Provide terminations onto insulation displacement connectors for high pair count copper cables.
 11. All patch panels shall be high density 48 port in 1RU (One EIA rack unit (1RU) = 1.75"). If last patch panel used has more than 50% of its ports used, provide a new patch panel for future use.
 12. If multiple floors are being fed from one telecom room, the Contractor shall provide patch panels for each floor (do not continue from one floor to another on the same patch panel). Each floors patch panels shall be separated in the rack such that each floor may be expanded by 20% by putting the new patch panels in the original line up).

2.02 CABLE TELEVISION (CATV) CABLING AND AMPLIFICATION

- A. Provide and install CATV trunk and distribution cables, taps and/or splitters, amplifiers (if needed) and field devices as noted on plans.

B. Acceptable Manufacturers:

1. CommScope 2275V (or General Cable equivalent), RG6 Plenum.
2. CommScope 2285K (or General Cable equivalent), RG11 Plenum.

C. Additional Requirements:

1. Provide and install Ideal or Thomas and Betts longitudinal compression style F connectors at all field locations.
2. Provide and install Ideal or Thomas and Betts longitudinal compression style F connectors at the source end of the coaxial cabling (telecom room or distributed tap locations).
3. Provide and install Blonder Tongue active amplifier(s) as needed to keep signal level within mandated range (see below).
4. CATV signal strength at each television/tuner location shall be +7dB, plus or minus 3dB.
5. All CATV drops over 200' in length shall be Series 11 coaxial cable.

PART 3 - EXECUTION

3.01 UTP NO-PAINT WRITTEN NOTIFICATION REQUIREMENT

- A. Many painters do not know that paint overspray of any quantity on voice/data UTP cabling (called UTP from here on) voids the manufacturer's extended warranty required by the specification. The Telecom Contractor shall notify the General Contractor in writing that the UTP cannot be painted (not even the slightest bit of overspray) and inform him or her that mechanical or chemical removal of paint is not allowed but rather full replacement of any cable that has received any amount of paint or paint overspray shall be fully replaced (no splicing allowed). This notification shall occur at least 30 days prior to any UTP being installed in the facility or brought on-site for storage.

3.02 INSTALLATION AND LABELING

- A. Install telecommunication systems cables and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
1. In general, all interior cables are installed in conduit.
 2. D rings are allowed in telecommunications room as needed.
 3. Contractor shall use hook and loop type fasteners on all UTP telecommunications cable. Tie wraps may be temporarily used loosely for dressing UTP cables during installation if they are removed before final inspection. Any tie wrap found in place around UTP cable tight enough that a 0.5" wooden dowel cannot be inserted into the bundle at the tie wrap location shall therefore obligate the Contractor to replace those potentially damaged UTP cables at the Design Professionals discretion, whether they pass electronic testing or not.
 4. Tie wraps may be used carefully on OSP and armored cabling at light tension levels which do not result in any visible cable jacket deformation.
 5. If unarmored fiber is specified without innerduct for any reason, tie wraps are forbidden on that cabling.
 6. Any and all tie wraps used in the project shall be trimmed flush at the locking device using a fully flush cutter tool for safety. Any tie wrap found with a sharp point shall be removed by the Contractor and replaced without additional compensation.

- B. Identify all fiber, copper, and coaxial cables that terminate in the telecommunication room as to field location.
1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic-coated type, or write-on type with transparent plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
 2. Contractor shall not distinguish between UTP that is initially intended for voice or data use. The structured cabling plant is designed to be flexible and shall be numbered sequentially throughout the building. Room numbers shall be used in the numbering scheme. Entering the main door or entrance of each room move around the room starting to the left in a clockwise direction numbering the ports in that sequentially. Any Ceiling mounted data devices in a room should be the last ports identified in the room. Example: Level 1, Room 100 the first port to the left entering the room would be 100-1, the second port would be 100-2. Number all ports in a single faceplate before moving onto the next faceplate.
 3. All field device labeling shall match the telecom room labeling for the corresponding cable.
 4. Jacks shall be numbered sequentially on the patch panel field, beginning at the top left, working across the row to the right, then down to the next row, etc. This will require Contractor to plan the installation and terminate sequentially on both ends through the building rather than terminate randomly which results in confusion for Owner.
 5. When transitioning from one floor to another on a multi-floor installation served out of one telecom room (or a multi-floor section of a larger building), the patch panel at the end of the installation for a particular floor shall have at least 12 open jacks/slots for future growth on that floor. Also, a new patch panel shall always be started for each new floor. This means if a particular floor has 25 jacks (using 24 port patch panels), the Contractor shall leave the second patch panel with 23 openings and start a fresh patch panel for the next floor.
- C. After completion, all cables shall be tested in accordance with the division 27 Testing and Documentation section.
1. Contractor shall provide all instruments for testing the cables.
 2. Contractor shall demonstrate in the presence of Owner's representative that the telecommunications system is complete and operational.
 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and posted in each Telecom Room within 3 days.
1. Two hard copies shall be created for each Telecom Room detailing the entire structured cabling plant and labeling scheme after installation. One hard copy shall consist of (at a minimum) the Telecom plans marked with permanent ink to show the labeling used at each field location, and a table or spreadsheet (for example, an 8 ½" x 11" printed Excel file) that lists all the patch panel jacks in a column sequentially, followed by a cross reference column identifying the room name/number that the corresponding jack is in. This is the only part of the labeling process in which room name/numbers are acceptable. The second hard copy shall be identical to the first one. One copy shall be posted in each corresponding Telecom Room, and the other copy shall be submitted to the Design Professional for review according to the submittal process identified in the shop drawing paragraph of Specification Section 27 0010. This second copy will then be forwarded to Owner.

END OF SECTION 27 1100

SECTION 27 1200 - TELECOMMUNICATIONS TESTING AND DOCUMENTATION

PART 1 - GENERAL

1.01 PURPOSE

- A. The purpose of the testing is to ensure proper installation of the telecommunications cabling system.

1.02 SUBMITTALS

- A. Submit product data under provisions of Division 1.
- B. Submit product data for the following:
 - 1. Hand-held testing equipment manufacturer, model, last calibration date/calibration due date and software version.
 - 2. Injector equipment manufacturer, model, and software version.

1.03 REFERENCES

- A. The following Performance Standards shall be followed. Unless otherwise stated, where Performance Standards conflict with manufacturer's recommendations, the more restrictive shall be applied:
 - 1. TIA-526-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
 - 2. TIA-526-14 Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant
 - 3. TIA-568-C.0 Generic Telecommunications Cabling For Customer Premises
 - 4. TIA-568-C.1 Commercial Building Telecommunications Cabling Standard
 - 5. TIA-568-C.2 Balanced Twisted-Pair Telecommunications Cabling and Components Standards
 - 6. TIA-568-C.3 Optical Fiber Cabling Components Standard
 - 7. TIA-568-C.4 Broadband Coaxial Cabling and Components Standard

1.04 TEST EQUIPMENT

- A. Test Equipment: JDSU Certifier40G, Fluke DSX-5000, Fluke DTX-1800 or TIA & Connectivity Manufacturer approved Level IV (or better) Certifier.
- B. The software version for the testers shall be the latest version available.
- C. The tester must have been calibrated within the last 12 months with calibration date noted on all test results.

1.05 LINK DEFINITION FOR THE PROJECT

- A. A link consists of up to 90 meters (295 feet) of horizontal cabling, a connection at each end, up to 2 meters of test equipment lead from the main unit of the hand-held tester to the local connection, and up to 2 meters of test equipment lead from the remote unit to the remote connection. A total length of up to 94 meters (308 feet).
- B. The connection to the equipment at each end of the link is not included in the link definition.

1.06 CHANNEL DEFINITION FOR THE PROJECT

- A. A channel consists of up to 90 meters (295 feet) of horizontal cabling, a connection at each end, up to 7 meters for the cross-connect and equipment cable, and up to 3 meters for the work area equipment cable. A total length of up to 100 meters (328 feet).
- B. The connection to equipment at each end of the channel is not included in the channel definition.

PART 2 - COPPER CABLING ACCEPTANCE TESTING

2.01 ACCEPTANCE TESTS

- A. The following field acceptance tests shall be performed for twisted - pair cabling:
 - 1. Wire Map (continuity).
 - 2. Length.
 - 3. Attenuation.
 - 4. NEXT.
 - 5. ACR-F
 - 6. Delay and delay skew.
 - 7. Return loss.
 - 8. Power sum crosstalk (PSNEXT and PSACR-F).

2.02 TEST EQUIPMENT SET-UP AND TEST PARAMETERS

- A. Auto test: Use the Auto tests to perform the required tests. Customize the Auto test as necessary to satisfy testing requirements and parameters.
- B. Cable Type: Select the cable type being tested. Cable Type may vary. Always change the NVP for the type of cable being tested.
- C. Frequency Range: The frequency range for category 6 tests shall be 1 MHz to 250 MHz.
- D. Cable Pairs: Test all cable pairs. Select all pairs for TEST and all pairs for Pass/Fail criteria for Auto test.
- E. Length Units: Cable length test results shall be in feet.
- F. Date Style: The date style shall show month, day, and year. Date shall be the date the test is conducted.
- G. Language: The language shall be English.

2.03 TEST PROCEDURE

- A. Testing shall be performed with the tester at the distribution frame and the remote unit at the Work Area Outlet.
- B. A Channel OR Permanent Link certification test will be performed as outlined in the specific job description.
- C. Test leads and test hardware have limited life-cycles. Inspect and replace the test leads as necessary.
- D. Use only test leads specified by the test equipment manufacturer.

- E. Strictly follow the test equipment manufacturer's instructions for equipment setup, initialization, and calibration.

END OF SECTION 27 1200

SECTION 27 4000.01 - AUDIOVISUAL SYSTEM – ACTIVITY ROOM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system in compliance with the specifications and drawings to Activity Room 1146. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- B. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph *1.06 ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout, as well as pdf screen-shots of the proposed touchpanel GUI pages and subpages.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor. In general, the following is provided:
 - 1. Electrical Contractor will make 120VAC connections for the motorized screen and switch (if applicable).

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.
- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- F. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- G. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 VIDEO PROJECTOR

- A. Video Projectors shall consist of the LCD projectors and their associated mounting.
- B. Video Projectors shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Video Projector Requirements:
 - 1. Mount projector in a manner that allows symmetrical projection to screen surface; no use of keystone correction.
 - 2. Configure projector's HDBaseT input to accommodate Crestron DM signaling.
 - 3. Calibrate projector in a manner consistent with ANSI/InfoComm standard 3M-2011, *Projected System Contrast Ratio*.

2.02 VIDEO SWITCHING AND CONNECTIVITY

- A. Video Switching and Connectivity shall consist of switches and wall plate transmitters
- B. Video Switching and Connectivity shall be provided with all applicable accessories as a system.

- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Video Switching and Connectivity Requirements:
 - 1. Configure EDID management to accommodate the most frequently used resolutions, including but not limited to:
 - a. 480p
 - b. 640 x 480
 - c. 720p
 - d. 800 x 600
 - e. 1024 x 768
 - f. 1280 x 720
 - g. 1280 x 800
 - h. 1600 x 900
 - i. 1080i/1080p
 - j. 1900 x 1200
 - 2. Provide DC power as required to transmitter wall plates.

2.03 PROJECTION SCREENS

- A. Projection Screens shall be provided per plans and specifications.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Projection Screen Requirements:
 - 1. Internal electrical junction box.
 - 2. Internal low voltage controller.

2.04 AUDIO

- A. Audio shall consist of wireless microphone, audio output of video sources, mixers/DSP, amplifiers, and loudspeakers.
- B. Audio shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Audio Requirements:
 - 1. Configure gain structure and equalization in accordance with AVIXA A102.01:2017; *Audio Coverage Uniformity in Listener Areas*.
 - 2. Set wireless microphone frequencies to spaces not currently used by the facility for other wireless microphone systems.
 - 3. Set all input and output feeds to a fixed line level.
 - 4. Configure audio input of Blu-ray player to compress the dynamic range in a manner that emphasizes dialog over soundtrack audio.

2.05 VIDEO SOURCES

- A. Video Sources shall consist of the Blu-ray player and the CATV/ATSC tuner.
- B. Video Sources shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Video Source Requirements:
 - 1. Connect tuner to CATV service.

2.06 CONTROL SYSTEMS

- A. Control Systems shall consist of the touchpanel & associated graphical user interface (GUI), control system processor, and network switch
- B. Control Systems shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Control System Requirements:
 - 1. Network switch shall NOT be connected to the LAN, and the host connection shall be password protected. All unused switch ports shall be shutdown.
 - 2. Touchpanel controls and GUI layout shall be in accordance with Infocomm Dashboard for Controls design reference. In general, the following functions should be available, plus any functionality requested by the Owner during submittal review of screenshots-
 - a. Projector powers on.
 - b. Projector screen lowers to position.
 - c. Program audio is unmuted.
 - i. Audio System always shall pass the microphone to the loudspeakers and Assistive Listening system, regardless if the remaining AV system is used.
 - d. Page flip to source selection.
 - i. Blu-ray transport controls when that source is selected.
 - ii. Preset channel selections of children-oriented CATV channels
 - 1) See Ankeny CATV service channel lineup for such channels.
 - e. Volume control of program sources.
 - i. Microphone levels shall not be adjustable.
 - f. AV Mute toggle of source video and audio.
 - g. A shutdown, with confirmation page, to mute program volume, power down the projector, raise the screen, and page flip to a startup screen.

2.07 ASSISTIVE LISTENING

- A. Assistive Listening shall be provided per plans and specifications.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule

C. Additional Assistive Listening Requirements:

1. Assistive listening shall be fully functional regardless as to whether the remaining AV system is in use.
2. Provide 4 bodypack/headphone bundles and 2 neckloops for system.
3. Transmit signal on a frequency that does not interfere with the Assistive Listening in the Council Chambers.

2.08 AUDIOVISUAL RACK

- A. Audiovisual Rack shall consist of the equipment rack, blank panels, vented panels, fan panels, and associated rack power
- B. Audiovisual Rack shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
1. Provide per Audiovisual Schedule
- D. Additional Audiovisual Rack Requirements:
1. Provide all cable management accessories to make a complete system; i.e. lacer bars, lacer panels, and hardware & fasteners.
 2. Assemble rack in compliance with AVIXA F502.01:2018 standard *Rack Building for Audiovisual Systems*.

2.09 CABLING FOR AUDIO AND VIDEO

- A. All cabling for audio and video devices shall be furnished and installed by the Audiovisual System Contractor as required for a complete and operational system. Special cable assemblies shall be furnished and installed as specified on the plans, but all bulk cabling (speaker wire, field terminated "back of rack" cabling, shielded microphone cable, etc.) shall be furnished as listed below.
- B. Acceptable Manufacturers:
1. For pre-assembled cable assemblies or specialty cabling items, furnish as specified on plans.
 2. For all bulk cabling, furnish Belden cabling.
- C. Additional Cabling Requirements:
1. Use plenum rated cabling when required for HVAC system in the space, or when directly specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
 - 1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.
 - 2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
- B. Identify all audiovisual cables as to field location.
 - 1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
- C. After completion, all cables shall be thoroughly tested.
 - 1. Contractor shall provide all instruments for testing the cables.
 - 2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
 - 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.
 - 1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

- A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.01

SECTION 27 4000.02 - AUDIOVISUAL SYSTEM - SIGNAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system to the following areas in compliance with the specifications and drawings:
1. Lobby 1001 digital sign near Stair 1.
 2. Break Room 2131 television viewing.
- B. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- C. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph *1.06 ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor. In general, the following is provided:
1. Electrical Contractor will make 120VAC connections for the motorized screen and switch (if applicable).

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.
- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- F. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- G. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 DISPLAYS

- A. Displays shall consist of flat-panel LED displays and their associated mounting.
- B. Displays shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule.
- D. Additional Display Requirements:
 - 1. Install Owner-furnished digital signage player.
 - a. Provide digital interconnect for Owner player, coordinate the specific interconnect with the City of Ankeny Technology support.
 - 2. Connect displays to services as applicable.
 - a. CATV
 - b. Building network

3. Engage Public Display Mode for Lobby 1001 display.
4. Program Lobby 1001 display to power on at 7:00 AM and shut down at 11:00 PM
5. Provide Owner with TV remote for Break Room 2131.
6. Engage audio mode that enhances voice/dialog for Break Room 2131.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
 1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.
 2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
- B. Identify all audiovisual cables as to field location.
 1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
- C. After completion, all cables shall be thoroughly tested.
 1. Contractor shall provide all instruments for testing the cables.
 2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.
 1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

- A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.02

SECTION 27 4000.03 - AUDIOVISUAL SYSTEM – MEETING ROOMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system to Meeting Rooms 1, 2, and 3 in compliance with the specifications and drawings. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- B. Meeting Rooms are intended to be Divisible/Combinable. There shall be three modes of operation:
1. All Meeting Rooms combined into 1 space.
 2. Meeting Room 1 split out; Meeting Rooms 2 & 3 combined together.
 3. All Meeting Rooms separated out into 3 spaces.
- C. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph 1.06 *ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor. In general, the following is provided:
1. Electrical Contractor will make 120VAC connections for the motorized screen and switch (if applicable).

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.
- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor's control system programmer shall be a Crestron Certified Programmer.
- F. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- G. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- H. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 MOTORIZED PROJECTION SCREENS

- A. Motorized screens shall be provided with all applicable accessories as a system.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Motorized Screen Requirements:
 - 1. Connect to Control System
 - 2. Three button low voltage control switch.

2.02 VIDEO PROJECTORS

- A. Video Projectors shall be provided with all applicable accessories as a system.

B. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

C. Additional Video Projector Requirements:

1. Mount projector in a manner that allows symmetrical projection to screen surface; no use of keystone correction.
2. Configure projector's HDBaseT input to accommodate Crestron DM signaling.
3. Calibrate projector in a manner consistent with ANSI/InfoComm standard 3M-2011, *Projected System Contrast Ratio*.
4. Install Projectors to support structure above ceiling via Unistrut. Include mounting accessories to mitigate vibration.

2.04 VIDEO SWITCHING AND CONNECTIVITY

A. Video Switching and Connectivity shall consist of matrix switches, distribution amplifiers, and HDBaseT transmitters & receivers.

B. Video Switching and Connectivity shall be provided with all applicable accessories as a system.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Video Switching and Connectivity Requirements:

1. Configure EDID management to accommodate the most frequently used resolutions, including but not limited to:
 - a. 480p
 - b. 640 x 480
 - c. 720p
 - d. 800 x 600
 - e. 1024 x 768
 - f. 1280 x 720
 - g. 1280 x 800
 - h. 1600 x 900
 - i. 1080i/1080p
 - j. 1900 x 1200
2. Provide DC power as required to transmitter wall plates.
3. Video sources are meant to be divisible combinable. Video in their respective spaces shall be tied to the adjacent projector for divisible mode.
4. Wireless HDMI dongles are to only be used when rooms are split out between Room 3, and Rooms 1&2 combined.
5. Configure wireless receiver dongles to connect to Ankeny public SSID, and label devices as room name and number.

2.01 AUDIO

A. Audio shall consist of wired and wireless microphones, audio output of video sources, RF distribution amplifiers, mixers/DSP, amplifiers, and loudspeakers.

B. Audio shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Audio Requirements:

1. Configure gain structure and equalization in accordance with AVIXA A102.01:2017; *Audio Coverage Uniformity in Listener Areas*.
2. Audio for sources is intended to be used in a manner that mimics video for divisible/combinable modes.
3. Set wireless microphone frequencies to spaces not currently used by the facility for other wireless microphone systems.
4. Configure audio outputs to ALT-1 as a fixed line level, regardless of volume of sound system.
5. Microphones and assistive listening shall operate regardless of whether projection system is being utilized.
6. Assistive listening shall transmit only the audio intended for Meeting Room 3 (1515).
7. Wireless microphones are intended to be used in their own respective room during Divisible mode. All wireless microphones shall clearly be labeled for the area they are intended to be used.

2.02 CONTROL SYSTEM

A. Control System shall consist of the touchpanel & associated graphical user interfaces (GUI), control system processor, and network switch.

B. Control System shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Control System Requirements:

1. Network switch shall NOT be connected to the LAN, and the host connection shall be password protected. All unused switch ports shall be shutdown.
2. Network switch shall have a VLAN for control and a VLAN for AVB.
3. Touchpanel controls and GUI layout shall be in accordance with Infocomm Dashboard for Controls design reference.
 - a. GUI shall have, in general for each divisible space:
 - i. Projector power
 - 1) Projector screen on lowers to position.
 - 2) Program audio is unmuted.
 - a. Audio System always shall pass the microphone to the loudspeakers and Assistive Listening system, regardless if the remaining AV system is used.
 - 3) Source selection for Airtames or wall plates
 - a. Note this function shall only be shown when the divisible mode is split between Room 3, and Rooms 1 & 2 combined.
 - 4) Volume control of program source.
 - a. Microphone levels shall not be adjustable.
 - 5) AV Mute toggle of source video and audio.
 - 6) A shutdown, with confirmation page, to mute program volume, power down the projector, raise the screen, and page flip to a startup screen.

- b. No control shall be allowed over other rooms that have gone into Divisible mode.
- c. Users shall not be allowed to override a Divisible/Combinable mode once a user in one of the other spaces has selected a mode. Users may only select a mode that is left available to them.

2.03 ASSISTIVE LISTENING

- A. Assistive Listening shall be provided per plans and specifications.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Assistive Listening Requirements:
 - 1. Assistive Listening shall only transmit audio from Meeting Toom 3 (1515)
 - 2. Assistive listening shall be fully functional regardless as to whether the remaining AV system is in use.
 - 3. Provide 7 bodypack/headphone bundles and 2 neckloops for system.
 - 4. Transmit signal on a frequency that does not interfere with the Assistive Listening in the Activity Room or Meeting Rooms.

2.04 AUDIOVISUAL RACKS

- A. Audiovisual Rack shall consist of the equipment rack, blank panels, vented panels, fan panels, and associated rack power
- B. Audiovisual Rack shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Audiovisual Rack Requirements:
 - 1. Provide all cable management accessories to make a complete system; i.e. lacer bars, lacer panels, and hardware & fasteners.
 - 2. Assemble rack in compliance with AVIXA F502.01:2018 standard *Rack Building for Audiovisual Systems*.

2.03 CABLING FOR AUDIO AND VIDEO

- A. All cabling for audio and video devices shall be furnished and installed by the Audiovisual System Contractor as required for a complete and operational system. Special cable assemblies shall be furnished and installed as specified on the plans, but all bulk cabling (speaker wire, field terminated "back of rack" cabling, shielded microphone cable, etc.) shall be furnished as listed below.
- B. Acceptable Manufacturers:
 - 1. For pre-assembled cable assemblies or specialty cabling items, furnish as specified on plans.
 - 2. For all bulk cabling, furnish Belden cabling.

C. Additional Cabling Requirements:

1. Use plenum rated cabling when required for HVAC system in the space, or when directly specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.
 2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
- B. Identify all audiovisual cables as to field location.
1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
- C. After completion, all cables shall be thoroughly tested.
1. Contractor shall provide all instruments for testing the cables.
 2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.
1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

- A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.03

SECTION 27 4000.04 - AUDIOVISUAL SYSTEM – STUDY SPACES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system for Study Rooms 2133, 2134, 2154, 2161, Conference Rooms 2501, 2503, 2505, and Teens 2101 in compliance with the specifications and drawings. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- B. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph *1.06 ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor.

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.

- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- F. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- G. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 DISPLAYS

- A. Displays shall consist of flat-panel LED displays and their associated mounting.
- B. Displays shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Display Requirements:
 - 1. Place display in 'GAME' mode, or the settings that defeat extraneous video processing.
 - 2. Leave IR remote controls in their respective rooms for Owner use.

2.02 HDMI CONNECTIVITY

- A. HDMI Connectivity shall consist of HDMI wall plates and wireless HDMI receiver dongles.
- B. HDMI Connectivity shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule.
- D. Additional HDMI Connectivity Requirements:
 - 1. Provide a 10' HDMI interconnect for each HDMI User location.

2. Configure wireless receiver dongle to connect to Ankeny public SSID, and label device as room name and number.

2.03 CONTROL SYSTEM

- A. Control System shall consist of a wall-mounted keypad for Study 2161
- B. Control System shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 1. Provide per Audiovisual Schedule
- D. Additional Control System Requirements:
 1. Provide functional programming and appropriate labeling and button feedback for the following:
 - a. Power On
 - b. Power Off
 - c. Source selection between wall plate and wireless receiver.
 - d. Display volume Up/Down

2.04 CABLING FOR AUDIO AND VIDEO

- A. All cabling for audio and video devices shall be furnished and installed by the Audiovisual System Contractor as required for a complete and operational system. Special cable assemblies shall be furnished and installed as specified on the plans, but all bulk cabling (speaker wire, field terminated "back of rack" cabling, shielded microphone cable, etc.) shall be furnished as listed below.
- B. Acceptable Manufacturers:
 1. For pre-assembled cable assemblies or specialty cabling items, furnish as specified on plans.
 2. For all bulk cabling, furnish Belden cabling.
- C. Additional Cabling Requirements:
 1. Use plenum rated cabling when required for HVAC system in the space, or when directly specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
 1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.

2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
- B. Identify all audiovisual cables as to field location.
1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
- C. After completion, all cables shall be thoroughly tested.
1. Contractor shall provide all instruments for testing the cables.
 2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.
1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

- A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.04

SECTION 27 4000.05 - AUDIOVISUAL SYSTEM – CONFERENCE ROOMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system in Conference Rooms 2141, 2508, and 2519 in compliance with the specifications and drawings. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- B. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph *1.06 ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor. In general, the following is provided:
 - 1. Electrical Contractor will make 120VAC connections for the motorized screen and switch (if applicable).

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.
- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- F. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- G. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 DISPLAYS

- A. Displays shall consist of flat-panel LED displays and their associated mounting.
- B. Displays shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Display Requirements:
 - 1. Place display in 'GAME' mode, or the settings that defeat extraneous video processing.
 - 2. Leave IR remote controls in their respective rooms for Owner use.

2.02 HDMI CONNECTIVITY

- A. HDMI Connectivity shall consist of HDMI wall plates, HDMI-over-twisted pair transmitter/receiver sets, and wireless HDMI receiver dongles.
- B. HDMI Connectivity shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule.

D. Additional HDMI Connectivity Requirements:

1. Provide a 10' HDMI interconnect for each HDMI User location.
2. Configure wireless receiver dongle to connect to Ankeny public SSID, and label device as room name and number.

2.03 CONTROL SYSTEM

A. Control System shall consist of a wall-mounted keypad.

B. Control System shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Control System Requirements:

1. Provide functional programming and appropriate labeling and button feedback for the following:
 - a. Power On
 - b. Power Off
 - c. Source selection between wall plate and wireless receiver.
 - d. Display volume Up/Down

2.04 AUDIO

A. Audio shall consist amplifiers, loudspeakers, and powered soundbars.

B. Audio shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Audio Requirements:

1. Audio from display shall be variable line level, with volume adjustments made to the Display via the Control System.

2.05 CABLING FOR AUDIO AND VIDEO

A. All cabling for audio and video devices shall be furnished and installed by the Audiovisual System Contractor as required for a complete and operational system. Special cable assemblies shall be furnished and installed as specified on the plans, but all bulk cabling (speaker wire, field terminated "back of rack" cabling, shielded microphone cable, etc.) shall be furnished as listed below.

B. Acceptable Manufacturers:

1. For pre-assembled cable assemblies or specialty cabling items, furnish as specified on plans.
2. For all bulk cabling, furnish Belden cabling.

C. Additional Cabling Requirements:

1. Use plenum rated cabling when required for HVAC system in the space, or when directly specified.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.

1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.
2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.

B. Identify all audiovisual cables as to field location.

1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.

C. After completion, all cables shall be thoroughly tested.

1. Contractor shall provide all instruments for testing the cables.
2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
3. Contractor shall complete and submit the Certificate of System Demonstration.

D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.

1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.05

SECTION 27 4000.06 - AUDIOVISUAL SYSTEM – COUNCIL CHAMBERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The requirements of Division 00 – Procurement, Contracting and Warranty Requirements, Division 01 - General Requirements and Section 27 0010 – Telecommunications General Provisions are applicable to work required of this section.

1.02 DESCRIPTION OF WORK

- A. The work included under this specification consists of the Audiovisual Contractor furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this audiovisual system for Council Chambers 2518 in compliance with the specifications and drawings. The Audiovisual Contractor shall provide and install all of the required material to form a complete system whether specifically addressed in the technical specifications or not.
- B. It is not acceptable for any portion of this scope of work (whether cable or material acquisition, or any labor to install said cable or materials) to be performed by the Electrical Contractor or any other contractor other than the acceptable bidder selected from the requirements in paragraph *1.06 ACCEPTABLE AUDIOVISUAL CONTRACTORS* below who have demonstrated the necessary technical and professional capabilities for the work required.

1.03 SUBMITTALS

- A. Submittal data for audiovisual cabling and components shall consist of catalog product sheets showing technical data necessary to evaluate the materials and also one line diagrams showing the intended signal flow throughout.

1.04 EQUIPMENT OBSOLESCENCE AND MANUFACTURER REPLACEMENTS

- A. Electronic equipment of all types (audiovisual included) is a fast paced industry with ever changing technology. Products are often specified by manufacturer and model number but can become obsolete during extended construction timeframes. The Audiovisual Contractor shall be responsible for providing either the equipment specified or the manufacturer approved replacement for the specified item (despite potential price increases or decreases). Submittals for replacement items shall be submitted through channels as soon as possible after the item is discovered. The Audiovisual Contractor shall plan accordingly as cost adding change orders for equipment obsolescence items will not be approved.

1.05 WORK BY OTHERS

- A. Unless noted otherwise, the building's Electrical Contractor will provide field device backboxes, and conduit paths for use by Contractor. In general, the following is provided:
 - 1. Electrical Contractor will make 120VAC connections for the motorized screen and switch (if applicable).

1.06 FIRESTOPPING

- A. Contractor shall be responsible for firestopping all conduit sleeves and cable tray where required to maintain integrity of fire walls. Contractor shall see architectural drawings for walls that require fire rating.

1.07 ACCEPTABLE AUDIOVISUAL CONTRACTORS

- A. The Contractor shall meet the minimum requirements identified herein.
- B. The Contractor's firm shall be an authorized sales and service center for all listed components, or for approved comparable product offerings in the specification.
- C. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, qualified, and certified by the respective original equipment manufacturers on the engineering, installation, operation, and testing of these systems.
- D. The Contractor's Audiovisual Technicians assigned to the systems shall be fully trained, certified, and carry valid and current industry certifications regarding the engineering. At least one (1) CTS shall be assigned to implement and complete the installation and configuration of the system.
- E. The Contractor shall provide formal written evidence of current industry and manufacturer certifications for the installers dedicated to this project as part of their submittal.
- F. The Contractor looking for a bid from the contractors listed above shall contact them as soon as possible to ensure they are aware of the project and have adequate time to prepare a bid. Two weeks should be considered a minimum.
- G. The contractor shall be one of the following:
 - 1. Mechdyne, Marshalltown, Iowa (641) 754-4649
 - 2. AVI Systems, Urbandale, Iowa (515) 254-9850
 - 3. SKC Communications, Winterset, Iowa (515) 604-8077
 - 4. Baker Electric, Des Moines, IA (515) 288-6774

PART 2 - PRODUCTS

2.01 MOTORIZED PROJECTION SCREENS

- A. Motorized screens shall be provided with all applicable accessories as a system.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Motorized Screen Requirements:
 - 1. Connect to Control System
 - 2. Three button low voltage control switch.

2.02 FIXED PROJECTION SCREENS

- A. Manual screens shall be provided with all applicable accessories as a system.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Fixed Screen Requirements:
 - 1. Field-verify opening in existing millwork to before procurement of screen.

2.03 VIDEO PROJECTORS

- A. Video Projectors shall consist of the projector and associated mounting.
- B. Video Projectors shall be provided per plans and specifications.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule.
- D. Additional Video Projector Requirements:
 - 1. Mount projector in a manner that allows symmetrical projection to screen surface; no use of keystone correction.
 - 2. Configure projector's HDBaseT input to accommodate Crestron DM signaling.
 - 3. Calibrate projector in a manner consistent with ANSI/InfoComm standard 3M-2011, *Projected System Contrast Ratio*.
 - 4. Install Projectors to support structure above ceiling via Unistrut. Include mounting accessories to mitigate vibration.

2.04 VIDEO SWITCHING AND CONNECTIVITY

- A. Video Switching and Connectivity shall consist of matrix switches, distribution amplifiers, HDBaseT transmitters and receivers, and confidence monitors.
- B. Video Switching and Connectivity shall be provided with all applicable accessories as a system.
- C. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- D. Additional Video Switching and Connectivity Requirements:
 - 1. Configure EDID management to accommodate the most frequently used resolutions, including but not limited to:
 - a. 480p
 - b. 640 x 480
 - c. 720p
 - d. 800 x 600
 - e. 1024 x 768
 - f. 1280 x 720
 - g. 1280 x 800
 - h. 1600 x 900
 - i. 1080i/1080p
 - j. 1900 x 1200
 - 2. Provide DC power as required to transmitter wall plates.
 - 3. Any content shown on the dais projector is mirrored onto the Council dais confidence monitors.

2.05 AUDIO

- A. Audio shall consist of wired and wireless microphones, audio output of video sources, solid-state audio recording, mixers/DSP, amplifiers, and loudspeakers.
- B. Audio shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Audio Requirements:

1. Configure gain structure and equalization in accordance with AVIXA A102.01:2017; *Audio Coverage Uniformity in Listener Areas*.
2. Set wireless microphone frequencies to spaces not currently used by the facility for other wireless microphone systems.
3. Configure audio outputs to REC-1 and ALT-1 as a fixed line level, regardless of volume of sound system.
4. Microphones and assistive listening shall operate regardless of whether projection system is being utilized.
5. Council dais microphones shall be configured to toggle ON/OFF.
6. Audio recorder shall capture audio from all microphones.

2.06 CONTROL SYSTEM

A. Control System shall consist of the touchpanel & associated graphical user interface (GUI), control system processor, and network switch.

B. Control System shall be provided per plans and specifications.

C. Acceptable Manufacturers:

1. Provide per Audiovisual Schedule

D. Additional Control System Requirements:

1. Network switch shall NOT be connected to the LAN, and the host connection shall be password protected. All unused switch ports shall be shutdown.
2. Network switch shall have a VLAN for control and a VLAN for AVB.
3. Touchpanel controls and GUI layout shall be in accordance with Infocomm Dashboard for Controls design reference. GUI's shall have 1 layout for the Lectern, and 1 layout for the two Clerk's stations.
 - a. Lectern GUI shall have, in general:
 - i. Projector power for projection on north wall.
 - 1) Projector screen on North wall lowers to position.
 - 2) Program audio is unmuted.
 - 1) Audio System always shall pass the microphone to the loudspeakers and Assistive Listening system, regardless if the remaining AV system is used.
 - 3) Page flip to source selection; selected source shall be mirrored to both projectors.
 - ii. Laptop or tablet device for lectern.
 - iii. Ceiling-mounted camera.
 - 1) Subpage for pan & zoom of camera
 - 2) Volume control of program sources.
 - 1) Microphone levels shall not be adjustable.
 - 3) AV Mute toggle of source video and audio.
 - 4) A shutdown, with confirmation page, to mute program volume, power down the projector, raise the screen, and page flip to a startup screen.

- b. The GUI for both Clerk touchpanels shall have, in general:
 - i. Projector power for main projector above dais.
 - 1) Program audio is unmuted.
 - 2) Audio System always shall pass the microphone to the loudspeakers and Assistive Listening system, regardless if the remaining AV system is used.
 - ii. Page flip to source selection, which is mirrored to both projectors:
 - 1) Lectern source
 - 2) Clerks' computers
 - 3) Council members' computers
 - iii. Projector power for projection/screen on north wall.
 - iv. Volume control of program sources.
 - 1) Microphone levels shall not be adjustable.
 - v. Audio recorder transport controls subpage.
 - vi. AV Mute toggle of source video and audio.
 - vii. AV Mute of lectern content.
 - viii. Audio mute of lectern microphone.
 - ix. A shutdown, with confirmation page, to mute program volume, power down the projector, raise the screen, and page flip to a startup screen.
 - x. Touchpanel status/feedback shall mirror the other Clerk touchpanel.
 - xi. Touchpanel source selection made by either Clerk touchpanel shall override selections made by the Lectern location.

2.07 VOTING SYSTEM

- A. Voting System shall be provided per plans and specifications.
- B. Acceptable Manufacturers:
 - 1. Provide per Audiovisual Schedule
- C. Additional Voting System Requirements:
 - 1. Voting system receiver shall be installed on one of the Clerk computers. Coordinate with the city of Ankeny on which computer it is installed to.
 - 2. Voting system software shall be installed onto both Clerk computers.
 - 3. Software shall be initially setup to provide functionality for the following:
 - a. Roll call/attendance: members key in they're presence and results are recorded.
 - b. Voting: Clerks create the issue and Council members may vote for, against, or abstain
 - 4. Allow voting period to remain open for 30 seconds, with unlimited changes by council members up until that window closes.
 - 5. Confirmation on the voting transmitters of most recent selected.

2.08 CABLING FOR AUDIO AND VIDEO

- A. All cabling for audio and video devices shall be furnished and installed by the Audiovisual System Contractor as required for a complete and operational system. Special cable assemblies shall be furnished and installed as specified on the plans, but all bulk cabling (speaker wire, field terminated "back of rack" cabling, shielded microphone cable, etc.) shall be furnished as listed below.
- B. Acceptable Manufacturers:
 - 1. For pre-assembled cable assemblies or specialty cabling items, furnish as specified on plans.

2. For all bulk cabling, furnish Belden cabling.
- C. Additional Cabling Requirements:
1. Use plenum rated cabling when required for HVAC system in the space, or when directly specified.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install audiovisual systems cables, equipment, and auxiliary materials as indicated in accordance with manufacturer's written instructions, and recognized industry practices.
1. Hook and loop type fasteners are preferred on all audiovisual cable. Tie wraps are acceptable if the Contractor uses them in a way that does not damage the cable (do not over-tighten), plus uses flush cut dikes (side cutters) to trim all tie wrap tails off flush with the connector body. Regular dikes or other cutters are not acceptable and pose a danger to all who may come in contact with the improperly trimmed tie wraps. Failure to follow this safety requirement (or the proper installation requirement regarding damage to cables) shall result in the Contractor removing all tie wraps and replacing them with hook and loop type fasteners. The Contractor shall be responsible for replacing any cable that does not perform properly and/or is damaged due to improper use of tie wraps.
 2. Contractor shall use provided raceways or Contractor install J-hooks for all cabling. No fastening cabling to conduits, piping, equipment, or anything other than Contractor installed J-hooks.
- B. Identify all audiovisual cables as to field location.
1. Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either pre-numbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show cable identification. Install within 6" of cable end.
- C. After completion, all cables shall be thoroughly tested.
1. Contractor shall provide all instruments for testing the cables.
 2. Contractor shall demonstrate in the presence of Owner's representative that the audiovisual system is complete and operational.
 3. Contractor shall complete and submit the Certificate of System Demonstration.
- D. After completion, comprehensive As-Builts will be created and provided to Owner within 3 days.
1. Two hard copies shall be provided to Owner detailing the entire audiovisual system after installation. Each field position shall be labeled and cross referenced to the appropriate head end position for ease of troubleshooting.

3.02 COMMISSIONING

- A. The Contractor shall coordinate a date/time with the Engineer after the system is fully operational, but before final payment, for the Contractor to provide a full system demonstration. This shall include all aspects of system operation that the user might encounter.

END OF SECTION 27 4000.06