

**CONSTRUCTION DOCUMENT SPECIFICATION
for the
WASHINGTON COUNTY
PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM**

PUR-1500

Crabtree, Rohrbaugh & Associates Project No. 3089

for the

**BOARD OF COUNTY COMMISSIONERS
OF WASHINGTON COUNTY, MARYLAND**

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May 10, 2021

**Prepared by:
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DIRECTORY

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DIRECTORY

OWNER

BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY

Washington County Administration Complex
100 West Washington Street, Suite 1101
Hagerstown, Maryland 21740
Phone: 240-313-2204
Fax: 240-313-2201

Contact: Krista L. Hart, County Clerk

DIVISION OF ENGINEERING

80 West Baltimore Street
Hagerstown, Maryland 21740
Director: Scott Hobbs, P.E.
Phone: 240-313-2407
Fax: 240-313-2251

Project Manager: Brennan Garrett
Phone: 240-313-2474
Fax: 240-313-2401

ARCHITECT OF RECORD

CRABTREE, ROHRBAUGH & ASSOCIATES - ARCHITECTS

401 East Winding Hill Road
Mechanicsburg, Pennsylvania 17055
Phone: 717-458-0272
Fax: 717-458-0047

Contact: John Pryor, R.A.

CIVIL ENGINEER & LANDSCAPE ARCHITECT

KCI TECHNOLOGIES

11830 West Market Place, Suite F
Fulton, MD 20759
Phone: 410-792-8086
Fax: 410-792-7419

Contact: Bryan Aloï, P.E.

STRUCTURAL ENGINEER

ADTEK ENGINEERS, INC.

150 South East Street, Suite 201
Frederick, Maryland 21701
Phone: 301-360-4268
Fax: 301-662-7484

Contact: Jeff Teagarden, P.E.

MECHANICAL/ELECTRICAL ENGINEER

BARRY ISSET & ASSOCIATES, INC.

85 South Route 100

Allentown, PA 18106

Phone: 484-866-4864

Fax: 610-481-9098

Contact: Lucy Paretti, P.E.

TECHNOLOGY ENGINEER

WRIGHT ENGINEERING, LLC

853 Ripple Stream Court

Joppa, MD 21805-1201

Phone: 410-877-6297

Fax: 866-635-0374

Contact: Jim Wright, P.E.

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SECTION 00 20 00
INVITATION TO BIDDERS

Invitation to Bid

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Public Safety Training Center Audiovisual System

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PURCHASING DEPARTMENT
DIVISION OF BUDGET & FINANCE

PUR-1500
INVITATION TO BID

The Board of County Commissioners of Washington County, Maryland, (hereinafter the "Owner") will accept sealed bids for the **Washington County PSTC Audiovisual System in Sharpsburg, Maryland**. Bids must be enclosed in a sealed opaque envelope marked "**SEALED BID – (PUR-1500) WASHINGTON COUNTY PSTC AUDIOVISUAL SYSTEM**" to be received and time-stamped in the **Washington County Purchasing Department, Washington County Administration Complex, 100 West Washington Street, Third Floor, Suite 3200, Hagerstown, MD 21740**, until no later than **2:00 P.M. (EDT/EST) on Wednesday, June 9, 2021**. All interested parties are invited to hear a reading of the bids. Those bidders who wish to hear a reading of the bids shall call 240-313-2330 to receive instructions prior to the bid opening. Bids received after this time will be returned unopened.

NOTE: Washington County Government has limited access to the Washington County Administration Complex at 100 West Washington Street, Hagerstown, Maryland until further notice. All Bidders shall allow ample time for delivery of their bid packets. Delivery of bid packets via-courier service or United States Postal Service (USPS) will be accepted. Those bidders who wish to deliver their bid packet in person will need to call 240-313- 2330 to receive instruction for dropping off their bid packet.

To obtain the Bid documents from the Washington County website, go to: www.washco-md.net and access "**Services/Bids-Purchasing/Open Bid Invitations**". When accessing the Bid documents from the Washington County website, please enter accurate contact information on the Solicitation Registration Form. To ensure receipt of subsequent addenda to this document, a VALID e-mail address must be provided. All addenda are issued via e-mail to the recipient's e- mail address provided on the Solicitation Registration Form.

Bid security in the form of a cashier's check, certified check, or bid bond in the amount of five percent (5%) of the bid amount shall be submitted with Contractor's bid. The successful bidder will be required to furnish satisfactory Payment and Performance Bonds for the full amount of the Contract. Bids shall be executed on bid forms provided with the bidding documents in accordance with the Instructions to Bidders.

The Owner may make such investigations as he deems necessary to determine the ability of the bidder to perform the work, and prospective bidders shall be required to furnish to the Owner's representative all such information as may be requested. The Owner reserves the right to reject any

bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligation of the Contract and to complete the work contemplated therein.

Due to the Coronavirus (COVID-19) pandemic the Washington County Purchasing Department has canceled all face-to-face meetings. A Pre-Bid Teleconference for the project will be held on **Monday, May 17, 2021 at 10:00 AM, (EDT/EST).** **All interested bidders wishing to take part in the meeting shall call 240-313-2330 to receive instructions.** All interested bidders are requested to take part in the teleconference call. Participation in the teleconference is not mandatory but is strongly encouraged. The project site will be available for contractors to tour after the pre-bid teleconference has been completed. Please contact the County's Project Manager, Brennan Garrett at 240-313-2474 to schedule a site visit.

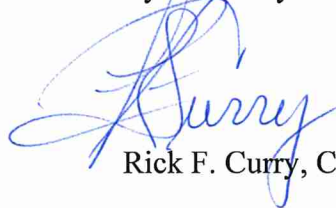
Overall Bid Schedule:

- **Pre-Bid Teleconference 10:00 A.M., (EDT/EST) Monday, May 17, 2021**
- **Deadline for submitting questions: 4:00 P.M., (EDT/EST) Friday, May 28, 2021**
- **Bid submission date: 2:00 P.M., (EDT/EST) Wednesday, June 9, 2021**
- **Subcontractors list submission date: 2:00 P.M., (EDT/EST) Friday, June 11, 2021.**

Washington County shall make positive efforts to utilize Disadvantaged Business Enterprises for its supplies and services and shall allow these sources the maximum feasible opportunity to compete for contracts. The Board of County Commissioners does not discriminate on the basis of race, color, national origin, sex, religion, age and disability in employment or the provision of services. Individuals requiring special accommodations are requested to contact the Washington County Purchasing Department at 240-313-2330 Voice, 711 Voice/TDD to make arrangements no later than seven (7) calendar days prior to the Pre-Bid and/or Bid Opening teleconference.

The Board of County Commissioners of Washington County, Maryland, reserves the right to accept or reject any or all bids, to waive formalities, informalities and technicalities therein. The Board reserves the right to contact a Bidder for clarifications and may, at its sole discretion, allow a Bidder to correct any and all formalities, informalities and technicalities in the best interest of Washington County, Maryland.

By Authority of:



Rick F. Curry, CPPO Director of Purchasing

SECTION 00 30 00

AIA DOCUMENT A701-1997 INSTRUCTIONS TO BIDDERS



AIA[®] Document A701[™] – 1997

Instructions to Bidders

for the following PROJECT:

Washington County Public Safety Training Center Audiovisual System
18350 Public Safety Place
Hagerstown, Maryland 21740

THE OWNER:

Board of County Commissioners of Washington County, Maryland
100 West Washington Street
Hagerstown, Maryland 21740

THE ARCHITECT:

Crabtree, Rohrbaugh & Associates
401 E. Winding Hill Road
Mechanicsburg, Pennsylvania 17055

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the

signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the

Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder 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.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

SECTION 00 40 00

**SUPPLEMENTAL CONDITIONS TO THE
INSTRUCTIONS TO BIDDERS A701-1997**

Supplemental Conditions

PUR-1500

Public Safety Training Center Audiovisual System

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**SUPPLEMENTAL CONDITIONS TO THE
INSTRUCTIONS TO BIDDERS**

AIA DOCUMENT A701-1997

ARTICLE 9

- 9.1 Subparagraph 3.1.1; **DELETE** from this section:
- 9.2 Subparagraph; **SUBSTITUTE** Paragraph 3.2.2 with the following subparagraph: “3.2.2 Should any Contractor find discrepancies in, or omissions from, the documents or be in doubt of their meaning, he/she should at once request in writing an interpretation from **Rick Curry, CPPO – Director of Purchasing, Washington County Purchasing Department, Washington County Administration Complex, 100 West Washington Street, Suite 3200, Hagerstown, Maryland, 21740, Fax 240-313-2331**; or send questions in MicroSoft Word platform via e-mail to: purchasingquestions@washco-md.net

All necessary interpretations will be issued to all Bidders as addenda to the specifications, and such addenda shall become part of the contract documents. **Requests received after 4:00 P.M., (EDT/EST), Friday, May 28, 2021** may not be considered. Every interpretation made by the County will be made as an addendum which, if issued, will be sent by the Director of Purchasing to all interested parties.”

- 9.3 Subparagraph 3.3.2; **CHANGE** to read as follows:
- 3.3.2 **“No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the County Purchasing Department for submittal to the Architect no later than 4:00 P.M. (EDT/EST), Friday, May 28, 2021** and submitted in accordance with Section 012500. Substitution requests after the bid may mandate a credit change order. Such requests shall include the name...”

- 9.4 Subparagraph 4.3.1; **ADD** the following subparagraph:

“In addition to the above referenced data which shall appear on the bid envelope, submit only one (1) original set of the Standard Form of Proposal and all required documents.”

- 9.5 Subparagraph 6.1; **ADD** the following subparagraph:

“Although Not required to be submitted with the Bid Form, the Owner reserves the right to request the Contractor to submit AIA Document A305. In addition, the Contractor shall include a financial statement, a resume’ of five (5) projects completed within the past five (5) years that are similar in scope and cost as specified herein; references; and an affidavit attesting that the firm which the Contractor represents has maintained a continuous practice for a minimum of five (5) years.”

- 9.6 Subparagraph 7.1.1; **REVISE** to read:

The Bonding Company must be licensed to conduct business in the State of Maryland.

9.7 Subparagraph 7.1.3; Delete in its entirety.

9.8 Subparagraph 7.2.1; **REVISE** to Read:

The Bonds shall be delivered to the Owner prior to the execution of the Contract.

9.9 Subparagraph 7.2.2; **REVISE** to Read:

That the Bonds shall be written on Washington County's *Performance Bond* and *Labor and Material Payment Bond* forms provided in Section 00 60 00 – Special Provisions.

9.10 Subparagraph Article 8; **REVISE** to Read:

The Agreement for the work will be written on Washington County's standard Contract Agreement form as provided in Section 00 60 00 – Special Provisions.

9.11 Subparagraph 7.1, **ADD** the following subparagraph:

“7.1.3 The Contractor's Performance Bond and Labor and Material Payment Bond shall be supplied in the amount of 100% of the value of the total contracted work and shall be submitted on a Standard Washington County Form made payable to the Owner.”

Notice of Political Contributions: In accordance with Maryland Code, State Finance and Procurement Article, §17-402, the Bidder shall comply with Maryland Code, Election Law Article, Title 14, which requires that every person that enters into contracts, leases, or other agreements with the State, a county, or any incorporated municipality, or their agencies during a calendar year in which the person receives in the aggregate \$100,000 or more, shall file with the State Administrative Board of Election Laws a statement disclosing contributions in excess of \$500 made during the reporting period to a candidate for elective office in any primary or general election. The statement shall be filed with the State Administrative Board of Election Laws: (1) before a purchase or execution of a lease or contract by the State, a county, an incorporated municipality or their agencies, and shall cover the proceeding two (2) calendar years; and (2) if the contribution is made after the execution of a lease or contract, then twice a year, throughout the contract term, on: (a) February 5, to cover the 6-month period ending January 31; and (b) August 5, to cover the 6 month period ending July 31.

9.12 **Payment of County and Municipal Taxes:** Effective October 1, 1993, in compliance with Section 1-106(b)(3) of the Code of the Public Local Laws of Washington County, Maryland, “If a bidder has not paid all taxes owed to the County or a municipal corporation in the County, the County Commissioners may reject the bidder's bid.”

9.13 **Award:** The contract will be awarded to the lowest responsive and responsible bidder who has either the lowest base bid or the lowest base bid plus the Alternate(s) selected upon evaluation of the bid prices and review of the available budget. The County reserves the right to include or exclude the Alternate(s) in the evaluation process.

- 9.14 **Award of Alternates:** If alternates are solicited by the Standard Form of Proposal, one or more alternates may be awarded in the discretion of the County in the order in which the alternates are listed in the Standard Form of Proposal; provided that in the event the County lacks funds for award of the base bid and any succeeding alternate, the County in its discretion may forego the award of the alternate for which funds are not available but may award one or more succeeding alternates for which funds are available.
- 9.15 **Sales Tax:** The County is exempt from the State of Maryland Sales Tax. The County's Sales Tax Exemption Number is 3000129-2. The Bidder is responsible to make any necessary inquiries and investigations with regulating state agencies to obtain a determination of tax exemptions in his/her bid.

END OF SUPPLEMENTAL CONDITIONS

SECTION 00 50 00
STANDARD FORM OF PROPOSAL

Form of Proposal

PUR-1500

Public Safety Training Center Audiovisual System

Page 00-50-00-1

STANDARD FORM OF PROPOSAL

Board of County Commissioners of Washington County
c/o Washington County Purchasing Department
100 West Washington Street, Suite 3200
Hagerstown, Maryland 21740

Date: **Wednesday, June 9, 2021**
Time: No later than **2:00 PM**
(EDT/EST)

Project: Washington County PSTC Audiovisual System

Washington County Bid No.: **PUR-1500**
Crabtree, Rohrbaugh & Associates Project No.: 3089

Firm Submitting Proposal _____
Telephone No. (____) _____ Fax: (____) _____
Contact: Name Printed and Title: _____
E-Mail Address: _____
Address: _____
Federal Employer Identification No.: _____

Gentlemen:

We hereby submit our proposal for the Washington County PSTC Audiovisual System

Having carefully examined the Specifications and Plans for the subject construction -

Specifications Dated, _____

Drawings Dated, _____

Addenda No. _____ Date _____; No. _____ Date _____; No. _____ Date _____

No. _____ Date _____; No. _____ Date _____; No. _____ Date _____

and having received clarification on all items of conflict or upon which any doubt arose, the undersigned proposes to furnish all labor, materials and equipment called for by the said documents for the entire work, in strict accordance with the Contract Documents, for the stipulated sum of:

1. **BASE BID:** PAGING & SHARED A/V EQUIPMENT, DIVISIBLE ROOM (B110 & B112), LOBBY (A119), RECEPTION (A101), LEARNING RESOURCE (A141), OFFICE (A104), OFFICE (A109), CONFERENCE (A112) & WEIGHT ROOM (A123).

_____ Dollars (\$ _____)
(Written) (Figures)

2. ALTERNATES:

- A. ADD / Deduct Alternate No. 1: ADD LARGE CLASSROOM (B100) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$ _____)
(Written) (Figures)

- B. ADD/Deduct Alternate No. 2: ADD LARGE CLASSROOM (B102) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- C. ADD/Deduct Alternate No. 3: ADD MULTI-PURPOSE ROOM (C100) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- D. ADD/Deduct Alternate No. 4: ADD DISPLAYS – MPR VIDEO WALL (C100) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- E. ADD/Deduct Alternate No. 5: ADD SMALL CLASSROOM (A134) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- F. ADD/Deduct Alternate No. 6: ADD SMALL CLASSROOM (B116) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- G. ADD/Deduct Alternate No. 7: ADD SMALL CLASSROOM (B119) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- H. ADD/Deduct Alternate No. 8: ADD SMALL CLASSROOM (B106) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

- I. ADD/Deduct Alternate No. 9: ADD SMALL CLASSROOM/SIMULATION LAB (B109) – Provide in accordance with Section 012300 - Alternates.

_____ Dollars (\$) _____
(Written) (Figures)

3. SUBCONTRACTORS

- A. All Bidders shall submit their list of subcontractors within forty-eight (48) hours of Bid submission to the Washington County Purchasing Department. No change or deviation from

this list shall be allowed except as determined by the Owner or the Owner's Representative (SEE ATTACHMENT "A"):

B. Subcontractors Bond:

1. The Owner retains the right to request a subcontractor to submit a performance and payment bond in the amount of his Contract to the General Contractor.
2. The Owner shall reimburse the subcontractor in the amount of the direct cost of the bond without subcontractor or General Contractor markup for overhead, profit or any other associated cost.

4. CONTRACTOR'S STATE OF MARYLAND REGISTRATION NUMBER.

Construction Firm License No.	Date Issued	Place of Issuance
Federal Employer Identification No. (or Social Security No. if no F.E.I.N.)		

It is understood that the bid price will be firm for a time period of ninety (90) calendar days from the bid opening date and that if the undersigned be notified of acceptance of this proposal within this time period, the firm shall complete the total work no later than 30 calendar days after substantial completion has been issued for the Public Safety Training Center building project. The most recent construction schedule indicates that substantial completion for the building is expected to be achieved on or about February 7, 2022. If this work is not completed within the time period specified, the contractor will be liable for Liquidated Damages of \$500.00 per calendar day.

5. AFFIRMATION REGARDING COLLUSION:

I AFFIRM THAT:

Neither I nor, to the best of my knowledge, information, and belief, the below stated business has:

- a. Agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the accompanying bid or offer that is being submitted;
- b. In any manner, directly or indirectly, entered into any agreement of any kind to fix the bid price or price proposal of the Bidder or Offeror or of any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the accompanying bid or offer is submitted.

6. AFFIRMATION REGARDING BRIBERY CONVICTIONS

I FURTHER AFFIRM:

Form of Proposal

PUR-1500

Public Safety Training Center Audiovisual System

Page 00-50-00-4

Neither I nor, to the best of my knowledge, information, and belief, the below business (as is defined in Section 16-101 (b) of the State Finance and Procurement Article of the Annotated Code of Maryland), or any of its officers, directors, partners, or any of its employees directly involved in obtaining or performing contracts with public bodies (as is defined in Section 16-101(f) of the State Finance and Procurement Article of the Annotated Code of Maryland), has been convicted of, or has had probation before judgment imposed pursuant to Criminal Procedure Article, Section 6-220 of the Annotated Code of Maryland, or has pleaded nolo contendere to a charge of, bribery, attempted bribery, or conspiracy to bribe in violation of Maryland law, or of the law of any other State or federal law, except as follows (indicate the reasons why the affirmation cannot be given and list any conviction, plea, or imposition of probation before judgment with the date, court, official or administrative body, the sentence or disposition, the name(s) of person(s) involved, and their current positions and responsibilities with the business):

Bid Security Bonds shall be submitted with each proposal in the amount of five (5%) percent of the total of the Base Bid and requested alternates.

Bid Bonds, except those of three (3) low bidders will be returned after the bid opening. Other bid bonds will be returned after the related contract has been executed. If no bid has been accepted within **ninety (90)** calendar days after the bid opening, then any bond may be returned upon demand of the bidder.

Failure to properly and completely fill in all blanks may be cause for rejection of this proposal. All alternates and unit prices called for in the Contract Documents must be submitted herewith.

INDIVIDUAL PRINCIPAL

In Presence of Witness: _____ FIRM NAME _____

SIGNED _____
ADDRESS _____
TELEPHONE _____

CO-PARTNERSHIP PRINCIPAL

In Presence of Witness: _____

(Name of Corporation)
ADDRESS _____

TELEPHONE _____
as to BY _____
as to BY _____

CORPORATE PRINCIPAL

(Name of Corporation)

ADDRESS _____

TELEPHONE _____

(Corporate Secretary)

BY _____

(AFFIX CORPORATE SEAL)

The bidder represents, and it is a condition precedent to acceptance of this bid, that the bidder has not been a part to any agreement to bid a fixed or uniform price.

WITNESS:

(SEAL)

SUBSCRIBED AND SWORN TO Before me, a Notary Public of the State of _____

County or City of _____ this _____ day of _____, 2021

Notary Public

For Information Purposes Only: Has your company/firm been certified by the State of Maryland as a Minority Business Enterprise (Please check below.)

_____ Yes _____ No

Forms to be Completed and submitted with the Bid:

- 1. Bid Bond***
- 2. Standard Form of Proposal (00 50 00)***
- 3. Attachment "A" (Sub-contractors list shall be submitted within forty-eight (48) hours of Bid submission)***
- 4. Schedule-A Equipment List***

ATTACHMENT “A”

SUBCONTRACTORS: All Bidders shall submit their list of subcontractors within forty-eight (48) hours of the Bid submission date to the Washington County Purchasing Department. No change or deviation from this list shall be allowed except as determined by the Owner or the Owner’s Representative:

- a. _____
- b. _____

SCHEDULE A
EQUIPMENT LIST SUMMARY
(Base Bid and Alternates)

SCHEDULE A – EQUIPMENT LIST SUMMARY

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Base Bid

4/8/2021

Room	Type	Cost
A119	Lobby	\$
A101	Reception	\$
A141	Learning Resource	\$
A104	Office	\$
A109	Office	\$
A112	Conference Room	\$
A123	Weight Room	\$
B110 & B112	Divisible Room	\$
N/A	Paging & Shared AV Equipment	\$
BASE BID TOTAL:		\$0.00
ALTERNATES		
Room	Type	Cost
B100	Large Classroom	\$
B102	Large Classroom	\$
C100	Multi-Purpose Room	\$
C100	Displays – MPR Video Wall	\$
A134	Small Classroom	\$
B116	Small Classroom	\$
B119	Small Classroom	\$
B106	Small Classroom	\$
B109	Small Classroom / Simulation Lab	\$
ALTERNATES TOTAL:		\$0.00
TOTAL BASE BID PLUS ALTERNATES		\$0.00

SCHEDULE A
EQUIPMENT LIST
(Small Classroom A134)

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom A134

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C861Q-AVT2	86-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom A134

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom A134

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Small Classroom B106)

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B106

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C861Q-AVT2	86-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

Schedule A – Equipment List (Small Classroom B106)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B106

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B106

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Small Classroom B116)

Schedule A – Equipment List (Small Classroom B116)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B116

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C861Q-AVT2	86-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

Schedule A – Equipment List (Small Classroom B116)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B116

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B116

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Small Classroom B119)

Schedule A – Equipment List (Small Classroom B119)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B119

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C861Q-AVT2	86-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

Schedule A – Equipment List (Small Classroom B119)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B119

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Small Classroom B119

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Large Classroom B100)

Schedule A – Equipment List (Large Classroom B100)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Large Classroom B100

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C981Q-AVT2	98-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

Schedule A – Equipment List (Large Classroom B100)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Large Classroom B100

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment					
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER AUDIOVISUAL SYSTEM

Large Classroom B100

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Large Classroom B102)

Schedule A – Equipment List (Large Classroom B102)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Large Classroom B102

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	1	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	1	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	1	By GC	By GC
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C981Q-AVT2	98-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	1	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Displays)	0	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	1	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	2	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	3	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	1	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	6	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		

OFE = Owner furnished equipment

Schedule A – Equipment List (Large Classroom B102)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Large Classroom B102

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	1	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	1	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$

SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Large Classroom B102

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

SCHEDULE A
EQUIPMENT LIST
(Lobby)

Schedule A – Equipment List (Lobby)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Lobby

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	V484	48-Inch Display; 1080p	1	\$0.00	\$
N/A	N/A	Digital Signage Player	1	OFE	OFE
			Sub-Total:		\$
Audio					
					\$
					\$
			Sub-Total:		\$
Control					
				\$0.00	
			Sub-Total:		\$
Miscellaneous					
Chief	TS218SU	Swing Arm Mount	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor		Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Lobby)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Lobby

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Reception)

Schedule A – Equipment List (Reception)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Reception

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	V484	48-Inch Display; 1080p	1	\$0.00	\$
Monoprice	21659	HDMI Input Plate	1	\$0.00	\$
N/A	N/A	CATV Tuner	1	OFE	OFE
			Sub-Total:		\$
Audio					
					\$
					\$
			Sub-Total:		\$
Control					
Crestron	TSW-760-B-S	Touch Panel	1	\$0.00	\$
Crestron	TSW-760-TTK-B-S	Touch Panel Tabletop Kit	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
Chief	TS218SU	Swing Arm Mount	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor		Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Reception)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Reception

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Offices, Learning Resources)

Schedule A – Equipment List (Offices, Learning Resources)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Offices, Learning Resources

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	V484	48-Inch Display; 1080p	1	\$0.00	\$
Monoprice	21659	HDMI Input Plate	1	\$0.00	\$
N/A	N/A	CATV Tuner	1	OFE	OFE
			Sub-Total:		\$
Audio					
					\$
					\$
			Sub-Total:		\$
Control					
Crestron	TSW-760-B-S	Touch Panel	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
Chief	TS218SU	Swing Arm Mount	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor		Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Offices, Learning Resources)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Offices, Learning Resources

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Weight Room)

Schedule A – Equipment List (Weight Room)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Weight Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	V484	48-Inch Display; 1080p	2	\$0.00	\$
N/A	N/A	CATV Tuner	2	OFE	OFE
			Sub-Total:		\$
Audio					
					\$
					\$
			Sub-Total:		\$
Control					
Crestron	TSW-760-B-S	Touch Panel	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
Crestron	C2N-IO	Control Port Expansion	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
Chief	TS218SU	Swing Arm Mount	2	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor		Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor		Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Weight Room)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Weight Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Conference Room)

Schedule A – Equipment List (Conference Room)

PUR-1500

Public Safety Training Center Audiovisual System

Page 1

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Conference Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	X551UHD	55-Inch Display; 1080p	1	\$0.00	\$
Kramer	CLS-AOCH/60-33	Optical HDMI Cable; 33-ft	1	\$0.00	\$
N/A	N/A	CATV Tuner	1	OFE	OFE
			Sub-Total:		\$
Audio					
NEC	SP-TF1	Side Mounted Speakers	1	\$0.00	\$
					\$
			Sub-Total:		\$
Control					
Crestron	TSW-760-B-S	Touch Panel	1	\$0.00	\$
Crestron	TSW-760-TTK-B-S	Touch Panel Tabletop Kit	1	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
Chief	TS218SU	Swing Arm Mount	1	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor		Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Conference Room)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Conference Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Divisible Room)

Schedule A – Equipment List (Divisible Room)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST **WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER** **AUDIOVISUAL SYSTEM**

Divisible Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	3	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 104” x 58” Image on Projection Screen	3	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 58"; 0.6 Gain	3	By GC	By GC
NEC	C981Q-AVT2	98-Inch Display	4	\$0.00	\$
Vaddio	RoboSHOT 30 OneLINK 999-9963-100	Pan / Tilt / Zoom Camera with Extender	2	\$0.00	\$
Vaddio	AV Bridge Mini (999-8240-000)	AV / USB Bridge	1	\$0.00	\$
N/A	N/A	CATV Tuner	4	OFE	OFE
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Laptop)	2	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (PC)	2	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (PC soft Codec)	1	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	7	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	6	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	6	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	12	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	2	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	2	\$0.00	\$
QSC	I/O-8 Flex	Audio Network Interface	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	1		
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	2	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	4	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	12	\$0.00	\$
			Sub-Total:		\$

OFE = Owner furnished equipment

Schedule A – Equipment List (Divisible Room)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Divisible Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	2	\$0.00	\$
Crestron	CP3N	Control Processor	1	\$0.00	\$
Crestron	GLS-PART-CN	Partition Sensor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
N/A	N/A	Lectern	2	By Furniture Vendor	
Peeress	SF680P	Fixed Wall Mount	4	\$0.00	\$
Chief	CMA450	Suspended Ceiling Tile Pole Mount	3	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	3	\$0.00	\$
Vaddio	535-2000-240	Camera Shelf	2		
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

Schedule A – Equipment List (Divisible Room)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Divisible Room

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Simulation Lab)

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Simulation Lab

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ870LWU	Projector; WUXGA 8,500 Lumen	3	\$0.00	\$
Panasonic	ET-DLE060	Short Throw Lens for 140” x 79” Image	3	\$0.00	\$
Draper	143022FB	Projection Screen; Motorized; Ceiling-Mounted; 104" x 79"; 0.6 Gain	3	By GC	By GC
Vaddio	RoboSHOT 30 OneLINK 999-9963-100	Pan / Tilt / Zoom Camera with Extender	4	\$0.00	\$
Vaddio	AV Bridge Mini (999-8240-000)	AV / USB Bridge	1	\$0.00	\$
N/A	N/A	CATV Tuner	1	OFE	OFE
NEC	C861Q-AVT2	86-Inch Display	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Lectern Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Lectern PC)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Operator Booth)	3	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (PC soft Codec)	1	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	4	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	5	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	5	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	7	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	0	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Shure	MXA910	Ceiling Microphone; AES67	2	\$0.00	\$
Shure	ULXS124/85	Wireless Microphone System; Combination Handheld/Lavalier	1	\$0.00	\$
Shure	A412B	Desktop Base; PTT	1	\$0.00	\$
Shure	MX405	Gooseneck Mic for Base	1	\$0.00	\$
Shure	MX418/C	Gooseneck Mic (lectern)	1	\$0.00	\$
QSC	I/O-22	Audio Network Interface	2	\$0.00	\$
Listen	LS-54-072	Listen iDSP Level II System – RF 72 MHZ	1	\$0.00	\$
Extron	60-1501-01	Audio Amplifier; 70V	2	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W	4	\$0.00	\$
Klipsch	CP-6T	5.25-Inch Speaker; 70V; Tap at 15W	2	\$0.00	\$
			Sub-Total:		\$

OFE = Owner will furnish

Schedule A – Equipment List (Simulation Lab)

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Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Simulation Lab

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	2	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Chief	CMA450	Suspended Ceiling Tile Pole Mount	3	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	2	\$0.00	\$
Vaddio	535-2000-240	Camera Shelf	3		
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		\$
Equipment Total					
			Equipment Total:		\$

SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Simulation Lab

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(MPR)

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

MPR

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
Panasonic	PT-RZ120WU	Projector; WUXGA 12,000 Lumen; w/Lens	2	\$0.00	\$
Draper	101347	Projection Screen; Motorized; Wall-Mounted; 104" x 79"; 0.6 Gain	2	By GC	By GC
Vaddio	RoboSHOT 30 OneLINK 999-9963-100	Pan / Tilt / Zoom Camera with Extender	2	\$0.00	\$
Vaddio	AV Bridge Mini (999-8240-000)	AV / USB Bridge	1	\$0.00	\$
N/A	N/A	CATV Tuner	1	OFE	OFE
Crestron	USB-EXT-2	USB Extender	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Lectern Laptop)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (Lectern PC)	1	\$0.00	\$
Crestron	DM-TX-4K-100-C-1G-B-T	HDMI Tx (AV Cart)	2	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Projectors)	2		
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (AV Cart)	1	\$0.00	\$
Crestron	DM-DGE-200-C	Graphics Engine; Annotated Video Loop Thru	2	\$0.00	\$
Crestron	DMB-4K-I-HD	Inputs Used on HDMI Input Blade	6	Reference Shared Equip.	
Crestron	DMB-4K-I-C	Inputs Used on DM Input Blade	8	Reference Shared Equip.	
Crestron	DMB-4K-0-C	Inputs Used on DM Output Blade	10	Reference Shared Equip.	
Crestron	DMB-4K-0-HD	Inputs Used on HDMI Output Blade	1	Reference Shared Equip.	
			Sub-Total:		\$
Audio					
Audio-Technica	ATND8677a	Desktop Base for Lectern Mic; Dante	1	\$0.00	\$
Shure	MX418/C	Gooseneck Microphone for Lectern	1	\$0.00	\$
Shure	MX405	Gooseneck Tabletop/Panel	9	\$0.00	\$
Shure	MX400DP	Desktop Base for Gooseneck Mic	9	\$0.00	\$
Shure	ULXD4Q	Wireless Receiver; Quad		\$0.00	\$
Shure	UA505	Antenna Bracket; Mount Near Projector	2	\$0.00	\$
Shure	ULXD1	Bodypack Wireless Microphone Transmitter	4	\$0.00	\$
Shure	WL-185	Lavalier Microphone	4	\$0.00	\$
Shure	ULXD2/B87A	Wireless Handheld Microphone	4	\$0.00	\$
Shure	SB900	Li-Lon Rechargeable Battery	4	\$0.00	\$

OFE = Owner furnished equipment

Schedule A – Equipment List (MPR)

PUR-1500

Public Safety Training Center Audiovisual System

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SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

MPR

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Shure	SBC800-US	Shure Battery Charger	1	\$0.00	\$
QSC	I/O-8 Flex	Audio Network Interface	1	\$0.00	\$
QSC	I/O Frame	Audio Network Card Interface	1	\$0.00	\$
QSC	CIML4	4-Analog Input Card	3	\$0.00	\$
Yamaha	QL1	Audio Console	1	\$0.00	\$
Listen Technologies	QUOTE #HL3802P Dated 10/29/18	Inductive Loop System	1	\$0.00	\$
Extron	60-1501-01				
Klipsch	CA-800T	8-Inch Speaker; 70V; Tap at 15W	20	\$0.00	\$
			Sub-Total:		\$
Control					
Crestron	TS-1542-TILT-C-B-S	15-Inch Touch Panel; Annotation; 8G+ Input	2	\$0.00	\$
Crestron	RMC3	Control Processor	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
N/A	N/A	Lectern	1	By Furniture Vendor	
Middle Atlantic	TOR-4-20SP	In-Wall Rack For Loop Driver & Amps	1	\$0.00	\$
Middle Atlantic	UNI-1-C	1RU XLR Connector Panel; Populate with 9 XLRF Connectors; Locate in Gator Case	1	\$0.00	\$
Gator Cases	GR-4L	4U Audio Rack for QSC I/O Frame	1	\$0.00	\$
Chief	VSMU	Projector Mount	2	\$0.00	
Vaddio	535-2000-240	Camera Shelf	2	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		\$
Crestron	DM-PSU-ULTRA-MIDSPAN	Power Injector	4	\$0.00	\$
AV Contractor	CUSTOM	Rack Aux Panels, Floor Box Plates, Wall Box Panels as required per AV Design Drawings for system operation	1	\$0.00	\$

SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

MPR

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
AV Contractor	CUSTOM	Job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV Contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
			Sub-Total:		
Equipment Total					
			Equipment Total:		\$
Non-Equipment			Qty of Hours	Hourly Rate	
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	ALS Loop Noise & Metal Loss Testing (Required)	0	\$0.00	\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL		\$

SCHEDULE A
EQUIPMENT LIST
(Shared Equipment)

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Shared Equipment

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Displays					
Video Components					
Crestron	DM-MD64X64	Video Matrix Switcher	1	\$0.00	\$
Crestron	DMB-4K-I-HD	HDMI Input Blade	3	\$0.00	\$
Crestron	DMB-4K-I-C	DM Input Blade	4	\$0.00	\$
Crestron	DMB-4K-0-C	DM Output Blade	6	\$0.00	\$
Crestron	DMB-4K-0-HD	HDMI Output Blade	1	\$0.00	\$
Crestron	DM-PSU-3X8-RPS	PoDM Power Supply	4	\$0.00	\$
			Sub-Total:		\$
Audio					
QSC	MP-A40V	Paging Amplifier	1	\$0.00	\$
TOA	H-1	Paging Speaker	3	\$0.00	\$
Klipsch	IC-650-T	6-Inch Speaker; 70V; Tap at 15W (Includes area B120)	19	\$0.00	\$
QSC	Core510i	Audio DSP	1	\$0.00	\$
QSC	Q-SYS NS-1148P	Network Switch	3	\$0.00	\$
QSC	Q-SYS-NS-1124P	Network Switch	1	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
Middle Atlantic	BGR-4532	AV Rack	1	\$0.00	\$
Middle Atlantic	PD-2420SC-NS	Vertical Power Strip; 20A	1	\$0.00	\$
Middle Atlantic	BSPN-45-32	Rack Sides; Pair	1	\$0.00	\$
Middle Atlantic	BGR-276FT-FC	Fan Top w/Controller; 120V	1	\$0.00	\$
APC	SURTA3000RMXL-NC	3000VA UPS; Rack Mounted w/Network Card	2	\$0.00	\$
Crestron	DM-RPP-K24	DM Patch Panel	2	\$0.00	\$
Crestron	DM-CONN-ULTRA-RECP	DM RJ45 Termination	As Required		

SCHEDULE A – EQUIPMENT LIST
WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER
AUDIOVISUAL SYSTEM

Shared Equipment

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
AV contractor	CUSTOM	Additional job site wire including all audio, video, and control wire as required for the system	1	\$0.00	\$
AV contractor	CUSTOM	Interconnecting cables, rack wiring, connectors and terminations, terminal strips, relay wiring, pad wiring, and miscellaneous hardware, wall plates, mounts, etc.	1	\$0.00	\$
TBD	TBD	Cable Ladder Tray; Provided and Installed by Telecom Contractor	By Others	\$0.00	By Others
			Sub-Total:		
Equipment Total					
			Equipment Total:		\$
Non-Equipment					
	Engineering		0	\$0.00	
	Project Management		0	\$0.00	
	Fabrication		0	\$0.00	
	Installation by Contractor		0	\$0.00	
	General & Administrative		0	\$0.00	
	Installation Warranty		0	\$0.00	
	Other	(please specify)	0	\$0.00	
	Other	(please specify)	0	\$0.00	
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				
	Taxes on Labor				
	Taxes on Shipping & Handling				
GRAND TOTAL					
			GRAND TOTAL:		

SCHEDULE A
EQUIPMENT LIST
(Displays – MPR Video Wall)

Schedule A – Equipment List (Displays – MPR Video Wall)

PUR-1500

Public Safety Training Center Audiovisual System

Page 1

SCHEDULE A – EQUIPMENT LIST

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Displays – MPR Video Wall

4/8/2021

GENERAL INFORMATION				EQUIPMENT COSTS	
Make	Model	Description	Quantity	Cost/Unit	Extended Cost
Video					
NEC	UN551S-TMX4P	2x2 Video Wall Kit; 55-Inch Displays Includes Peerless LIT1446 Mount	2	\$0.00	\$
NEC	E203W-BK	20” Desktop Monitor (AV Cart)	2	\$0.00	\$
Datavideo	TWP-10	4K Video Wall Processor	3	\$0.00	\$
Crestron	DM-RMC-4K-100-C-1G-B-T	HDMI Rx (Video Wall Processors)	3	\$0.00	\$
			Sub-Total:		\$
Miscellaneous					
			Sub-Total:		\$
Equipment Total					
			Equipment-Total:		
Non-Equipment					
	Engineering		0	\$0.00	\$
	Project Management		0	\$0.00	\$
	Fabrication		0	\$0.00	\$
	Installation by Contractor		0	\$0.00	\$
	General & Administrative		0	\$0.00	\$
	Installation Warranty		0	\$0.00	\$
	Other	(please specify)	0		\$
	Other	(please specify)	0		\$
Shipping & Handling					
	Shipping & Handling				\$
Taxes					
	Taxes on Equipment				\$
	Taxes on Labor				\$
	Taxes on Shipping & Handling				\$
GRAND TOTAL					
			GRAND TOTAL:		\$

Schedule A – Equipment List (Displays – MPR Video Wall)

PUR-1500

Public Safety Training Center Audiovisual System

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AV NETWORK WORKSHEET

AV NETWORK WORKSHEET

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Base Scope				
Room Type	Room Number	Device Description	Switch #	IDF Room #
Shared Equipment	N/A	Audio DSP – AV LAN	1	A115
Shared Equipment	N/A	Audio DSP – AV LAN (Dante VLAN)	1	A115
Shared Equipment	N/A	Matrix Switcher – AV LAN	1	A115
Shared Equipment	N/A	Matrix Switcher – AV LAN (Dante VLAN)	1	A115
Lobby	A119	Display	1	A115
Reception	A101	Display	1	A115
Reception	A101	Control Processor	1	A115
Reception	A101	Touch Panel	1	A115
Office	A104	Display	1	A115
Office	A104	Control Processor	1	A115
Office	A104	Touch Panel	1	A115
Office	A109	Display	1	A115
Office	A109	Control Processor	1	A115
Office	A109	Touch Panel	1	A115
Learning Resource	A141	Display	1	A115
Learning Resource	A141	Control Processor	1	A115
Learning Resource	A141	Touch Panel	1	A115
Weight Room	A123	Display	4	A136
Weight Room	A123	Display	4	A136
Weight Room	A123	Control Processor	4	A136
Weight Room	A123	Touch Panel	4	A136
Conference	A112	Display	1	A115
Conference	A112	Control Processor	1	A115
Conference	A112	Touch Panel	1	A115
Divisible Classroom	B110 & B112	Projector	2	A115
Divisible Classroom	B110 & B112	Projector	2	A115
Divisible Classroom	B110 & B112	Projector	2	A115
Divisible Classroom	B110 & B112	Display	2	A115
Divisible Classroom	B110 & B112	Display	2	A115
Divisible Classroom	B110 & B112	Amplifier	2	A115
Divisible Classroom	B110 & B112	Amplifier	2	A115
Divisible Classroom	B110 & B112	Control Processor	2	A115
Divisible Classroom	B110 & B112	QSYS IO (FB 1)	2	A115
Divisible Classroom	B110 & B112	QSYS IO (FB 2)	2	A115

AV NETWORK WORKSHEET

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Base Bid				
Room Type	Room Number	Device Description	Switch #	IDF Room #
Divisible Classroom	B110 & B112	QSYS IO (FB 3)	2	A115
Divisible Classroom	B110 & B112	Display	3	A115
Divisible Classroom	B110 & B112	Display	3	A115
Add-Alt Displays				
Small Classroom	A134	Projector	4	A136
Small Classroom	A134	Amplifier	4	A136
Small Classroom	A134	Control Processor	4	A136
Small Classroom	A134	Touch Panel	4	A136
Small Classroom	A134	QSYS IO	4	A136
Small Classroom	A134	Display	3	A115
Small Classroom	B106	Projector	1	A115
Small Classroom	B106	Amplifier	1	A115
Small Classroom	B106	Control Processor	1	A115
Small Classroom	B106	Touch Panel	1	A115
Small Classroom	B106	QSYS IO	1	A115
Small Classroom	B106	Display	3	A115
Small Classroom	B116	Projector	2	A115
Small Classroom	B116	Amplifier	2	A115
Small Classroom	B116	Control Processor	2	A115
Small Classroom	B116	Touch Panel	2	A115
Small Classroom	B116	QSYS IO	2	A115
Small Classroom	B116	Display	3	A115
Small Classroom	B119	Projector	2	A115
Small Classroom	B119	Amplifier	2	A115
Small Classroom	B119	Control Processor	2	A115
Small Classroom	B119	Touch Panel	2	A115
Small Classroom	B119	QSYS IO	2	A115
Small Classroom	B119	Display	3	A115
Large Classroom	B100	Projector	1	A115
Large Classroom	B100	Amplifier	1	A115
Large Classroom	B100	Control Processor	1	A115
Large Classroom	B100	Touch Panel	1	A115
Large Classroom	B100	QSYS IO	1	A115
Large Classroom	B100	Display	3	A115

AV NETWORK WORKSHEET

WASHINGTON COUNTY PUBLIC SAFETY TRAINING CENTER

AUDIOVISUAL SYSTEM

Add-Alt Displays				
Room Type	Room Number	Device Description	Switch #	IDF Room #
Large Classroom	B102	Projector	1	A115
Large Classroom	B102	Amplifier	1	A115
Large Classroom	B102	Control Processor	1	A115
Large Classroom	B102	Touch Panel	1	A115
Large Classroom	B102	QSYS IO	1	A115
Large Classroom	B102	Display	3	A115
Simulation Lab	B109	Projector	1	A115
Simulation Lab	B109	Projector	1	A115
Simulation Lab	B109	Projector	1	A115
Simulation Lab	B109	Amplifier	1	A115
Simulation Lab	B109	Amplifier	1	A115
Simulation Lab	B109	Display	1	A115
Simulation Lab	B109	Control Processor	1	A115
Simulation Lab	B109	QSYS IO	1	A115
Simulation Lab	B109	Microphone	1	A115
Simulation Lab	B109	Microphone	1	A115
Simulation Lab	B109	QSYS IO	1	A115
MPR	C100	Projector	2	A115
MPR	C100	Projector	2	A115
MPR	C100	Video Wall	2	A115
MPR	C100	Control Processor	2	A115
MPR	C100	QSYS IO (FB 1)	2	A115
MPR	C100	QSYS IO (FB 1)	2	A115
MPR	C100	QSYS IO (FB 2)	2	A115
MPR	C100	Audio Console (FB 2)	2	A115
MPR	C100	QSYS IO (WP L)	2	A115
MPR	C100	QSYS IO (WP R)	2	A115
MPR	C100	Amplifier	2	A115
MPR	C100	Amplifier	2	A115
MPR	C100	Amplifier	2	A115
MPR	C100	ALS Loop Driver (Dante VLAN)	2	A115
MPR	C100	Graphics Engine	2	A115

SECTION 00 60 00

SPECIAL PROVISIONS

(This SECTION must be Executed by the Successful Bidder)

Contract No.: PUR-1500

(This Document must be Executed by the Successful Bidder)

CONTRACT AGREEMENT BY AND BETWEEN THE

**BOARD OF COUNTY COMMISSIONERS OF
WASHINGTON COUNTY, MARYLAND**

AND

THIS CONTRACT AGREEMENT (hereinafter the "Contract"), is made this ____ day of _____, 2021, by and between _____, (hereinafter the "Contractor") and the **BOARD OF COUNTY COMMISSIONERS OF WASHINGTON COUNTY, MARYLAND**, a body corporate and politic and a subdivision of the State of Maryland, (hereinafter the "County").

RECITALS

This contract is for the construction of **Contract No. PUR-1500, Washington County PSTC Audiovisual System, Sharpsburg, Maryland**, as shown in the drawings identified in the same manner, with a final approval date of December 18, 2019, on file with the Washington County Division of Engineering, 80 West Baltimore Street, Hagerstown, Maryland, subject to all the conditions, covenants, stipulations, terms and provisions contained in the Specifications, the Specifications being in all respects incorporated herein by reference and made a part hereof as if attached or entirely stated herein, has recently been awarded to the Contractor by the County, at and for a sum equal to the prices and rates respectively named therefore in the bid.

One of the conditions of said award is that a formal contract should be executed by and between the Contractor and the County evidencing the terms of said award.

NOW, THEREFORE, in consideration of the mutual covenants, conditions and agreements herein contained, the parties hereby agree as follows:

1. The "Contract Documents", except for modifications issued after the execution of this Contract, are enumerated as follows and are incorporated herein by reference and made a part hereof as if attached or entirely stated herein:

The executed Contract Agreement between the County and the Contractor, Bid Documents consisting of:

The Following Specifications:

Specifications:

Division 0 – Conditions of the Contract
Division 1 – General Requirements
Division 26 – Electrical
Division 27 – Communications

The Completed Project Bid Form:

Standard Form of Proposal
Bid Bond
Attachment “A” (Subcontractors)
Schedule-A Equipment List

Labor and Material Payment Bond
Performance Bond
Certificate of Insurance provided by Contractor

The following Drawings:

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SPECIAL PROVISIONS

CONTRACT NO. PUR-1500

The following Addenda:

Addenda No. _____ Date _____; No. _____ Date _____; No. _____ Date _____
No. _____ Date _____; No. _____ Date _____; No. _____ Date _____

2. The date of commencement and substantial completion of the project contemplated herein shall be as set forth in the Invitation to Bidders and stipulated by the Notice to Proceed or an unauthorized extension thereof.

3. The Contractor shall complete **Contract No. PUR-1500 Washington County PSTC Audiovisual System, Sharpsburg, Maryland** in accordance with each and every one of the conditions, covenants, stipulations, terms and provisions contained in the aforementioned Specifications, which in all respects are incorporated herein by reference and made a part hereof, and as shown on the aforementioned drawings, at and for a sum equal to the prices and rates respectively named therefore in the Standard Form of Proposal attached hereto, and shall comply with and perform each and every obligation imposed upon it by the said Specifications or by the terms of said award.

4. The County shall comply with and perform each and every obligation imposed upon it by the said Specifications or by the terms of the said award.

5. The County shall pay the Contractor for the Contractor's performance of the
Contract the sum of _____ (\$ _____)
hereinafter (The "Contract Sum"), based on the lowest Total Base Bid or lowest Total Base Bid plus the Alternates (The County reserves the right to include, exclude or choose any combination of the Alternates) when due and payable under the terms of the said Specifications and the terms of said award and shall be subject to additions and deductions as provided for in the Contract Documents.

6. Progress payments shall be made on account of the Contract Sum to the Contractor as set forth in the Contract Documents.

7. The Contractor hereby certifies that it is a corporation in good standing and is authorized and registered to do business in the State of Maryland with the Maryland State Department of Assessments and Taxation.

8. The Contractor hereby certifies that it has read and understood the provisions of the Washington County Purchasing guidelines dealing with conflicts of interest, and that it further certifies, represents and warrants to the County that there is no current conflict of interest and that the Contractor shall refrain from any such conflict of interest for the duration of this Contract.

9. This Contract was made and entered into in the State of Maryland and shall be governed and construed in accordance with the laws of the State of Maryland. As to the Contractor, this Agreement is intended to be a contract under seal and specialty.

10. The Recitals are incorporated in this Contract as substantive provisions.

IN WITNESS WHEREOF, the parties hereto have executed and delivered this Contract under their respective seals under the day and year first written above.

Attest:

Name of Corporation

Corporate Secretary

By: _____(SEAL)
Officer of Corporation

Attest:

BOARD OF COUNTY COMMISSIONERS
OF WASHINGTON COUNTY,
MARYLAND

Krista L. Hart, County Clerk

By: _____(SEAL)
Jeffrey A. Cline, President

Approved for Execution:

Scott Hobbs, P.E., Director
Division of Engineering

Approved as to form and legal sufficiency:

Kirk C. Downey
County Attorney

Special Provisions

PUR-1500

Public Safety Training Center Audiovisual System

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LABOR AND MATERIAL PAYMENT BOND

(This Document must be Executed by the Successful Bidder)

Board of County Commissioners of Washington County, Maryland

Bond No.: _____ Bond Date: _____ Contract No.: **PUR-1500**

KNOW ALL MEN BY THESE PRESENTS, that we _____

(Here insert full name and address or legal title of Contractor, including zip code)

hereinafter called the “**Principal**” and

Here insert full name and address or legal title of Surety, including zip code)

a corporation organized and existing under the laws of the State of **Maryland**, and authorized to transact business in the State of Maryland, hereinafter called the “**Surety**”, are held and firmly bound unto the Board of County Commissioners of Washington County, Maryland, a body corporate and politic, hereinafter called the “County”, for the use and benefit of claimants as hereinafter defined, in the Penal Sum of (\$ _____) lawful money, for the payment of which Penal Sum we bind ourselves, our heirs, executors, administrators, personal representatives, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County, for **Contract No. PUR-1500, Washington County PSTC Audiovisual System, Sharpsburg, Maryland.**

The contract referenced above and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed thereunder or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred to as the “**Contract**”.

WHEREAS, it is one of the conditions precedent to the final award of the Contract that these presents be executed.

NOW, THEREFORE, the condition of this obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and materials furnished, supplied and reasonably required for use in the performance of the Contract, then this obligation shall be null and void, otherwise it shall remain in full force and effect, subject to the following conditions:

Special Provisions

PUR-1500

Public Safety Training Center Audiovisual System

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1. A **Claimant** is defined to be any and all of those persons supplying labor and materials (including lessors of the equipment to the extent of the fair market value thereof) to the Principal or its subcontractors and sub-subcontractors in the prosecution of the work provided for the Contract, entitled to the protection provided by Md. Code Ann., State Finance and Procurement Article, §17-101, *et seq.*, as from time to time amended.
2. The above-named Principal and Surety hereby jointly and severally agree with the County that every claimant as herein defined, who has not been paid in full may, pursuant to and when in compliance with the provisions of the aforesaid State Finance and Procurement Article, §17-101, *et seq.*, sue on this Bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant and have execution thereon. The County shall not be liable for the payment of any costs or expenses of any such suit.

The Surety hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Payment Bond, and it do_{es} hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or the Specifications.

This Payment Bond shall be governed and construed in accordance with the laws of the State of Maryland and any reference herein to the Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, the Principal and Surety have set their hands and seals to this Payment Bond this _____ day of _____, 2021.

WITNESS:

(Typed Name of Principal)

(Signed Name of Principal)

(Typed Name and Title of witness)

(Signed Name of Witness)

(Seal)

(Typed Name of Contact)

(Phone Number of Contact)

WITNESS:

(Typed Name of Surety)

(Signed Name of Surety)

(Typed Name and title of witness)

(Signed Name of Witness)

(Seal)

(Typed Name of local Agent)

(Telephone Number)

PERFORMANCE BOND

(This Document must be Executed by the Successful Bidder)

Board of County Commissioners of Washington County, Maryland

Bond No.: _____ Bond Date: _____ Contract No.: **PUR-1500**

KNOW ALL MEN BY THESE PRESENTS, that we

(Here insert full name and address or legal title of Contractor, including zip code)

a corporation of the State of **Maryland** and authorized to do business in the State of Maryland,
hereinafter called the “**Principal**” and

(Here insert full name and address or legal title of Surety, including zip code)

hereinafter called the “**Surety**”, are held and firmly bound unto the Board of County Commissioners of Washington County, Maryland, hereinafter called the “**County**”, Sum of _____ (\$ _____) lawful money of the United States for the payment of which sum well and truly to be made, the Principal and the Surety bind themselves, their heirs, personal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into or will enter into a contract with the County, for **Contract No. PUR-1500, Washington County PSTC Audiovisual System, Sharpsburg, Maryland.**

The contract referenced above and all items incorporated into the contract, together with any and all changes, extensions of time, alterations, modifications, or additions to the contract or to the work to be performed thereunder or to the Plans, Specifications, and Special Provisions, or any of them, or to any other items incorporated into the contract shall hereinafter be referred to as the “**Contract**”.

NOW, THEREFORE, during the original term of said Contract, during any extensions thereto that may be granted by the County, and during the guarantee and warranty period, if any, required under the Contract, unless otherwise stated therein, this Performance Bond shall remain in full force and effect unless and until the following terms and conditions are met:

1. Principal shall well and truly perform the Contract; and
2. Principal and Surety shall comply with the terms and conditions in this Performance Bond.

Whenever Principal shall be declared by the County to be in default under the Contract,

the Surety may, within fifteen (15) days after notice of default from the County, notify the County of its election to either promptly proceed to remedy the default or promptly proceed to complete the contract in accordance with and subject to its terms and conditions. In the event the Surety does not elect to exercise either of the above stated options, then the County thereupon shall have the remaining contract work completed, Surety to remain liable hereunder for all expenses of completion up to but not exceeding the penal sum stated above.

The Surety for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the Contract or to the work to be performed thereunder of the Specifications accompanying the same shall in any way affect its obligations on this Performance Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder of the specifications accompanying the same.

This Performance Bond shall be governed by and construed in accordance with the laws of the State of Maryland and any reference herein to Principal or Surety in the singular shall include all entities in the plural who or which are signatories under the Principal or Surety heading below.

IN WITNESS WHEREOF, Principal and Surety have set their hands and seals to this Performance Bond. If any individual is a signatory under the Principal heading below, then each such individual has signed below on his or her own behalf, has set forth below the name of the firm, if any, in whose name he or she is doing business, and has set forth below his or her title as a sole proprietor. If any partnership or joint venture is a signatory under the Principal heading below, then all members of each such partnership or joint venture, and each member has set forth below his or her title as a general partner, limited partner, or member of joint venture, whichever is applicable. If any corporation is a signatory under the Principal or Surety heading below, then each such corporation has caused the following: the corporation's name to be set forth below, a duly authorized representative of the corporation to affix below the corporation's seal and to attach hereto a notarized corporate resolution or power of attorney authorizing such action, and each such duly authorized representative to sign below and to set forth below his or her title as a representative of the corporation. If any individual acts as a witness to any signature below, then each such individual has signed below and has set forth below his or her title as a witness. All of the above has been done as of the Date of Bond shown above.

Signed, and sealed this _____ day of _____, 2021, in four counterparts each of which shall without proof of accounting for the other counterparts be deemed an original hereof.

WITNESS:

(Typed Name of Principal)

(Signed Name of Principal)

(Typed Name and title of witness)

(Signed Name of Witness)

(Seal)

(Typed Name of Contact)

(Telephone Number)

WITNESS:

(Typed Name of Surety)

(Signed Name of Surety)

(Typed Name and title of witness)

(Signed Name of Witness)

(Seal)

(Typed Name of local agent)

(Telephone Number)

END OF DOCUMENT

SECTION 00 70 00

**GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION A201 - 2017**

General Conditions

PUR-1500

Public Safety Training Center Audiovisual System

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AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Washington County Public Safety Training Center Audiovisual System
18350 Public Safety Place
Hagerstown, MD 21740

THE OWNER:

(Name, legal status and address)

Board of County Commissioners of Washington County, Maryland
100 West Washington Street
Hagerstown, MD 21740

THE ARCHITECT:

(Name, legal status and address)

Crabtree, Rohrbaugh & Associates
401 East Winding Hill Road
Mechanicsburg, PA 17055

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

Init.

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User Notes:

(1179670640)

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely

upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

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§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

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

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

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§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

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

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

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- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or

expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during

that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

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§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;

- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

SECTION 00 80 00

**SUPPLEMENTAL CONDITIONS TO THE
A201-2017 GENERAL CONDITIONS OF THE
CONTRACT FOR CONSTRUCTION**

SUPPLEMENTARY GENERAL CONDITIONS

The "Supplementary General Conditions" contains changes and additions to the "General Conditions of the Contract for Construction". Where any part of the General Conditions is modified as bound by the Supplementary General Conditions, the unaltered provisions shall remain in effect.

TABLE OF ARTICLES

Articles in General Conditions of the Contract for Construction:

Articles 1 through 15 (See AIA Document A201-2017). Article(s) - Amended in

Supplementary General Conditions:

- | | |
|-----------|--|
| 1 | General Provisions |
| 2 | Owner |
| 3 | Contractor |
| 4 | Architect |
| 7 | Changes in the Work |
| 8 | Time |
| 9 | Payments and Completion |
| 10 | Protection of Persons and Property |
| 11 | Insurance and Bonds |
| 13 | Miscellaneous Provisions |
| 14 | Termination or Suspension of the Contract |
| 15 | Claims and Disputes |

Amendment to Article 1 of General Conditions – GENERAL PROVISIONS:

Revisions to Article 1:

§1.1.1 Delete paragraph §1.1.1. in its entirety and substitute the following:

§1.1.1. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Standard Form of Proposal, Pre-Bid Meeting Minutes (when incorporated by reference through Addenda), Conditions of the Contract (General, supplementary, Special and other Conditions), drawings, Specifications, Addenda issued prior to execution of the Contract, other documentations listed in the Agreement to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§1.5.1. Delete all of Paragraph §1.5.1 in its entirety and substitute the following:

§1.5.1. The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultant are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Owner, the Architect or the Architect's consultants, and the Owner shall retain ownership of all documents. All copies of Instruments of Service, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractors, Sub-subcontractors or material or equipment supplier on other projects.

Additions to Article 1:

§1.1.9. STANDARD FORM OF PROPOSAL:

Any reference in the Contract Documents to the "Bid Form" shall be interpreted to mean the "Standard Form of Proposal".

§1.1.10. COMPLETED IN EVERY RESPECT:

1. After the Contractor notifies the Architect in writing that work is ready for final inspection, and:
2. A "punch list" of deficiencies is prepared by the Architect and Owner at the time of the final inspection, and:

3. Items on the "punch list" have been corrected by the Contractor and their correction verified by the Architect, and:
4. The Architect issues a Certificate of Final Completion.

§1.1.11. Additional Definitions:

“Provide” means to furnish and install.

“Exposed” means showing in any or all parts at completion of the work under this Contract.

“Where shown” means as-shown or where indicated referring to the drawings, details, shopdrawings and schedules.

“Approved” means approved, selected, directed and/or authorized by the Architect unless otherwise specified.

“Excludes”, under the headings of SCOPE; means from this section only.

§1.2.4. CONVENIENCE OF REFERENCE

For convenience of reference and to facilitate letter of subcontractors, specifications are separated into titled sections. Such separation, however, shall not make the Architect an arbiter to establish limits to the contracts between the Contractor and Subcontractors. The Contractor only shall be recognized as a part of this Contract and it shall be his responsibility to turn over to the Owner a project complete in all respects and in accordance with the Contract Documents. Unless a provision within a specification section provides alternatives, the specifications are written in the form of a directive to the Contractors, using imperative statements. For brevity and to avoid repetition, such phrases as "The Contractor shall" are intentionally omitted; omitting words or phrases shall be supplied in inference.

§1.2.5. RESOLVING CONFLICTS AND INCONSISTENCIES AMONG THE CONTRACT DOCUMENTS

The Contract Documents shall be interpreted as a whole. It shall be assumed that every provision was intended to have some effect; however, it may be necessary to prefer one provision over another. Where one clause deals generally with a problem and another deal more specifically with the same problem, the specific takes precedence over the general. Operative clauses take precedence over “whereas” clauses that seek to give the background of the issue. Inconsistencies between printed, typed and handwritten provisions, handwritten provisions will be preferred over typed and typed preferred to printed. Anything mentioned in the specifications and not shown on the drawings or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. Specification includes the furnishing of all material, labor equipment, plant, tools, services and appliances and performing all operations in connection with the fabrication and installation of items, complete, as shown on the drawings and/or specified, subject to the General Conditions and Supplementary Conditions (if any) and terms of the Contract. Where Supplementary General or Special Conditions conflict with General Conditions, the former shall govern. In the event of conflict or inconsistency within the drawings, within the specifications, or between drawings and specifications, Architect's decision as to intent of the Contract Documents shall be final.

§1.4.2. INCONSISTENCIES FOUND DURING THE BIDDING PHASE

Conflicts and inconsistency found during the bidding phase shall be called to the Owner’s attention immediately. A correction or clarification will be made by Addendum.

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§1.4.3. DIMENSIONING AND SCALE

Adhere to dimensions though differing from scale measurements; in the absence of dimensions or in case of doubt as to the proper measurements, consult Architect. Detailed drawings take precedence over those of small scale and specifications take precedence over drawings.

Amendment to Article 2 of General Conditions - OWNER:

Revisions to Article 2:

§2.1.1. Delete Paragraph §2.1.1. in its entirety and substitute the following:

§2.1.1 The Owner is the Board of County Commissioners of Washington County, MD and is referred to throughout the Contract Documents as if singular in number. The Director of the Division of Engineering for Washington County is the Owner's authorized representative with respect to all matters requiring the Owner's approval or authorization. The Director shall designate a Project Manager who will interact on a daily basis with the Contractor and Architect to facilitate completion of the project. The Architect's authority is provided in Subparagraph 4.2.1. The term "Owner" means the Owner or the Owner's authorized representative.

§2.1.2. Delete Paragraph §2.1.2 in its entirety.

§2.2.2. Delete Paragraph §2.2.2 in its entirety and substitute the following:

§2.2.2. Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under section 3.7.1., the Owner shall secure and pay for necessary approvals, easements, assessment and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Any permits, fees, approvals, easements, assessments and/or charges required for construction associated with the Contractor's means and methods shall be the responsibility of the Contractor.

§2.2.3. Delete Paragraph §2.2.3 in its entirety and substitute the following:

§2.2.3. The Owner may furnish surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of the information when specific dimensions, elevations and physical locations are stipulated in the contract documents but shall exercise proper precautions relating to the safe performance of the work. It shall be the express responsibility of the Contractor to contact Miss-Utility to mark the location of utilities and exercise extreme care while excavating as to prevent contact with any underground utility system. Information and data furnished from subsurface soil investigations are furnished for the Contractor's information and the Owner does not represent or warrant that this available information is either accurate or complete. Subsurface information is to be expressly understood that the Architect, Owner, Soils Engineer (Geotechnical Engineer), will not be responsible for any interpretation or conclusion drawn there from. The

Contractor shall excavate to the grades, slopes, lines, and levels indicated irrespective of the materials encountered with no increase in the contract cost, unless stipulated otherwise elsewhere in the contract documents. The Contractor shall be responsible for verifying or supplementing the subsurface data to the extent that he considers necessary.

Amendment to Article 3 of General Conditions - CONTRACTOR

Revisions to Article 3:

§3.4.3. Delete Paragraph §3.4.3. in its entirety and substitute the following:

§3.4.3. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Owner may require removal of anyone from the site who is deemed disruptive behaving in an inappropriate manner. The Contractor shall not permit employment of unfit persons or persons not properly skilled in assigned tasks to them or illegal aliens meeting the federal government definition, as such.

§3.9.2. Revise Paragraph §3.9.2. in its entirety and substitute the following:

§3.9.2. Within (10) calendar days following Award of the Contract, the Contractor shall furnish to the Owner a detailed resume of the proposed Superintendent for the project. The Owner may make such investigations as he deems necessary to determine the qualifications of the proposed Superintendent to perform his duties, and the Contractor shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject the Superintendent if the evidence submitted by or investigation of, the Contractor fails to satisfy the Owner that the Superintendent is qualified to perform his duties.

Additions to Article 3:

§3.4.4. The Contractor shall comply with the Immigration and Nationality Act (INA) which includes provisions addressing employment eligibility, employment verification, and nondiscrimination. Under the INA, the Contractor may hire only persons who may legally work in the United States (i.e., citizens and nationals of the U.S.) and aliens authorized to work in the U.S. The Contractor shall verify the identity and employment eligibility of anyone employed or to be employed, including completion of the Employment Eligibility Verification Form (I-9). The Contractor shall establish appropriate procedures and controls to insure that no services under this Contract will be performed by any worker who is not legally eligible to perform such services or foreemployment.

§3.4.5. Failure by the Contractor or his/her Sub-Contractors to comply with the provisions of above paragraph (a) will be grounds for termination of the Contract.

§3.8.3.2. The Contractor shall allow reasonable time for the Owner to make such selections.

§3.9.3. If the Superintendent does not perform his duties to the Owner's satisfaction, the Owner may order him removed and the Contractor shall comply therewith. The Owner under this provision will allow no claim for actions.

§3.10.3. SCHEDULE MEETINGS

The Contractor shall meet with the Owner and the Architect (unless the architect's absence is excused by the Owner) at least monthly to discuss in detail the Contractor's updating of the schedule, the necessity for revisions or corrections in the schedule or updates, and all other issues or matters relating to the scheduling of the project and the Contractor's obligation under the project respecting scheduling. This meeting shall be in addition to the progress meetings required elsewhere in the Contract Documents.

Amendment to Article 4 of General Conditions: ARCHITECT

Revisions to Article 4:

§4.2.1. Delete all of Paragraph §4.2.1 in its entirety.

Amendment to Article 7 of General Conditions: CHANGES IN THE WORK:

Revisions to Article 7:

§7.3.10. Delete Paragraph §7.3.10. in its entirety and substitute the following:

§7.3.10. When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Project Manager will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

1. A written request for a change in the work may be made by Owner, the Architect, or the Contractor, but only the Owner shall authorize and approve the change.
2. The change will be issued in the form of a written "Change Order Form", signed by the Owner and the Contractor, which authorizes the change in the work, indicates the mutually agreed upon price which shall be added or deducted from the contract price, and the extent to which the contract time shall be increased or decreased.
3. The Contractor shall furnish in duplicate to the Owner and the Architect a fully itemized breakdown of the quantities and prices used in computing the value of

any change that might be requested. All written requests for a change in the work and/or time extensions must include the full explanation and justification for the change regardless of its nature.

4. For all work to be performed by a subcontractor, the Contractor shall furnish the subcontractor's itemized proposal, which shall contain original signature by an authorized representative of the subcontracting firm. If requested by the Owner or Architect, proposals from suppliers or other supporting data to substantiate the Contractor's or the subcontractor's cost shall be furnished.
5. All proposals and breakdowns shall be submitted promptly.
6. When changes, alterations, deductions or additions are so ordered, the value of suchwork will be determined in the following ways:
 - A. When unit prices are stated in the Contract or have been subsequently agreedupon, by application of these unit prices.
 - B. A lump sum price agreed to by both the Owner and the Contractor.
 - C. If job conditions or the extent of the change prohibit the use of either 6-A or 6-B a price arrived at by performing the work on a cost plus not to exceed basis.
 - D. If a change involves merely a credit, the Contract price will be reduced by the amount it would have cost the Contractor if the omitted item or work had not been eliminated, including overhead and profit. However, the Contractor and the subcontractor will be allowed to retain a sum not in excess of threepercent (3%) for handling.
 - E. If a change involves both an extra and a credit, both sums shall be shown and the two sums balanced to determine the adjusted total cost or credit. No allowance to the Contractor shall be made or allowed for loss of anticipatedprofits on account of any changes in the work.
 - F. Unless otherwise specified, the allowable mark-up for combined overhead and profit for work performed by the Contractor with his own forces will be based on the monetary value of the work in accordance with the following schedule:

Value of the Work	Combined Overhead and Profit
\$0 to \$1,000	25%
\$1,001 to \$5,000	20%
\$5,001 to \$10,000	17%
\$10,001 to \$25,000	15%
Over \$25,000	Negotiated but not to exceed 15%

- G. For work performed by a subcontractor with his own organization the percentages for combined overhead and profit will be as outlined in 6-F. On work partly or solely performed by a subcontractor, the Contractor will be allowed six percent (6%) of the total cost of the subcontractor's labor, materials, overhead, net profit only, + 1 1/2% for bond/insurance.

Additions to Article 7:

§7.3.11. When the Contractor and the Owner fail to agree upon a lump sum price or method as outlined in §7.3.10.6., above, the Owner shall have the right to issue a Construction Change Directive for the work to be accomplished on a time and material basis. A correct account shall be kept by the contractor and approved by the Owner and/or the Architect of the actual cost of all labor and materials as directed by the Owner and/or the Architect. To these costs shall be added percentage allowances for overhead and profit as stated in Paragraph F, above. Receipted invoices shall be submitted to the Owner to validate the cost of all shop fabricated material and all other materials supplied. Certified payrolls shall be submitted for labor costs.

§7.3.12. On all work as defined in Article 12, no Contractor will be allowed any expenses, overhead or profit for employment of another subcontractor to perform work for him.

§7.3.13. Further on work covered by Change Order the Contractor will be reimbursed for his expenditures for Workmen's Compensation insurance, Social Security Taxes and Unemployment compensation covering men actually engaged upon the work and the actual increased cost of bond. These without any percentage added.

§7.3.14. The cost of foremen and superintendents may be added only when the Change Order makes necessary the hiring or additional supervisory personnel or makes their employment for time additional to that required by the basic Contract.

§7.3.15. If the Contractor and the Owner cannot agree as to the extent that the contract time shall be increased for extra work or the extent the contract time shall be reduced for work omitted by the Owner, the increase or decrease, as the case may be, shall be in the same proportion of the original Contract as the cost of the additional work; including overhead and profit or the amount of the omitted work; including overhead.

§7.3.16. No order for change at any time or place shall in any manner or to any extent relieve the Contractor of any of his obligations under the Contract.

§7.3.17. The Architect with the concurrence from the Owner shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purposes of the building. Otherwise, except in any emergency endangering life or property, no extra work or change shall be made unless a written order from the Owner and/or the Architect has been received by the Contractor. No claim for addition to the contract sum or time of completion shall be valid unless so ordered.

Amendment to Article 8 of General Conditions: TIME:

Revisions to Article 8

§8.3. Delete Article §8.3 Delays and Extension of Time, in its entirety and substitute the following:

§8.3. DELAYS AND EXTENSION OF TIME

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It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the Contract of the work to be done hereunder are essential conditions of this Contract. It is intended that the work shall commence within ten (10) calendar days immediately after the date of Notice to Proceed and that the entire work shall be substantially complete in every respect so that the Owner may occupy the work or designated portion thereof for the use for which it is intended.

§8.3.2. If the Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner liquidated damages as stipulated in the Contract Documents, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work. The said amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain, and said amount is agreed to be the amount of damages which the Owner would sustain.

§8.3.3. It is further agreed that where under the Contract, additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract; provided, that the Contractor shall not be charged with liquidated damages when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extensions are acceptable to the Owner; provided, further, that the Contractor shall not be charged with liquidated damages when the delay in completion of the work is due.

1. To any preference, priority or allocation order duly issued by the Government.
2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including but not restricted to changes ordered in the work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties or any cause beyond the Contractor's control, or by delay authorized by the Owner pending determination, or by any other cause which the Architect (with the Owner's approval) determines may justify the delay.

§8.3.4. Requests for extensions of completion time will be reviewed by the Owner, after written application is made for a time extension to the Architect. Any request for an extension of time is to be made immediately upon occurrence of conditions which in the opinion of the detailed proof given for all delays beyond the Contractor's control, these to be made in writing to the Architect. No time extension will be allowed except after written concurrence of the Architect and formal approval thereof by Owner.

§8.3.5. WEATHER

§8.3.5.1. Definition of rain and drying days:

1. Rainfall sufficient to result in a workday being potentially lost due to rain (rain day) shall be defined as liquid precipitation greater than 0.10 inch, measured in

- general vicinity to the jobsite as determined by the Architect.
2. It shall be considered normal for the workday immediately following a rain day of precipitation greater than 1.00 inch to potentially be lost due to wet ground conditions (drying day). The Owner may allow additional drying days if deemed reasonable, in its discretion. It shall be the Contractor's obligation to provide sufficient justification and supporting documentation to the Owner for review and approval for designation of a rain day or drying day.

§8.3.5.2. UNUSUALLY SEVERE WEATHER

§8.3.5.2.1. RAIN

To qualify as unusually severe weather due to rain, the number of actual weekdays lost due to rain and drying days must be greater than that calculated for the month in question using the following procedure.

1. Using the last ten (10) years of weather data for the project location from the National Oceanic and Atmospheric Administration (NOAA) or the Greg Keefer Local Weather Observer website (<http://i4weather.net/>) or similar source acceptable to the Owner, Contractor shall compute the average number of weekdays lost due to rain days and drying days for the month in question and the standard deviation from the average.
2. Contractor shall then add the average number of weekdays lost to the standard deviation. The sum (the average plus the standard deviation) shall be considered normal for the month in question.
3. Actual weather impact shall be calculated by first determining the actual lost rain weekdays during each month in question. If any of the following conditions existed on a given weekday, the day will be deducted from the total actual rain days for the month to determine the net number of weekdays lost due to rain:
 - A. Rainfall occurred on a non-work weekday such as a holiday;
 - B. Rainfall occurred at a time when no weather-dependent work was in Progress or occurred during planned or unplanned shutdowns due to other (non-weather) circumstances such as equipment failure, strikes, delays, etc.; or
 - C. Contractor was still working or able to work on all weather dependent activities to the extent that production was or could have been within actual normal levels established on the project (average plus or minus the standard deviation).

§8.3.5.2.2. TIME EXTENSIONS FOR RAIN

If the net number of weekdays lost to rain is less than the normal in question (average rain days and drying days plus one standard deviation), no time adjustment will be made. If the net number of weekdays lost to rain is more than the normal number for the month in question, an excusable and non-compensable time extension will be granted. No adjustments will be made for the time between the start date stated in the Notice to Proceed and the first day of the following month or for the last partial month.

§8.3.5.3. OTHER WEATHER CONDITIONS

Time extensions for delays due to unusual weather conditions other than rain (such as snow, extreme cold or heat, high winds, etc.) will be considered only to the extent Contractor can prove conditions were unusually severe, and they caused actual delay to the adjusted as-planned/as-built critical path. Any extension authorized by the Owner under this provision shall be excusable and non-compensable.

§8.3.5.4. SCHEDULING OF ADVERSE WEATHER DAYS

The Contractor's progress schedule must reflect all phases of the work and anticipate adverse weather delays in all-weather dependent activities. The following schedule of monthly adverse weather delays based on National Oceanic Atmospheric Administration (NOAA), Local Weather Observer or similar data source acceptable to the Owner may constitute a baseline for monthly weather time evaluations:

Monthly Anticipated Adverse Weather Delays Workdays Based on 5 Day Work Week					
January 8	February 7	March 8	April 8	May 8	June 7
July 5	August 6	September 4	October 6	November 5	December 5

The above summary reflects the total average number of weekdays lost using the weather data from BWI Airport and is described as: days of rainfall greater than 0.10 inch and days considered normal weekdays that follow a rain day greater than 1.0 inch.

Amendment to Article 9 of General Conditions: PAYMENTS AND COMPLETION

Revisions to Article 9

§9.3.1. Delete Paragraph §9.3.1 in its entirety and substitute the follows:

§9.3.1. At least ten (10) days before the date established for each progress payment, the Contractor shall submit to the Architect and itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from subcontractors and material suppliers, and shall reflect a five (5%) percent retainage on all Contractor's Applications for Payment.

§9.3.2. Revise Paragraph §9.3.2. in its entirety and substitute the following:

§9.3.2. Unless otherwise provided in the Contract Documents, payments shall be made on

account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the work. If approved in advance by the owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off site. Requests for payment of stored materials shall not be granted prior to 90-days of scheduled use unless otherwise approved by the Owner and Architect.

Amendment to Article 10 of General Conditions: PROTECTION OF PERSONS AND PROPERTY

Revisions to Article 10

§10.2.4. Delete Paragraph §10.2.4 in its entirety and substitute the following:

§10.2.4. When use or storage of explosives or other hazardous materials or equipment or usual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. No use or storage of explosives or other hazardous materials will be permitted on the premises without prior written notification and approval from the Owner.

§10.3.3. Delete all of Paragraph §10.3.3 in its entirety.

Amendment to Article 11 of General Conditions: INSURANCE AND BONDS

Revisions to Article 11

Additions to Article 11:

§11.5. INSURANCE REQUIREMENTS FOR INDEPENDENT CONTRACTORS

§11.5.1. The Contractor shall provide the following additional insurance limits beyond the County's contractor limits, stipulated in Paragraph 11.5.2.:

1. Primary General Liability: \$2,000,000 each occurrence and \$2,000,000 aggregate.
2. Umbrella Liability: \$5,000,000 each occurrence and \$5,000,000 aggregate.
3. Automobile Liability: \$1,000,000 each occurrence and \$1,000,000 aggregate.
4. Worker's compensation: Statutory

5. Builder's Risk: Full replacement cost of the structure under construction, plus debris removal coverage and ordinance coverage for all risk perils, and cost of materials onsite that have not yet been installed.

All other provisions and requirements of the County's Insurance policy remain in effect for the Washington County INSURANCE REQUIREMENTS FOR INDEPENDENT CONTRACTORS (below).

§11.5.2. Additional insurance requirements for independent contractors shall be consistent with the Owner's policy regarding same, as follows:

POLICY TITLE: Insurance Requirements for
Independent Contractors Adoption Date: August 29, 1989

EFFECTIVE DATE: September 1, 1989

FILING INSTRUCTIONS:

I. PURPOSE

To protect Washington County against liability, loss or expense due to damaged property, injury to or death of any person or persons and for care and loss of services arising in any way, out of, or in connection with or resulting from the work or service performed on behalf of Washington County.

II. ACTION

The following should be inserted in all Independent Contractor Contracts:

"The Contractor shall procure and maintain at his sole expense and until final acceptance of the work by the County, insurance as hereinafter enumerated in policies written by insurance companies admitted in the State of Maryland, have A.M. Best rating of A- or better or its equivalent, and acceptable to the County."

1. **Workers Compensation:** The Contractor agrees to comply with Workers Compensation laws of the State of Maryland and to maintain a Workers Compensation and Employers Liability Policy.

Minimum Limits Required:

Workers Compensation-	Statutory
Employers Liability -	\$100,000 (Each Accident)
	\$500,000 (Disease - Policy Limit)
	\$100,000 (Disease - Each Employee)

2. **Comprehensive General Liability Insurance:** The Contractor shall provide Comprehensive General Liability including Products and Completed Operations.

Minimum Limits Required:

\$1,000,000 combined single limit for Bodily Injury and Property Damage.

2. Such insurance shall protect the County, its agents, elected and appointed officials, commission members and employees, and name Washington County on the policy as additional insured against liability, loss or expense due to damaged property (including loss of use), injury to or death of any person or persons and for care and loss of services arising in any way, out of, or in connection with or resulting from the work of service performed on behalf of Washington County.

The Contractor is ultimately responsible that Subcontractors, if subcontracting is authorized, procure and maintain, at their sole expense and until final acceptance of the work by the County, insurance as hereinafter enumerated in policies written by insurance companies admitted in the State of Maryland, have A.M. Best rating of A- or better or its equivalent, and acceptable to the County.

3. **Business Automobile Liability:** The Contractor shall provide Business Auto Liability including coverage for all leased, owned, non-owned and hired vehicles.

Minimum Limits Required:

\$1,000,000 combined single limit for bodily Injury or Property Damage.

Certificate(s) of Insurance: The Contractor shall provide certificates of insurance requiring a 30 day notice of cancellation to the Insurance Department, Board of County Commissioners of Washington County prior to the start of the applicable project.

Approval of the insurance by the County shall not in any way relieve or decrease the liability of the Contractor. It is expressly understood that the County does not in any way represent that the specified limits of liability or coverage or policy forms are sufficient or adequate to protect the interest or liabilities of the Contractor.

All responsibility for payment of any sums resulting from any deductible provisions, corridor, or self-insured retention conditions of the policy or policies shall remain with the Contractor.

General Indemnity: The Contractor shall indemnify, defend and save harmless the Board of County Commissioners of Washington County, its appointed or elected officials, commission members, employees and agents for any and all suits, legal actions, administrative proceedings, claims, demands, damages, liabilities, interest, attorneys fees, costs and expenses of whatsoever kind of nature, whether arising before or after final acceptance and in any manner directly or indirectly caused, occasioned or contributed to in whole or in part by reason of any act, error or omission, fault or negligence whether active or passive by the Contractor, or any one acting under its direction, control or on its behalf in connection with or incident to its performance of the Contract.

Revision Date: August 27, 1991
Effective Date: August 27, 1991
Revision Date: March 4, 1997
Effective Date: March 4, 1997

Supplemental General Conditions

PUR-1500

Public Safety Training Center Audiovisual System

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Amendment to Article 13 of General Conditions: MISCELLANEOUS PROVISIONS

Revisions to Article 13:

§13.2.2. Delete all of Paragraph §13.2.2 in its entirety.

Amendment to Article 14 of General Conditions: TERMINATION OR SUSPENSION OF THE CONTRACT

§14.1. Delete all of Section §14.1 in its entirety.

Amendments to Article 15 of General Conditions: CLAIMS AND DISPUTES

Revisions to Article 15:

Additions to Article 15:

§15.1.8. CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

The Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within twenty-one (21) calendar days after the first observance of any one of the following conditions:

1. Concealed conditions encountered in the performance of the Work below the surface of the ground be at variance with the conditions indicated by the Contract Documents;
2. Should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents be encountered;
3. Should unknown physical conditions below the surface of the ground or should concealed or unknown structure of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract, be encountered.

In addition to the above, the Contractor shall not disturb or alter the differing site conditions before giving proper notification to the Owner's Representative and the Architect opportunity for inspection.

§15.1.9. CLAIMS ALLEGING DESIGN ERROR OR OMISSION

Claims, including those alleging an error or omission by the Architect shall be referred initially to the Architect for recommendation to the Owner. An initial decision by the Architect shall be required as a condition precedent to mediation or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless (30) calendar days have passed after the Claim has been referred to the Architect with no decision having been rendered by the Architect.

END OF SUPPLEMENTARY CONDITIONS TO THE GENERAL CONDITIONS OF

SECTION 00 90 00
DRAWING INDEX

Drawing Index

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Public Safety Training Center Audiovisual System

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AUDIOVISUAL

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TA7.12	AUDIOVISUAL LOGICAL DIAGRAMS
TA7.13	AUDIOVISUAL LOGICAL DIAGRAM

SECTION 011000 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of a new audiovisual system for the Washington County Public Safety Training Center.

Generally, the project shall include all of the audiovisual equipment and services as indicated on the construction drawings and in the specification, including all hardware, software, cabling, wall plates, accessories and acceptance testing as specified and as may be required to provide a fully integrated and turn-key audiovisual system installation. Projection screens and required rough-ins for installation of the A/V equipment are being installed by the General Building Contractor. Additional projection screen information, as well as other pertinent construction details can be found within the conformed specifications and construction drawings that were previously issued for construction of the building. These drawings have been provided separately for informational purposes only. Please note that due to grant funding requirements all of the base bid equipment shall be purchased, received and invoiced by no later than the end of August 2021. Please note that equipment may need to be stored by the A/V contractor until the building is ready for installation. In addition, the installation of all above ceiling work shall be coordinated with the General Building Contractor and shall be installed prior to installation of the ceiling tile and grid. Ceiling grid installation is tentatively scheduled to begin around the middle of September 2021. This Contractor shall be responsible for coordinating their work with the General Building Contractor and related subcontractors as required for a turn-key installation.

- 1 Project and Location: Washington County PSTC Audiovisual System:
18350 Public Safety Place Hagerstown, MD 21740
- 2. Owner: Washington County Board of Commissioners
100 West Washington Street, Room 1101
Hagerstown, MD 21740
- 3. The Contract Documents, dated December 18, 2019 were prepared for the Project by Crabtree, Rohrbaugh & Associates – Architects, 401 E. Winding Hill Road, Mechanicsburg, PA. 17055, phone: (717) 458-0272. The conformed Bid documents for the General Building Project (other than the one's included for this project), have been provided for informational purposes.

END OF SECTION 011000

SECTION 012300 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

1.3 DEFINITIONS

- A. Definition: An alternate is an amount proposed by a bidder and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the NET addition to or deduction from the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate whether alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other Work of this Contract.
- D. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. GENERAL CONSTRUCTION - ALTERNATES

- 1 Add Large Classroom (B100): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 2 Add Large Classroom (B102): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 3 Add Multi-purpose Room (C100): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 4 Add Displays-MPR Video Wall (C100): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 5 Add Small Classroom (A134): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 6 Add Small Classroom (B116): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 7 Add Small Classroom (B119): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 8 Add Small Classroom (B106): State the change in the contract amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section 274100.
- 9 Add Small Classroom/Simulation Lab (B109): State the change in the contract

amount to be ADDED to the base bid to add the audiovisual equipment including installation as indicated on the audiovisual (TA Series) drawings and specifications, in particular the Schedule A Equipment List included in Section A Equipment List included in Section 274100.

END OF SECTION 012300

SECTION 012700 - CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes procedural requirements for cutting and patching.
- B. Related Sections include the following:
 - 1. Division 1 Section "Selective Demolition" for demolition of selected portions of the building.
 - 2. Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 3. Division 7 Section "Firestop Systems" for patching fire-rated construction.

1.3 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.

1.4 GENERAL

- A. Build sleeves and anchors into the Work for the proper engagement of the Work.
- B. Provide chases, openings and recesses in the new Work.
- C. Perform all cutting necessary to install Work. Cutting of structural members will not be permitted except by written permission of the Architect.
- D. Repair, at own expense, all surfaces cut into or damaged as a result of Work.
- E. All cutting and patching that is unnecessary, excessive or carelessly done and cutting of new construction made necessary by ill-timed Work shall be repaired at own expense. All such repairing shall be accomplished by skilled mechanics of the proper trade and to the satisfaction of the Architect.

1.1 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least seven (7) days prior to the required Cutting and Patching Conference, requesting approval to proceed. Include the following information:
1. Extent: Describe cutting and patching, show how it will be performed, and indicate why it cannot be avoided.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 3. Products: List products to be used and firms or entities that will perform the Work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 7. Approval: Obtain approval of the cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory Work.

1.2 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. Operating elements include the following:
1. Primary operational systems and equipment.
 2. Mechanical systems piping and ducts.
 3. Control systems.
 4. Communication systems.
 5. Electrical wiring systems.
 6. 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. Miscellaneous elements include the following:
1. Water, moisture, or vapor barriers.
 2. Membranes and flashings.

3. Exterior storefront 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 the Architect'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: Meet at the Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review the previously submitted Cutting and Patching Proposal and areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding with Work.

1.3 WARRANTY

- A. 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

2.1 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 in the Architect's opinion, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 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.

3.2 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 the Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passageto adjoining areas.
- D. Utility Services and Mechanical/Electrical Systems: Where services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 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.
 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. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. 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 seams that are invisible. Provide materials and comply with installation requirements specified in other Sections.
 - 1. Inspection: Test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean surfaces, piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original 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 012700

SECTION 012900 - APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
 - 1. Coordinate the Schedule of Values and Applications for Payment with the Contractor's Construction Schedule, Submittal Schedule, and List of Subcontracts.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 1 Section "Submittals" for the Contractor's Construction Schedule and the Submittal Schedule.
 - 2. Division 0 Section "Supplementary General Conditions" for requirements related to Payments and Completion.
- C. Attachments: The following documents are attached to the end of this Section.
 - 1. Partial Waiver and Release of Mechanics Lien Claims.
 - 2. Initial Statement of Contract Value
 - 3. Stipulation Against and Waiver of Liens.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
- B. Coordination: Each Prime Contractor shall coordinate preparation of its Schedule of Values for its part of the Work with preparation of the Contractors' Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of alternates.
 - e. List of products.
 - f. List of principal suppliers and fabricators.
 - g. Schedule of submittals.

2. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Application for Payment.
 3. Subschedules: Where Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- C. Format and Content: Use the Project Manual table of contents as a guide to establish the format 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 the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section and Division.
 - b. Description of 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 Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual Table of Contents. Break principal subcontract amounts down into several line items.
 4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
 5. 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 permitted by Owner). Include requirements for insurance and bonded warehousing, if required.

6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. Each Application for Payment MUST include an attached, executed Partial Waiver and Release of Mechanics Lien Claims Form.
 - a. The Contractor shall be responsible to have each subcontractor under his Contract, execute the attached Stipulation Against and Waiver of Liens prior to submittal of the initial Application for Payment.
- B. Payment-Application Times: Draft applications for progress payments shall be presented to the Architect no later than the 25th of each month. The Architect will comment and return to the Contractor for final submission no later than the first of the following month. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.
- D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
 3. Include an updated, executed copy of the Partial Waiver and Release of Mechanics Lien Claims Form.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to the Architect by a method ensuring receipt within 24 hours.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- F. Initial Application for Payment: Administrative actions and/or submittals, that must precede or coincide with submittal of the initial Application for Payment, include the following:

1. Secure a Stipulation Against and Waiver of Liens Form from each subcontractor.
2. Execute an Initial Statement of Contract Value.
3. List of subcontractors.
4. List of principal suppliers and fabricators.
5. Schedule of Values.
6. Contractor's Construction Schedule (preliminary if not final).
7. Schedule of principal products.
8. List of Contractor's staff assignments.
9. Copies of building permits.

G. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and/or submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Startup performance reports.
 - f. Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - g. Final cleaning.
 - h. Application for reduction of retainage and consent of surety.
 - i. Advice on shifting insurance coverages.
 - j. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

H. Final Payment Application: Administrative actions and/or submittals that must precede or coincide with submittal of the final Application for Payment include the following:

1. Execute a Contractor's Affidavit of Release of Liens Form (AIA Document G706A).
2. Completion of Project closeout requirements.
3. Completion of items specified for completion after Substantial Completion.
4. Ensure that unsettled claims will be settled.
5. Ensure that incomplete Work is not accepted and will be completed without undue delay.
6. Transmittal of required Project construction records to the Owner.
7. Removal of temporary facilities and services.
8. Removal of surplus materials, rubbish, and similar elements.
9. Change of door locks to Owner's access.

END OF SECTION 012900

**PARTIAL WAIVER AND RELEASE
OF MECHANICS LIEN CLAIMS**

(Must be executed and attached to Every Application for Payment)

OWNER: _____



Crabtree, Rohrbaugh & Associates - Architects
401 East Winding Hill Road
Mechanicsburg, PA 17055
Maryland • Pennsylvania • Virginia • West Virginia

ARCHITECT: _____

CONTRACTOR: _____

PROJECT: _____

(legal description attached hereto as Exhibit "A")

PAYMENT AMOUNT: _____

PAYMENT DATE: _____

ORIGINAL CONTRACT AMOUNT: _____

VALUE OF APPROVED CHANGE ORDERS: _____

For and in consideration of the Payment cited above, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned Contractor does hereby waive, release, and relinquish any and all rights, claims, demands, liens, mechanics liens, claims for relief, causes of action and the like, whether arising at law, under a contract, in tort, in equity or otherwise, which the undersigned has now, may have had or may have in the future, arising out of any payment due or alleged to be due for any Contractor work, labor, or materials provided in connection with the Project, through the date hereof.

CONTRACTOR ACKNOWLEDGES THAT ANY CLAIM CONTRACTOR HAS HEREAFTER RELATING TO PAYMENT OR DEMANDS FOR PAYMENT SHALL BE LIMITED TO THE DIFFERENCE BETWEEN THE ORIGINAL CONTRACT AMOUNT AS MODIFIED BY THE VALUE OF APPROVED CHANGE ORDERS LESS THE AMOUNT PAID TO CONTRACTOR THROUGH THE DATE OF ANY SUCH CLAIM.

The Contractor warrants that it has not and will not assign any claims for payment or right to perfect any lien against Owner or Project and further warrants that it has the right to execute this waiver and release. Furthermore, Contractor hereby agrees to defend, indemnify and hold harmless Owner from and against all damages and costs that arise from any other entity or person claiming entitlement through the Contractor through the Payment Date.

In order to induce Owner to make the Payment referenced herein, the Contractor also warrants and certifies that it has made full payment of any amounts due or claimed to be due through the Payment Date to any person or entity who has supplied materials or labor in connection with the Project.

The undersigned agrees that the Owner of the Project, any lender, any title insurer, and any surety may rely upon this waiver.

The undersigned further agrees that the making and receipt of payment and execution of this Waiver and Release shall in no way release the undersigned from its continuing obligations with respect to the completion of any work remaining undone, punch list work, warranty and guaranty work, and any other obligations of the undersigned to the Owner.

IN WITNESS WHEREOF, on behalf of the undersigned, the Contractor executes this Partial Waiver and Release on the date first written above.

CONTRACTOR:_____

By:_____

Title: _____

Sworn to and subscribed before me this ____ day of _____, 2021

My commission expires:_____

Notary Public

INITIAL STATEMENT OF CONTRACT VALUE

(To be executed by each Prime Contractor and submitted to the Architect for filing)



Crabtree, Rohrbaugh & Associates - Architects

401 East Winding Hill Road

Mechanicsburg, PA 17055

Maryland • Pennsylvania • Virginia • West Virginia

ARCHITECT:

OWNER: _____

In the Court of Common Pleas _____ County, Maryland

Plaintiffs :

:

v.

:

No. _____

:

PRIME CONTRACTOR: _____

:

Defendant :

PRIME CONTRACTOR: _____

:

Plaintiff:

:

v.

:

:

OWNER: _____

:

Defendant :

NOTICE PURSUANT TO 49 P.S. §1405

1. Owner is the legal or equitable owners of certain real estate known as ADDRESS by deed dated DATE, and recorded DATE, in the Office of the Recorder of Deeds of County, Pennsylvania, in Book _____, page____(hereinafter the "Property").
2. Prime Contractor is the "Contractor" as defined in 49 P.S. §1201, Pennsylvania Mechanics' Lien Law of 1963.
3. Owner and Contractor have entered into a contract for the construction of a building on the Property (hereinafter the "Contract") in which Owner is the Owner as defined in 49 P.S. §1201, Pennsylvania Mechanics' Lien Law of 1963, and Prime Contractor is the Contractor.

4. For the specific purpose of limiting the potential mechanics lien claims of Owner's or Prime Contractor's subcontractors as against the Owner to any such subcontractor's/claimant's pro-rata share of the unpaid balance of the contract price set forth in the Contract, the parties hereto file this Notice.
5. The Contract is dated _____ by and between the Owner and the Contractor.
6. The Contract contemplates the construction of a building containing approximately *insert square footage* _____ square feet to be constructed on the Property.
7. The total price of the Contract, as modified hereafter by any material change orders, is _____.
8. Any claim by any subcontractor/claimant shall be limited to its pro-rata share of the contract price remaining unpaid at the time notice of intention to file any such claim is first given to the Owner.

By: Owner

By: _____
Authorized Officer

By: Prime Contractor

By: _____
Authorized Officer

STIPULATION AGAINST AND WAIVER OF LIENS

(Executed by the Prime Contractor and each Subcontractor prior to submittal of the INITIAL Application for Payment)

(Each Prime Contractor shall attain and file this Stipulation for each of their respective Subcontractors)



Crabtree, Rohrbaugh & Associates - Architects

401 East Winding Hill Road

Mechanicsburg, PA 17055

Maryland • Pennsylvania • Virginia • West Virginia

ARCHITECT:

This instrument is executed this _____ day of _____, 2021, by and between

And

("Contractor")

in favor of

("Subcontractor")

("Owner")

WITNESSETH:

1. Contractor is a Contractor within the meaning of the Mechanics Lien Law of 1963.
2. Owner and Contractor have entered into a certain contract (herein "Contract") in connection with the construction of **[PROJECT NAME]** Maryland (herein "Project").
3. Contractor and Subcontractor have entered into a certain agreement by which Subcontractor will provide labor or materials to Contractor or Owner in connection with the construction of the Project.
4. Pursuant to 49 P.S. §1401(b)(2), Contractor has posted a bond guaranteeing payment for labor and materials provided by Subcontractor, and Subcontractor, for itself, its owners, shareholders, members, employees, partners, successors, and assigns, intends by this document to waive its right to file any claim whatsoever against the Project.
5. Subcontractor agrees that to the fullest extent permitted by law, no mechanics' or materialmen's liens shall be filed or maintained against the estate or title of Owner of the Project or any part thereof, or the appurtenances thereto, either by itself or anyone else acting or claiming through or under it, including subcontractors of Subcontractor, for or on account of any work, labor or materials supplied in the performance of the work under the Contract or under any supplemental contract or for extra work.
6. Subcontractor agrees that this agreement shall be an independent covenant and shall operate and be effective with respect to work done and materials furnished under any supplemental contract and for any extra work in connection with the above-described Project.

7. Subcontractor agrees that it will indemnify, defend, and hold harmless Contractor and Owner from it against any claims, including mechanics' lien claims raised by any subcontractor, supplier, or materialman of Subcontractor, including, without limitation, any subcontractor as that term is defined in the Pennsylvania Mechanics' Lien Law of 1963, as amended.
8. Subcontractor agrees that in the event it violates any provision of this Stipulation Against and Waiver of Liens, Subcontractor shall be liable to Contractor and Owner for all expenses and costs incurred in the defense of or payment of any claim brought by any person, to the extent the Subcontractor has indemnified Contractor and Owner against such a claim, including without limitation, attorneys fees and court costs.
9. To give Owner full power and authority to protect itself, the Project, the estate, or title of Owner therein, and the appurtenances thereto, against any and all liens filed by anyone acting under or through Subcontractor in violation of the terms of this agreement, Subcontractor hereby irrevocably authorizes and empowers any attorney of any Court of Common Pleas of the Commonwealth of Pennsylvania (i) to appear as attorney for it in any such Court, and in its name or names, to the extent permitted by law, mark satisfied of record at the cost and expense of Subcontractor any and all lien or liens filed in violation of the foregoing covenant, or (ii) to cause to be filed and served in connection with such lien or liens any pleading or instrument, or any amendment to any pleading or instrument previously filed by it, and to incorporate therein, as part of the record, the waiver contained in this instrument; and for such act or acts this instrument shall be good and sufficient warrant and authority. A reference to the court, term and number in which and where this agreement shall have been filed shall be conclusive evidence of the authority herein to warrant such action, and Subcontractor hereby remises, releases and quitclaims all rights and all manner of errors, defects and imperfections whatsoever in entering such satisfaction or in filing such pleading, instrument or amendment, or in any way concerning them.
10. Contractor must attach a copy of the Legal Description of Project property to this form prior to submittal to the Architect.

IN WITNESS WHEREOF, Contractor has executed this instrument as of the day and year first above written.

CONTRACTOR: _____

By: _____

Its: _____

SUBCONTRACTOR: _____

By: _____

Its: _____

SECTION 013100 – PROJECT COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations on the Project to be collectively fulfilled by the prime Contractors including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Cleaning and protection.
- B. The General Contractor shall be assigned the responsibility for overall coordination of coordination requirements.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Field Engineering" specifies procedures for field-engineeringservices, including establishment of benchmarks and control points.
 - 2. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
 - 3. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
 - 4. Division 1 Section "Contract Closeout" for coordinating contract closeout.
 - 5. Division 4 Section "Unit Masonry Assemblies".

1.3 GENERAL PROJECT COORDINATION PROCEDURES

- A. The General Contractor is designated as the Lead Prime Contractor for the Project and shall coordinate its construction activities with those its subcontractors and other entities involved to assure efficient and orderly installation of each part of the Work.
 - 1. The General Contractor shall schedule its construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Where availability of space is limited, the General Contractor shall coordinate installation of different components with other contractors to assure maximum accessibility for required maintenance, service, and repair.
- B. The General Contractor shall advise the Owner and Architect of overall coordination progress. When necessary, such as in congested spaces where multiple contractors are involved, the General Contractor shall meet with the Owner and Architect and other contractors involved to resolve critical coordination areas.
 - C. The Owner will not consider requests for additional time or compensation associated with direction provided to contractors in response to coordination, questions, or disputes.
 - D. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their Work is required.
 - E. Administrative Procedures: The General Contractor shall coordinate scheduling and timing of its required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.

1.4 CONSERVATION

- A. The General Contractor shall coordinate construction activities to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.5 COORDINATION DRAWINGS

- A. Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
 1. Refer to Division 4 for Masonry Preinstallation Shop Drawing requirements to include specific Coordination Drawing components and equipment interface issues.

2. Refer to Divisions 22-28 for specific coordination drawing requirements for mechanical and electrical installations.
3. Responsibility: The General Contractor shall be responsible for the coordination with subcontractors in the preparation of coordination drawings within the building envelope. The General Contractor shall have the lead role in this process and shall initiate coordination drawings by producing preliminary 1/4" scale drawings, by building section, in electronic format. Electronic background drawing files in the format specified in the Electronic Media Agreement found as an attachment to Division 1 Section "Submittals" are available from the Architect for a fee. These background drawings shall include walls, partitions, structural elements, finished floor elevations, dimensions, duct, piping, and equipment locations and layout.

Upon completion of the preliminary coordination drawings, the General Contractor shall schedule a coordination meeting with all its subcontractors in order to resolve all interference issues. This meeting shall be held in accordance with Division 1 Section "Project Meetings". Altering structural elements, bearing elevations, established dimensions, partition locations and ceiling/bulkhead heights or any other aesthetic effect is prohibited without the consent of the Architect. Upon resolution of all interference issues, the General Contractor shall revise the coordination drawings as required, and upon acceptance by all subcontractors, the General Contractor will issue a set of final coordination drawings to all its subcontractors, the Owner and the Architect.

Utility sleeve locations through foundation walls shall be coordinated in the field by the involved Prime Contractors in order to ensure project continuity. Utility sleeve locations may be included on the coordination drawings only to the extent to establish piping entry locations.

Coordination drawings shall be completed within 60 calendar days of the Notice to Proceed. The General Contractor shall include coordination drawings in their Contract Price and shall indicate the value of this effort as a line item on the Schedule of Values.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to its full-time on site Project Superintendent, the General Contractor shall provide other administrative and supervisory personnel, as required for proper performance of the Work.
- B. Project Coordinator: The General Contractor shall provide a full-time Project Coordinator, experienced in administration and supervision of building construction, including mechanical and electrical work.
 1. Construction activities requiring coordination by the Project Coordinator include, but are not limited to, the following:
 - a. Scheduling and sequencing the Work.

- b. Sharing access to workspaces.
 - c. Installations.
 - d. Protection of each other's work.
 - e. Cutting and patching.
 - f. Selections for compatibility.
 - g. Coordination drawings.
 - h. Inspections and tests.
 - i. Temporary services and facilities.
 - j. Daily project cleanup activities
- C. Staff Names: Within 15 calendar days of commencement of construction operations, the General Contractor shall submit a list of its principal staff assignments as well as those for Plumbing, HVAC and Electrical Subcontractors, including the Superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
- 1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: The Prime Contractor involved shall require the Installer of each major component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place during handling and installation. Apply protective covering where required to assure protection from damage or deterioration until Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: The General Contractor shall supervise its 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. Where applicable, such exposures include, but are not limited to, the following:

1. Excessively high or low temperatures.
2. Thermal shock.
3. Excessively high or low humidity.
4. Air contamination or pollution.
5. Water or ice.
6. Solvents.
7. Chemicals.
8. Light.
9. Radiation.
10. Puncture.
11. Abrasion.
12. Heavy traffic.
13. Soiling, staining, and corrosion.
14. Bacteria.
15. Rodent and insect infestation.
16. Combustion.
17. Electrical current.
18. High-speed operation.
19. Improper lubrication.
20. Unusual wear or other misuse.
21. Contact between incompatible materials.
22. Destructive testing.
23. Misalignment.
24. Excessive weathering.
25. Unprotected storage.
26. Improper shipping or handling.
27. Theft.
28. Vandalism.

Any Work subjected to such exposures shall be tested, corrected and/or replaced at the expense of the General Contractor, in accordance with the "General Conditions of the Contract for Construction".

D. Daily project clean up shall be the responsibility of the General Contractor.

END OF SECTION 013100

SECTION 013150 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Project Coordination" for procedures for coordinating project meetings with other construction activities.
 - 2. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

- A. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, within 15 calendar days of the Notice to Proceed. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and other requirements of the Contractors.
- B. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its Superintendent; major subcontractors; manufacturers; and suppliers. All participants at the Preconstruction Conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance including the following:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, Product Data, and Samples.

8. Preparation of record documents.
9. Use of the premises.
10. Parking availability.
11. Office, work, and storage areas.
12. Equipment deliveries and priorities.
13. Safety procedures.
14. First aid.
15. Security.
16. Daily cleanup activities.
17. Working hours.

1.4 PREINSTALLATION CONFERENCES

- A. The General Contractor shall conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction and as required by specific specification Sections.
- B. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Shop Drawings, Product Data, and quality-control samples.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities.
 - q. Space and access limitations.
 - r. Governing regulations.
 - s. Safety.
 - t. Inspecting and testing requirements
 - u. Required performance results.
 - v. Recording requirements.

w. Protection.

2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS

- A. The Architect shall conduct progress meetings at the Project Site at bi-weekly intervals, unless otherwise needed.
- B. Attendees: In addition to representatives of the Owner and the Architect, *IT IS MANDATORY THAT THE GENERAL CONTRACTOR ALONG WITH PERTINENT SUBCONTRACTORS BE REPRESENTED AT THESE MEETINGS*. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
 1. Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
 2. Review the present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Status of submittals.
 - e. Deliveries.
 - f. Off-site fabrication problems.
 - g. Access.
 - h. Site utilization.
 - i. Temporary facilities and services.
 - j. Hours of work.
 - k. Hazards and risks.
 - l. Daily cleanup activities.
 - m. Quality and work standards.
 - n. Change Orders.
 - o. Documentation of information for payment requests.

D. Reporting: Minutes will be distributed by the Architect 3 calendar days prior to the next meeting to each party present and to parties who should have been present.

1. Schedule Updating: Refer to Division 1 Section "Construction Progress Documentation" for requirements. Issue the revised schedule concurrently with the report of each meeting.

1.6 COORDINATION MEETINGS

A. The General Contractor shall conduct coordination meetings a minimum of once every two weeks. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings. *IT IS MANDATORY THAT PERTINENT SUBCONTRACTORS BE REPRESENTED AT THESE MEETINGS.*

B. Record meeting minutes and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting. In addition, the Owner and Architect shall receive copies of these meeting minutes.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013150

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Daily construction reports.
 - 4. Field condition reports.
 - 5. Special reports.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Project Coordination."
 - 2. Division 1 Section "Applications for Payment" for submitting the Schedule of Values.
 - 3. Division 1 Section "Project Meetings" for submitting and distributing meeting and conference minutes.
 - 4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.
 - 5. Division 1 Section "Project Record Documents" for submitting Project Record Documents at Project closeout.
 - 6. Division 1 Section "Submittals" for procedural requirements regarding Submittal Schedule.

1.3 DEFINITIONS

- A. Contractor: The term "Contractor", as used throughout this Section, applies to the General Contractor entering into a Contract with the Owner.
- B. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that must be completed before a given activity can be started.

- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- D. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float is not for the exclusive use or benefit of either the Owner or the Contractor. Extensions of the time to interim milestone dates or the Contract Completion Date, under the Contract, will be granted only to the extent that equitable time adjustment to the activity or activities affected by the Contract Modification or delay, exceeds the total float of the affected or subsequent paths and extends any interim milestone date or the Contract Completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.4 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.
- B. Preliminary Construction Schedule: Submit one (1) copy in an acceptable format as determined by the Architect.
- C. Contractor's Construction Schedule: Submit one (1) paper Gant Chart and one (1) electronic copy in its native format.

- D. CPM Reports: The Contractor's Construction Schedule shall be a CPM Schedule. Concurrent with the CPM Schedule, submit three printed copies of each of the following computer-generated reports. The format for each activity in the reports shall contain an activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Daily Construction Reports: Submit two copies at weekly intervals.
- F. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- G. Special Reports: Submit two copies at time of unusual event.

1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: The schedule shall be composed and maintained by an individual having been employed for at least the past five years primarily as CPM scheduler or an individual certified as a Planning and Scheduling Professional (PSP) by the Association for the Advancement of Cost Engineering (AACE). Documentation supporting compliance with these requirements shall be supplied to the Architect for review and acceptance.
- B. Prescheduling Conference: Conduct conference at the Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:
 - 1. Discuss constraints, including phasing, work stages, area separations and interim milestones.
 - 2. Review delivery dates for Owner-furnished products.
 - 3. Review time required for review of submittals and resubmittals.
 - 4. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 5. Review time required for completion and startup procedures.
 - 6. Review and finalize list of construction activities to be included in schedule.
 - 7. Review submittal requirements and procedures.
 - 8. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

- B. Coordinate the Contractor's Construction Schedule with the Schedule of Values, List of Subcontracts, Submittals Schedule, Progress Reports, and Applications for Payment and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. The Work under the Contract Documents shall be planned, scheduled, executed, reported and accomplished using the "Critical Path Method", in workdays (excluding legal holidays). The provisions of the General Requirements and the directions of the Lead Contractor are to be followed by all Contractors in scheduling their construction activities. The scheduling services of the Lead Contractor are part of his Contract with the Owner, but nothing herein relieves the obligations of the other Prime Contractors to schedule their own construction activities, and nothing herein alters the obligation of the Lead Contractor to resolve all supervision, coordination and scheduling issues between and among the Lead Contractor and other Prime Contractors.
- B. The primary objectives of the requirements of this Section are: (1) to insure adequate planning and execution of the Work by the Contractor by having a schedule of construction activities for the General Contractor and all of their Subcontractors in initial form covering the first 120 days of construction within thirty (30) days of the Notice to Proceed and in final form within seventy-five (75) days of the Notice to Proceed; (2) to assist the General Contractor in evaluating progress of the Work; (3) to provide for optimum coordination by Subcontractors, all under the direction and supervision of the General Contractor; (4) to permit the timely prediction or detection of events or occurrences which may affect the timely prosecution of the Work; and (5) to provide a mechanism or tool for use by the General Contractor and other Subcontractors in monitoring any actions of Contractors which may be required to comply with the requirements of the Contract Documents relating to the completion of the various portions of the Work by the Completion Dates specified in the Contract Documents.
- C. The General Contractor is responsible for determining the sequence and logic of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed with regard to their portion of the Work. The Construction Schedule shall represent the Contractor's best judgment of how they shall prosecute the Work in compliance with the requirements of the Contract Documents. The General Contractor shall ensure that the Construction Schedule is current and accurate and is properly and timely monitored, updated and revised as Project conditions and the Contract Documents may require.

- D. The General Contractor shall consult with their major Subcontractors relating to the preparation of their construction plan and Construction Schedule. Major Subcontractors shall receive copies of those portions of the Contractor's Construction Schedule which relate to their Work and shall be continually advised of any updates or revisions to the Construction Schedule as the Work progresses. When the Subcontractor submits their Construction Schedule to the General Contractor or makes any proposed updates or revisions to such Schedule, it shall be concluded by the Owner and General Contractor that the Subcontractor is in concurrence. The General Contractor shall be solely responsible for ensuring that all Subcontractors comply with the requirements of the Contractor's Construction Schedule for their portions of the Work.
- E. The General Contractor shall provide the drafting and computerization of the Contractor's data for the Contractor's Initial Construction Schedule, in accordance with the requirements of the Contract Documents. Each Subcontractor shall submit their data in a form or format acceptable to the General Contractor.
- F. The Completion Dates set forth in the Contract Documents represent only the major items of Work and may include interface dates with the construction activities of the other General Contractor. Completion Dates are Contract requirements and are of the essence to the Contract Documents and to the coordination of the Work by the Contractor. Completion Dates represent the latest allowable completion time for those portions of the Work to which each Completion Date relates. The Completion Dates are not intended to be a complete listing of all Work under the Contract Documents or of all interfaces with work performed by the General Contractors or others. The General Contractor shall determine the time requirements for all such interfaces and shall be responsible for planning, scheduling and coordinating the Work in order to complete in accordance with those requirements.
- G. Should the General Contractor intend or plan to complete the Work, or any portion thereof, earlier than any applicable Completion Date or the Contract Time, the Contractor shall give timely and reasonable Notice of this fact.
- H. Unless otherwise specifically provided in the Contract Documents, and in particular the General Requirements, the General Contractor acknowledges that the Owner and Architect have contemplated in their planning and in any preliminary schedule that may have been prepared and made available to the Bidders, and in their budgeting for professional services, that the Work shall be performed on a 5-day work week basis, utilizing a single 8-hour shift per day. The Owner and Architect shall have the sole discretion of approving or rejecting a variance in the work week, number of shifts, or shift length. Unless otherwise agreed by the Owner or Architect, the General Contractor shall bear the cost of, and pay the Owner, for additional staff and supervisory personnel and inspectors of any public authority having jurisdiction of the Work, necessary to support any variance in the contemplated work week, number of shifts or shift length.

2.2 POST AWARD ACTIVITIES

- A. Upon receipt by the General Contractor of the Notice to Proceed, and until the Construction Schedule is completed by the General Contractor, the General Contractor shall do the following.
 - 1. Within thirty (30) days of the Notice to Proceed complete an Initial Construction Schedule governing the first 120 days of construction.
 - 2. Within seventy-five (75) days of the Notice to Proceed complete a Final Construction Schedule governing the Work.
- B. Orientation Session: The General Contractor shall, upon the issuance of the Notice to Proceed by the Owner, attend an orientation session relating to the requirements pertaining to schedules and reports for the Project. This orientation meeting is designed to assist the General Contractor in planning their Work and in developing their Construction Schedule. This session shall be held within ten (10) days after the date of the Notice to Proceed and shall be conducted by the General Contractor. The Contractor shall arrange for their Superintendent(s), major Subcontractors, and any scheduling consultants that they may employ, to attend the orientation session.
 - 1. It is understood and agreed that the General Contractor has no authority to waive any requirements of the Contract Documents at this orientation session, and all requirements of the Contract Documents remain applicable to the Contractor's Work whether or not discussed at this session.
 - 2. Should the General Contractor or his principal Subcontractors fail or refuse to attend this orientation session, the Owner shall have the right to immediately terminate the Agreement with the General Contractor for default and without liability or penalty to the Owner pursuant to the provisions of these specifications.

2.3 INITIAL CONSTRUCTION SCHEDULE

- A. Within ten (10) days following the orientation session, the General Contractor shall complete a draft of their Construction Schedule.
- B. The General Contractor shall provide the Architect with a draft print out of all activities needed during the first 120 days of construction for inclusion in the Initial Construction Schedule. The printouts shall be carefully reviewed by all of the Subcontractors. Any revisions, additions and/or deletions to these documents that are reasonably desired by the Subcontractors shall be brought to the attention of the General Contractor within five (5) days following receipt by the Subcontractor of such draft.

2.4 FINAL CONSTRUCTION SCHEDULE

- A. Within fourteen (14) days following completion of the Initial Construction Schedule, the General Contractor shall complete a draft of their Final Construction Schedule.

- B. The General Contractor shall provide the Architect and Owner with a draft print out of all activities included in the Final Construction Schedule. Any revisions, additions and/or deletions to these documents that are reasonably desired by the Owner and/or Architect shall be brought to the attention of the General Contractor within five (5) days following receipt by the Contractor of such draft. The General Contractor shall, if consistent with the requirements of the Contract Documents, incorporate the proposed revisions and shall thereafter deliver the completed Construction Schedule and other reports to the Owner and Architect.

2.5 CONSTRUCTION SCHEDULE CONTENT

- A. The Final Construction Schedule shall consist of a detailed CPM Schedule of all work activities of the Project. The Schedule shall include, but not be limited to, the following information:
 - (1) Project name; (2) completed Work ready for use by the next Subcontractor, the Owner, etc.; (3) activities relating to different areas of responsibility, such as subcontracted Work which is distinctly separate from that being done by the General Contractor directly; (4) different categories of Work as distinguished by craft or crew requirements; (5) different categories of Work as distinguished by equipment requirements; (6) different categories of Work as distinguished by materials; (7) distinct and identifiable subdivisions of Work such as structural slabs, beams, columns; (8) location of Work within the Project that necessitates different times or crews to perform; (9) outage schedules for existing utility services that shall be interrupted during the performance of the Work; (10) acquisition and installation of equipment and materials supplied and/or installed by the Owner or Subcontractors; (11) material to be stored on Site; and (12) dates for completion of Work.
- B. For all major equipment and materials to be fabricated or supplied for the Project, the Construction Schedule shall show a sequence of activities including: (1) preparation of Shop Drawings, Samples and all required submissions as set forth in these specifications; (2) a reasonable time for review of Shop Drawings, Samples, and submissions or such time as specified in the Contract Documents; (3) shop fabrication, delivery, and storage; (4) erection or installation; and (5) testing of equipment and materials.
- C. The Gant Chart shall include the early dates and total float for each activity. There shall be no negative float in the baseline schedule.
- D. All activity durations shall be given in calendar days. No activity shall have a duration of more than twenty (20) days.
- E. General Contractor Approval and Certification: Approval by the General Contractor of the drafting and computerization of the Construction Schedule, and of schedule revisions, shall be evidence of the General Contractor's agreement that the proposed schedule or schedule revision to the Construction Schedule is a true and accurate representation of their plan to complete the Work, including all Change Orders that are in the General Contractor's possession as of the foregoing date, that the schedule or

schedule revision fully complies with the requirements of the Contract Documents, that they shall prosecute the Work in accordance with this schedule revision, subject to any change therein which is implemented in accordance with the Contract Documents and that they have met and coordinated with and obtained the approval of said schedule revision by all other parties that are affected thereby.

2.6 UPDATING OF CONSTRUCTION SCHEDULE/PROGRESS REPORTS

- A. On a monthly basis the General Contractor shall arrange for their Superintendent to meet at the Site with the Subcontractors to review each of their reports of actual progress. Said report shall set forth up-to-date and accurate progress data, shall be based upon the General Contractor's best judgment and shall be prepared by the General Contractor in consultation with all Subcontractors.
- B. The progress report of the General Contractor shall show the activities, or portions of activities, completed during the reporting period, the actual start and finish dates for these activities, remaining durations and/or estimated dates for completion of Work for activities currently in progress.
- C. The General Contractor shall submit a written report with the updated progress analysis which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors and their impact, explanations of corrective actions taken or planned, any newly planned activities or changes in sequence, and proposed logic for a recovery schedule, if required, as further described herein. The report shall also include: (1) a narrative describing actual Work accomplished during the reporting period; (2) a list of major construction equipment used on the Project during the reporting period and any construction equipment idle during the reporting period; (3) the total number of personnel by craft actually engaged in the Work during the reporting period, with such total stated separately as to office, supervisory, and field personnel; (4) a manpower and equipment forecast for the succeeding thirty (30) days, stating such total as to office, supervisory and field personnel; (5) a list of Contractor-supplied materials and equipment, indicating current availability and anticipated job Site delivery dates; and (6) changes or additions to the Contractor's supervisory personnel, if any, since the preceding progress report.
- D. Application for Payment: The General Contractor understands and agrees that the submission and approval of progress updates and the receipt of progress reports are an integral part and basic element of the Applications for Payment; and that the General Contractor shall not be entitled to any progress payment under the Contract Documents until, in the sole discretion of the Owner, the General Contractor has fully complied with the requirements of this Section.
- E. The General Contractor shall be solely responsible for expediting the delivery of all materials and equipment to be furnished by or to them so that the progress of construction shall be maintained according to the currently approved Construction Schedule for the Work. The General Contractor shall notify the Owner in writing, and in a timely and reasonable manner, whenever the General Contractor determines or

anticipates that the delivery date of any material or equipment shall be later than the delivery date indicated by the Construction Schedule or required consistent with the completion requirements of the Contract Documents, subject to schedule updates as herein provided.

- F. The General Contractor shall ensure that off the Site activities do not control the critical path of the Construction Schedule and instead, that the critical path relates to activities on the Site.

2.7 RECOVERY SCHEDULE.

- A. Should the updated Construction Schedule, at any time during construction, show, in the sole opinion of the Owner, that the General Contractor is fourteen (14) or more days behind schedule for any Completion Date, or should the General Contractor be required to undertake actions as provided for in these specifications, the Contractor shall prepare a recovery schedule at no additional cost to the Owner (unless the Owner is solely responsible for the event or occurrence which has caused the schedule slippage) explaining and displaying how the Contractor intends to reschedule their Work in order to regain compliance with the Construction Schedule during the immediate subsequent pay period.

2.8 SCHEDULE REVISIONS

- A. Should the General Contractor desire to or be otherwise required under the Contract Documents to make modifications or changes in their method of operation, their sequence of Work or the durations of the activities in their Construction Schedule, they shall do so in accordance with the requirements of this Paragraph and the Contract Documents. Revisions to the approved Construction Schedule must be presented to and reviewed by the Owner.
- B. The General Contractor shall submit requests for revisions to the Construction Schedule to the Owner, together with written rationale for revisions and description of logic for rescheduling Work and maintaining the Completion Dates listed in the Contract Documents. Proposed revisions acceptable shall be incorporated into the next update of the Construction Schedule.

2.9 FLOAT TIME

- A. Float or slack time associated with one chain of activities is defined as the amount of time between the earliest start date and latest start date or between the earliest finish date and latest finish date for such activities, as calculated as part of the Construction Schedule. Float or slack time shown on the Construction Schedule is reserved for the exclusive use and benefit of the Owner. The General Contractor specifically agrees that float time may be used by the Owner in conjunction with review of construction activities or to resolve Project problems. The General Contractor also agrees that there shall be no basis for any modification of the Completion Dates or an extension of the Contract Time, or a claim for additional compensation as a result of any Project problem, Change Order or delay which only results in the loss of available positive float on the Construction Schedule.

2.10 SCHEDULE OF INSPECTIONS AND TESTS

- A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule within 10 days of the date established for commencement of the Work.
- B. Form: The schedule shall be in tabular form and shall include, but not be limited to, the following:
 - 1. Specification Section number.
 - 2. Description of the test.
 - 3. Identification of applicable standards.
 - 4. Identification of test methods.
 - 5. Number of tests required.
 - 6. Time schedule or time span for tests.
 - 7. Entity responsible for performing tests.
 - 8. Requirements for taking samples. Unique characteristics of each service.
- C. Distribution: Distribute the schedule to the Owner, Architect, and each party involved in performance of portions of the Work where inspections and tests are required.

2.11 REPORTS

- A. Daily Construction Reports: Prepare Daily Construction Reports recording the following information concerning events at the Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. High and low temperatures and general weather conditions.
 - 5. Accidents.
 - 6. Meetings and significant decisions.
 - 7. Unusual events (refer to special reports).
 - 8. Stoppages, delays, shortages, and losses.
 - 9. Meter readings and similar recordings.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.
 - 12. Change Orders received and implemented.
 - 13. Construction Change Directives received.
 - 14. Services connected and disconnected.
 - 15. Equipment or system tests and startups.
 - 16. Partial Completions and occupancies.
 - 17. Substantial Completions authorized.

- B. Field Correction Reports: When the need to take corrective action that requires a departure from the Contract Documents arises, prepare a detailed report. Include a statement describing the problem and recommended changes. Indicate reasons the Contract Documents cannot be followed. Submit a copy to the Architect immediately.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Material Location Reports: At weekly intervals, prepare a comprehensive list of materials delivered to and stored at the site. The list shall be cumulative, showing materials previously reported plus items recently delivered. Include with the list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from the site. Submit copies of the list to the Architect at weekly intervals.

2.12 SPECIAL REPORTS

- A. General: Submit Special Reports directly to the Owner within one day of an occurrence. Distribute copies of reports to parties affected by the occurrence and to the Architect.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at the Project site, whether or not related directly to the Work, prepare and submit a Special Report. List chain of events, persons participating, response by General Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise the Owner in advance when these events are known or predictable.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013200

SECTION 013300 – SUBMITTALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
 - 1. Shop Drawings.
 - 2. Product Data.
 - 3. Samples.
 - 4. Quality assurance submittals.
 - 5. Submittals Schedule.
- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
 - 1. Permits.
 - 2. Applications for Payment.
 - 3. Performance and Payment Bonds.
 - 4. Insurance certificates.
 - 5. List of subcontractors.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Applications for Payment" specifies requirements for submittal of the Schedule of Values.
 - 2. Division 1 Section "Substitutions" specifies procedural requirements for handling requests for substitutions made after award of the Contract.
 - 3. Division 1 Section "Project Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 - 4. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
 - 5. Division 1 Section "Construction Progress Documentation" specifies requirements for Submittal Schedules.
 - 6. Division 1 Section "Quality Requirements" specifies requirements for submittal of inspection and test reports.
 - 7. Division 1 Section "Warranties" specifies requirements for submittal of warranties at project closeout.
 - 8. Division 1 Section "Project Record Documents" specifies requirements for submittal of Project Record Documents at project closeout.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
 - 1. Preparation of Coordination Drawings is specified in Division 1 Section “Project Coordination” and may include components previously shown in detail on Submittals.
- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.
- D. For Specification sections listing manufacturer’s products that include the phrases “but are not limited to the following” or “approved equal”, the Contractor shall be responsible to provide certification that the submitted product complies with the specified product. Include this certification with the submittal. Final approval of a product submitted as an “equal” shall be solely by the Architect.

1.4 SUBMITTAL PROCEDURES

- A. **Process submittals electronically through Newforma Project Cloud – web-based construction administration software.** Newforma serves as a collaborative web environment which expedites and organizes the review process. The Owner shall pay the fee (through the Architect) associated to acquire the use of a Newforma license for the project.
 - 1. Newforma shall provide a training session via web conference for the design and construction team.
 - 2. Submittals shall be processed and delivered electronically through Newforma’s web-based submittal processing software.
 - 3. All samples/color selections shall be delivered by mail or courier. Samples shall be logged in via Newforma but delivered hardcopy by mail.
 - 4. The design and construction team shall collectively maintain the submittal log through Newforma’s submittal software.

Each submittal shall include a single item or element of construction. A Submittal Cover Sheet, on the attached form, shall be completed, signed and certified by the Contractor for EACH submittal. The Architect will not accept submittals including multiple items or elements of construction. Submittals not meeting this procedure requirement may be returned with No Action Taken. No extension of Contract Time will be authorized due to failure to comply with this procedure.

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
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 elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - b. Be advised that all interior finishes will be reviewed together and finally determined after receipt of all shop drawings, product data and samples which pertain to the interior finish color selections and related equipment.
 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow a minimum of fifteen (15) working days for review. Additional time may be required for further review and/or coordination with consultants and subsequent submittals as determined by Architect.
 - b. If a resubmittal is necessary, process the same as the original submittal.
 - c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- C. Submittal Preparation: The Architect will not accept submittals received without the attached 'Submittal Cover Sheet'. The Contractor shall stamp the 'Submittal Cover Sheet' with a uniform, action stamp. The Contractor shall mark the stamp appropriately to indicate the action taken. **Submittals shall be pre-reviewed by the Contractor PRIOR to submittal to the Architect for review.** See Paragraph 1.6.C.1 this Section.
1. Use the 'Submittal Cover Sheet' attached at the end of this Section for all submittals.
 2. Complete all information required on 'Submittal Cover Sheet'. Failure to do so may result in return of the submittal with No Action Taken. No extension of Contract Time will be authorized because of failure to comply with this procedure.
- D. Contractor's Transmittal: The Architect will not accept submittals received from sources other than the Contractor.

1.5 SUBMITTALS SCHEDULE

- A. Submittals Schedule: Submit three copies of schedule to the Architect. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of Subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for final release or approval.
- B. Preparation: Submit a Submittals Schedule, arranged in chronological order by dates required by the Contractor's Construction Schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
1. Coordinate Submittals Schedule with List of Subcontractors, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit an initial Submittals Schedule concurrently with Initial Construction Schedule as noted in Division 1 Section "Construction Progress Documentation". Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture, fabrication, or delivery.
 3. Final Submittal: Submit a final Submittals Schedule concurrently with the final Contractor's Construction Schedule as noted in the Division 1 Section "Construction Progress Documentation". Include all remaining submittals. All submittals are required within ninety (90) days of the Notice to Proceed.
- C. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- D. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.6 SUBMITTALS

A. SHOP DRAWINGS

1. Submit newly prepared information drawn accurately and to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

2. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
 - a. Dimensions.
 - b. Identification of products and materials included by sheet and detail number.
 - c. Notation of dimensions established by field measurement.
 - d. 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.
 - e. Submittal: Submit four (4) copies for the Architect's review.
 - f. The Architect will return one (1) marked copy to indicate action taken.
 - g. Maintain a complete set of shop drawings on site during construction.
 - h. Maintain a set of marked up Shop Drawings as part of the project record documents to be turned over to the Owner at Contract Closeout.
 - i. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

B. PRODUCT DATA

1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 - g. Submittal: Submit four (4) copies for the Architect's review.
 - h. The Architect will return one (1) marked copy to indicate the action taken.
 - i. Maintain a complete set of Product Data on site during construction.
 - j. Maintain a set of marked up Product Data as part of the project record documents to be turned over to Owner at Contract Closeout.
 - k. Do not use Product Data without an appropriate final stamp indicating action taken.

C. Action Stamp: The Contractor will stamp each sheet of Submittal with a uniform, action stamp. The Contractor shall mark the stamp appropriately to indicate the action taken.

1. Contractor's action stamp and all related review notations shall be applied with **GREEN** color ink

- D. Distribution: Furnish copies of final approved Submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and all others required for performance of construction activities.

1.7 SAMPLES

- A. Where required by individual specification sections, submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
 - 1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the Sample.
 - c. Sample source.
 - d. Product name or name of the manufacturer.
 - e. Compliance with recognized standards.
 - f. Availability and delivery time.
 - 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
 - 3. Submittal: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.
 - 4. The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.
 - a. Refer to Paragraph 1.4 - Submittals Procedures for coordination of sample Submittals.

1.8 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a certification from the manufacturer certifying compliance with the specified requirements. The Architect reserves the right to require this certification to be notarized.
 - 1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Requirements."

1.9 ARCHITECT'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp to indicate the action taken, as follows:
 - 1. "NO EXCEPTION TAKEN": The Work covered by the submittal may proceed without further submittal provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. "EXCEPTION(S) NOTED": The Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. "SUBMIT SPECIFIED": Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Prepare a new submittal indicating specified material; resubmit without delay.
 - 4. "REVISE AND RESUBMIT": Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary, to obtain different action mark.
 - 5. "REJECTED": Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery or other activity. Do not resubmit a revised copy; prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary, to obtain different action mark.
- C. Unsolicited Submittals: The Architect will take no action on unsolicited submittals.

END OF SECTION 013300

SUBMITTAL COVER SHEET
(Attach to each copy of each submittal)

PROJECT NAME & NUMBER _____

ARCHITECT:



Crabtree, Rohrbaugh & Associates - Architects
401 East Winding Hill Road
Mechanicsburg, PA 17055
Maryland • Pennsylvania • Virginia • West Virginia

ENGINEER: _____

PRIME CONTRACTOR: _____

SUBCONTRACTOR/SUPPLIER: _____

MANUFACTURER: _____

ITEM SUBMITTED: _____ SUBMITTAL NO. _____

SPECIFICATION SECTION NO. _____ PARAGRAPH NO. _____

DRAWING REFERENCE _____ DETAIL NO. _____

CERTIFICATION: (Circle One)

- A. Certified to comply with Drawings and Specifications.
- B. Certified to comply with Drawings and Specifications except as noted on Contractor attachment(s)

_____ Signature: Subcontractor/Supplier	_____ Date	_____ Signature: Prime Contractor	_____ Date
--	---------------	--------------------------------------	---------------

Contractor's Action Stamp Here

Architect's Action Stamp Here

SUBMITTAL DEVIATION SHEET
(Attach this sheet behind Submittal Cover Sheet)

PROJECT NAME AND NUMBER: _____



Crabtree, Rohrbaugh & Associates - Architects
401 East Winding Hill Road
Mechanicsburg, PA 17055
Maryland • Pennsylvania • Virginia • West Virginia

ARCHITECT: _____

ENGINEER: _____

PRIME CONTRACTOR: _____

SUBCONTRACTOR/SUPPLIER: _____

PRODUCT SPECIFIED: _____

SPECIFICATION SECTION NO: _____ PARAGRAPH NO. _____

DRAWING REFERENCE _____ DETAIL NO. _____

DESCRIPTION OF DEVIATION _____

Signature: Subcontractor/Supplier Date Signature: Subcontractor/Supplier Date

ARCHITECT / ENGINEER REMARKS:



Crabtree, Rohrbaugh & Associates - Architects

401 East Winding Hill Road

Mechanicsburg, PA 17055

Maryland • Pennsylvania • Virginia • West Virginia

PROJECT NAME **Washington Co. Public Safety Training Center Audiovisual System**

PROJECT NO. **CRA Project No. 3089**

This document sets forth the terms and conditions of an agreement between

Crabtree, Rohrbaugh & Associates, and consultant _____

_____, collectively hereinafter referred to as the "Design Professional" and _____

_____, hereinafter referred to as "Contractor."

AGREEMENT DELIVERY OF FILES ON ELECTRONIC MEDIA

Issuance of the Design Professional's Instruments of Service via electronic media in either .dwf or .dwg file format, hereinafter referred to as "Media" will be provided at the request of Contractor after Contracts have been awarded. This Media is provided without detail and dimensions and is for illustrative purposes only and does not amend, supplement or replace any drawing, Contract Document, Specification and/or in any way, the Contract requirements of such. The purpose of this Media is solely for coordination by Contractor and shall not be relied upon for any other purpose. Contractor fully releases the Design Professional, its agents, officers, and employees, and consultants, from any and all liability, including without limitation, damages, consequential damages, costs and attorney's fees that Contractor may incur as a result of its reliance on the information contained in the Media.

In accepting and utilizing Media provided by the Design Professional, Contractor covenants and agrees that all such Media are instruments of service between the Design Professional and the client of the Design Professional, who shall be deemed the author of the Media, and the Design Professional shall retain all common law, statutory law and other rights, including copyrights, whether or not such copyright is registered. Contractor acknowledges that the information and designs contained on the Media are provided to Contractor as a convenience and at the request of Contractor. Contractor also acknowledges that there may be undiscovered errors or inconsistencies in the Media that may result from any number of issues, including migrating the data from printed material to the Media or from others adding information to, or changing information in, the Media once transmitted to Contractor. Contractor agrees not to hold the Design Professional responsible for any defects Contractor may discover with the Media or information contained in the Media.

Contractor agrees not to use the Media, in whole or in part, for any purpose or project other than the Project of this Contract. Contractor agrees to waive all claims against the Design Professional resulting in any way from use of the Media.

Contractor agrees, to the fullest extent permitted by law, to defend, release, indemnify and hold the Design Professional harmless from and against any and all claims, damage, loss, liability or cost, including reasonable attorney's fees and costs of defense, arising out of or resulting from any changes made by anyone other than the Design Professional, or from any reuse of the Media, and data contained on the Media without the prior written consent of the Design Professional.

Contractor recognizes that information contained on the Media may not be 100% compatible with Contractor's computer system; therefore, Contractor agrees that the Design Professional shall not be liable for the completeness or accuracy of any materials provided on the Media arising out of, due to, or resulting from the difference in computer and software systems, or translations or mistranslation of electronic data, the incompatibility of viewing or operating programs, or the corruption of documents or data as a result of compatibility issues.

Contractor recognizes that information stored on electronic media including, but not limited to, computer disks may be subject to undetectable alteration and/or uncontrollable deterioration, due to, among other causes, errors in transmission, conversion, media degradation, software error or human error or alteration. Accordingly, the Media is provided for informational purposes only and is not intended as an end-product. Contractor therefore agrees that the Design Professional shall not be liable for the completeness or accuracy of any materials provided on the Media for this or any other reason whatsoever.

Under no circumstances shall the transfer of instruments of service in electronic media, for use by Contractor, be deemed a sale by the Design Professional, and the Design Professional makes no warranties, either expressed or implied, of merchantability and fitness for any particular purpose of the electronic media, or the information stored or contained thereon. Contractor acknowledges that the Media is provided as a convenience by the Design Professional at Contractor's request, and Contractor assumes all risk in the use of the Media, and the data contained therein for any purpose. Contractor further acknowledges that the Design Professional was not engaged to provide usable electronic data, or a usable system, compilation, Model or program to Contractor or any other party. Contractor agrees that the Design Professional shall not be liable in any manner whatsoever for any subsequent usage of the data provided on electronic media.

Contractor agrees that in the event of a conflict between non-electronic data and data provided on the Media, including but not limited to the Model, the data contained on non-electronic documents prevails over data on the Media. While the Design Professional has made a reasonable effort in accordance with the generally accepted standards of professional skill and care so that the data contained on the Media is accurate, the Design Professional makes no representation or warranty concerning the accuracy of the data contained on the Media, or any viruses contained in the materials as delivered or any other defect or error or alleged defect or error in the materials as delivered.

Contractor, by submitting a Bid and requesting electronic media from the Design Professional, accepts all terms of use of the Media as stated herein. Media will be provided to Contractor, upon Contractor's request, and upon remittance of payment to the following schedule:

- 1 to 10 Sheets as they appear in the Contract Documents - \$100
- 11 to 20 Sheets as they appear in the Contract Documents - \$200
- 21 to 30 Sheets as they appear in the Contract Documents - \$300
- 31 to 40 Sheets as they appear in the Contract Documents - \$400

The above costs apply to Architectural sheets only. The cost for electronic files for the engineering disciplines may vary. The Engineer of Record, as the author of the engineering drawings, shall be contacted directly for cost information, and the procedures for requesting their electronic media.

Instructions:

AutoCAD files can be provided in .dwg or .dwt format only. Submit Media Agreement directly to the Design Professional for which the files are being requested. Send signed agreement and Check payable to the design professional.

Identify files requested:

_____	_____
_____	_____
_____	_____

TOTAL:\$ _____

AGREED:

CONTRACTOR

DESIGN PROFESSIONAL

_____	_____
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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 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-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 quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 1 Section "Cutting and Patching" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 3. Divisions 2 through 16 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

- C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 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 Architect.

1.5 REGULATORY REQUIREMENTS

- A. Copies of Regulations: Obtain copies of applicable regulations and retain at Project site to be available for reference by parties who have a reasonable need.

1.6 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. 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.

- D. 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. Ambient 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.
- E. 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.

1.7 QUALITY ASSURANCE

- A. 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.
- B. 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.
- C. 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.
- D. 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.
- 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. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.
- H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
1. Contractor responsibilities include the following:
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
 - d. When testing is complete, remove assemblies; do not reuse materials on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, 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.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Special Tests and Inspections: Contractor shall engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner.
 - 1. Testing agency will notify the Owner, Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Testing agency will retest and reinspect corrected work. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- C. 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.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- F. 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.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-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.
- H. 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.
1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 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 Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 - 2. Comply with the Contract Document requirements for Division 1 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 014000

SECTION 0014100 REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Section, apply to this Section.

1.2 SECTION INCLUDES

- A. General Comply with the applicable Articles and Sections of the Annotated Code of Maryland
- B. General Safety and Health Regulations.
- C. Discrimination
- D. Environmental Statutes and Regulations
- E. Miscellaneous Regulations
 - 1. Buy American Steel Act
 - 2. Financial Disclosure
 - 3. Political Contribution Disclosure
 - 4. Retention of Records

1.3 GENERAL SAFETY AND HEALTH REGULATIONS.

- A. The use of products containing asbestos will not be permitted.
- B. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements, pertaining to health and safety.
- C. The Contract is to be governed at all times by applicable provisions of federal law, including but not limited to the following:
 - 1. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596.
 - 2. Part 1910 - Occupational Safety and Health Standards, Chapter XIII of Title 29, Code of Federal Regulations
 - 3. Maryland State Safety Health Act (MOSHA)
- D. Project safety procedures/policies for construction activities shall be adhered to at all times. Refer to PART 3 - EXECUTION for further safety information and requirements.

1.4 DISCRIMINATION

- A. The Contractor shall not discriminate against any employee or applicant because of race, creed, color or national origin. The Contractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, color or national origin. Such action shall include but not be limited to the following: employment, upgrading, demotion, or transfer; rates of pay or other forms of compensation; and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment notices to be provide by the Owner concerning discrimination.
- B. The Contractor shall send to each labor union or representative of workers with which he has collective bargaining agreements or contract or understanding a notice to be provided by the Owner advising the said union or worker's representative of the Contractor's commitments under this section, and the Contractor shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- C. The Contractor shall furnish, if requested by the Owner a compliance report concerning their employment practices and policies in order for the Owner to ascertain compliance with the special provisions of this contract concerning discrimination in employment.
- D. In the event of the Contractor's noncompliance with the nondiscrimination clause of this contract, this contract maybe canceled, terminated or suspended in whole or in part and the Contractor may be declared in eligible for further Prince George's County Public School work.
- E. The Contractor shall include the special provisions outlined herein, pertaining to nondiscrimination in employment in every subcontract or purchase order utilized by him in order to carry out the terms and conditions of this contract. So that such nondiscrimination inemployment provisions shall be binding on each subcontract.

1.5 ENVIRONMENTAL PROTECTION

- A. Contractor shall comply with all applicable provisions of federal and state laws dealing with the prevention of environmental pollution and the preservation of natural resources, including but not limited to the Federal Air Quality Act of 1967; the Clean Air Act; the Clean Water Restoration act; the Water Pollution Control Act Amendments of 1956; the Water Quality Act of 1965; the Water Quality Improvement Act of 1970; the Water Pollution Control Act Amendments of 1972; the Water Facilities Act (see Consolidated Farmer's Home Administration Act of 1961); the Watershed Protection and Flood Prevention Act; the Clean Streams Law; the Solid Waste Management Act; the Municipal Waste Planning, Recycling and Waste Reduction Act; A.H.E.R.A; and all rules and regulations thereunder, including but not limited to, those formulated by the United States Environmental Protection Agency, the Maryland Department of the Environment. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements pertaining to environmental protection.

- B. Nothing contained in the Contract Documents for construction shall be construed by the Contractor as relieving him in any way of his responsibility for strict compliance with the statutes, rules and regulations contained in the above mentioned Environmental Protection Act.

1.6 MISCELLANEOUS REGULATIONS

- A. **MARYLAND BUY AMERICAN STEEL ACT:** The Contractor shall comply with Section 17-301 through Section 17-306 of Annotated Code of Maryland, State Finance and Procurement Article. The "Buy American Steel" Act of Maryland defines "steel products" as any product: "rolled, formed, shaped, drawn, extruded, forged, cast, fabricated, or otherwise similarly processed, or processed by a combination of two or more of such operations, from steel made in the United States by the open hearth, basic oxygen, electric furnace, bessemer, or other steel making process."
- B. **FINANCIAL DISCLOSURE:** The Contractor shall comply with the provisions of Section 13-221 of the State Finance and Procurement Article, Annotated Code of Maryland. Every business that enters into contracts, leases, or other agreements, with that State of Maryland or its agencies, during a calendar year under which the business is to receive in the aggregate \$100,000 or more, shall within 30 days of the time when aggregate value of these contracts, leases to other agreements reached \$100,000, file with the Secretary of State of Maryland certain specified information to include disclosure of beneficial ownership of the business.
- C. **POLITICAL CONTRIBUTION DISCLOSURE:** The Contractor shall comply with the provisions of Article 33, Section 30-1 through 30-4 the Annotated Code of Maryland, which requires that every person that enters into contracts , leases, or other agreements with the State of Maryland during a calendar year under which the business is to receive in the aggregate \$10,000 or more, shall on or before February 1, of the following year file with the Secretary of State of Maryland certain specified information to include disclosure of political contributions in excess of \$100 to a candidate for elective office in any primary or general election.
- D. **RETENTION OF RECORDS:** The Contractor shall retain and maintain all records and documents relating to this contract for three years after final payment by the Owner or any applicable statute of limitations, whichever is longer, and shall make them available for inspection and audit by the Owners authorized representatives at all times.
- E. **DRUGS, TOBACCO AND ALCOHOL:** All of the Washington County properties are "drug, tobacco, and alcohol free zones" as designated by state and local laws. Neither the Contractor nor any of his employees or subcontractors are permitted to have any drugs, tobacco, or alcohol products on school property. Use or possession of such items on school properties will result in immediate termination of the Contract.

Upon termination of the contract, the contractor will be paid for all services performed to date but will not be paid for any lost or anticipated profits due to termination of the Contract. The Contractor will be removed from all bids with the Prince George's County

Public Schools for a period not to exceed two years. Washington County will provide an unsatisfactory reference when inquiries are made.

PART 2 - PRODUCTS Not Used.

PART 3 – EXECUTION

3.1 SAFETY REQUIREMENTS

- A. All work shall be performed in accordance with rules, regulations, procedures and safe practices and/or OSHA and all other Government agencies having jurisdiction over the project.

B. MARYLAND OCCUPATIONAL SAFETY & HEALTH (MOSH) REQUIREMENTS

All contracts with the BOARD OF EDUCATION OF PRINCE GEORGE'S COUNTY shall be governed by the STATE OF MARYLAND OCCUPATIONAL SAFETY AND HEALTH (MOSH) LAWS. Where any difference(s) may exist between any particular MOSH standard(s) and the corresponding, related United States Occupational Safety and Health Administration (OSHA) standard(s), MOSHLAW SHALL TAKE PRECEDENCE.

- 1. Information pertaining to any particular MOSH Law(s) may be obtained from:

STATE OF MARYLAND DEPARTMENT OF LICENSING AND REGULATION
Division of Labor and Industry/Maryland Occupational Safety and Health
1100 North Eutaw Street
Baltimore, Maryland 21202
Telephone No.: 410-767-2215

3.2 SAFETY PRECAUTIONS AND PROGRAMS:

- A. Each Contractor shall be responsible for initiating, maintaining and supervising safety precautions and programs in connection with the work.
- B. All Contractors shall comply with the provisions of the "Occupational Safety and Health Act" and Federal, State and local requirements.
- C. If a Contractor fails to maintain the safety precautions required by law or directed by authorities having jurisdiction, the Owner may take such action as necessary and charge the Contractor. Therefore, the failure of the Owner to take any such action shall not relieve the Contractor of his obligations.
- D. The Contractor individually shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods and for any damage which may result from their failure or their improper construction, maintenance or operation.
- E. Prior to mobilizing to the job, the Contractor shall submit, in writing, a description of his safety program. During the conduct of the work, the Contractor shall immediately notify

the Owner and Architect in writing of all accidents and shall submit a written report describing in detail the circumstances of each accident within 24 hours of its occurrence. All Contractors shall notify the Architect of any flammable, combustible and/or toxic materials intended for use on the project and shall furnish literature pertinent to the use and control of all materials, including, but not limited to M.S.D.S. sheets.

- F. Each Contractor shall delegate one representative who shall be responsible to maintain all safety requirements of the Contractor.

3.3 SAFETY OF PERSONS AND PROPERTY:

- A. The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage or loss to:
 - 1. All school personnel, employees on the work site and all other persons who may be affected thereby.
 - 2. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-Subcontractors.
 - 3. Other property at the site or adjacent thereto, including but not limited to trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction and underground property.
- B. The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority, including the Owner's requirements bearing on the Safety of persons or property or their protection from damage, injury or loss.
- C. The Contractor shall erect and maintain, as required by existing conditions and progress of the work, all reasonable safeguards for safety and protection, including danger signs and other warnings against hazards.
- D. The Contractor shall promptly remedy all damage or loss to any property caused in whole or in part by the Contractor, his Subcontractors, his Sub-Subcontractors, or anyone directly employed by any of them, or by anyone for whose acts any of them be liable.
- E. The Contractor shall not load or permit any part of the work to be loaded so as to endanger its integrity and safety.
- F. Contractors using a method of blasting to perform work on the project shall use all proper methods, including adequate safety matting and/or overburden, progressive time sequences and scaled distances, in accordance with all governmental regulations.
- G. The use of audio equipment and headsets will not be permitted on the construction site.

3.4 PERSONAL PROTECTION REQUIREMENTS

- A. All persons entering the project shall wear hard hats in good condition and meet ANSI 289.11997. Hard hats shall be worn in the proper manner.
- B. All persons entering the project shall wear proper work boots, clothing and attire including long trousers and shirts. No obscene or inappropriate messages may be displayed on clothing. What constitutes obscene or inappropriate will be at the sole discretion of the Owner.
- C. All job site personnel are expected to strictly adhere to the following rules and regulations:
 - 1. Use of approved eye protection by all Contractor personnel shall be required during all types of percussion and reciprocating work or when other requirements govern.
 - 2. Approved respiratory equipment shall be worn by all personnel exposed to hazardous volumes of toxic or noxious dusts, fumes, mists, or gases.
 - 3. Personal protective equipment is to be used under unusual conditions, such as high temperature work, handling caustic or corrosive liquids, or molten metals.
 - 4. The Contractor is responsible for providing safety training to all of his employees.
 - 5. All shipments to the site shall have the required documentation and labels attached and the documentation and labels shall be maintained while the material is on site.
 - 6. As defined in the occupational Safety & Health Act, safety belts, complete with lanyards, or parachute-style harness, complete with lanyard, are to be used where there is a danger of falling.

3.5 HOUSEKEEPING

- A. Materials and equipment must be piled up or stored in a safe manner. Aisles must be kept clear.
- B. All drop cables/extension cords shall be elevated above the ground or protected in such a way to allow traffic to pass.
- C. Consumption of food and beverages shall be in designated areas and at specified times.
- D. Glass-bottled refreshments will not be allowed in the workplace.
- E. Welding stubs and shells from explosive activated tools shall be collected and properly disposed of by Contractor.
- F. The cords and connections at temporary panels must be maintained in an orderly fashion at all times to prevent tripping.

- G. Nails are to be bent over and/or removed from wood.
- H. Aisles, stairwells and base areas of ladders are to be kept clear at all times.

3.6 M.S.D.S.-CONTROLLED PRODUCTS

- A. The Contractor is responsible for notifying the Owner, of any controlled products that they bring or cause to have brought onto the site. The Contractor shall submit copies of the Material Safety Data Sheet (M.S.D.S.) for the controlled product, and the Contractor shall retain a copy of the M.S.D.S. on site for their own reference. The legal storage, use, and disposal of any controlled product is the responsibility of the Contractor.
- B. The Contractor shall comply with OSHA Communications' Standards 29 CFR 1910- 1200 for hazardous materials. The Contractor shall maintain a Material Safety Data Sheet on file at the jobsite for each chemical brought to the site.
- C. Temporary storage of hazardous materials shall be the responsibility of the Contractor. Final cleanup and removal shall be by the Contractor.

3.7 EMERGENCIES

- A. In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss and shall immediately notify the Owner and Architect of such emergency conditions. Any claims made by the Contractor for additional compensation or extension of time on account of emergency work shall be processed in accordance with the Conditions of the Contract.

END OF SECTION 014100

SECTION 014101 – SAFETY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. General: This Section specifies the required safety procedures for this Project.
- B. It is recognized that the safety of all personnel is the responsibility of the General Contractor involved in the construction of this Project. It is the contractual obligation of each Contractor to adhere to all requirements of the Occupational Health and Safety Act (OSHA), as well as Local and State safety rules and regulations. The General Contractor shall assure the safety of their personnel by providing all protection and safety devices, covers, etc. as they relate to the safe conduct of their work in accordance with all Local, State and Federal regulations. The General Contractor is responsible for any safety requirements that are contractually those of any Contractor.
- C. The General Contractor is the “Lead Contractor” with respect to jobsite safety. Responsibilities and authority of the General Contractor shall be as follows:
 - 1. This Contractor will be responsible to inspect and maintain safe working conditions on the jobsite.
 - 2. Where the work of one (1) Contractor places another Contractor’s workers in jeopardy, the “Lead Contractor” shall direct and coordinate the effort of the Contractors to ensure that jobsite safety is maintained.
 - 3. This Contractor will maintain a “competent person” on site at all times designated to make safety inspections and to serve as the designated representative in charge of safety during the inspection by OSHA employees.
 - 4. This Contractor shall direct any of its subcontractor to make corrections in the event of a safety violation.
 - 5. This Contractor’s responsibilities and corresponding authority will be as defined in the General Conditions of the Contract for Construction.
 - 6. The General Contractor will maintain primary responsibility for the safety of their workers and their subcontractors.
 - 7. The General Contractor shall provide regular and periodic safety inspections and reports by an independent safety consultant. Inspections and reports shall be performed at least once every three months.
 - 8. The General Contractor shall provide a safety representative who is trained in First Aid and CPR.
 - 9. Separation of students and faculty from workers will be required to the extent possible.

PART 2 - PRODUCTS (Not applicable).

PART 3 - EXECUTION

3.1 ACCIDENTS

- A. The Contractor shall notify the Owner of any personal injury that could require medical treatment of any Contractor or their subcontractor's employees at the project site. Also, any damage to property arising in connection with the Contractor's performance should be told to the Owner as promptly as possible after the occurrence of such injury or damage but at the maximum 24 hours. Within 48 hours of such occurrence, the Contractor shall furnish to the Owner a complete written report of such injury or damage. Accident Reports shall include specific actions taken by the Contractor to preclude recurrence of similar incidents.

3.2 EMERGENCY DATA

- A. Each Contractor shall provide the Owner with the following emergency data prior to beginning work at the project site:
 - 1. Emergency care facility to be utilized, address and telephone number.
 - 2. Insurance company and local agent/name, address and telephone number.
 - 3. Detailed description of overall corporation or company safety program.
 - 4. Employees qualified in type of first aid, list employee and associated skill.
 - 5. Detailed description of specifically tailored job site safety program.
 - 6. Identify corporate and job site safety officer.
 - 7. Submit weekly TOOLBOX SAFETY TALK program/meeting minutes including:
 - a. Day of week.
 - b. Time of day.
 - c. Location.
 - d. Attendance record.
 - e. Agenda.
 - f. Unsafe items previously discussed, date of correction.
 - g. Identify on-site personnel with FIRST AID training.
 - 8. All applicable MSDS Program sheets. (Include numbered pages and Table of Contents.
 - 9. Submit completed hazardous substance survey form.
 - 10. Review project "Emergency Response Plan" with the Owner.

3.3 SAFETY AGREEMENT

- A. The General Contractor shall review and comply with the following Safety Agreement before beginning work:

As a Contractor under this Contract, you have, by accepting this Contract, obligated yourself to conduct all your operations within this Safety Agreement.

The Contractor agrees that the prevention of accidents to employees engaged in the Work under this Agreement is the responsibility of the Contractor.

The Contractor agrees to comply with all laws, regulations and codes concerning safety as shall be applicable to the Work and to the safety standards established during the progress of the Work. When so ordered, the Contractor agrees to stop any part of the Work which the "Lead Contractor" or any other applicable agency may deem unsafe until corrective measures satisfactory to the Owner and in accordance with the applicable Federal and/or State regulations have been taken and further agrees to make no claim for damages growing out of such stoppages. Should the Contractor neglect to adopt such corrective measures, the Owner may elect to hire an entity, perform the corrections and deduct the cost from payments due or to become due the Contractor. Failure on the part of the Owner to stop unsafe practices shall in no way relieve the General Contractor of his responsibility.

The Contract realizes that an effective accident prevention program is to the mutual benefit of all Contractors through improved employee and public relations and through increased efficiency and production. Further, no accident prevention activity can be truly effective without the sincere cooperation of each Contractor performing on the site. Your attention is directed, but not limited to the following items:

3.4 HOUSEKEEPING

- A. Indiscriminate accumulations of debris, waste or scrap in work areas will not be permitted. (Areas will be designated for storage or disposal). All materials, tools and equipment must be stored in an orderly manner in designated areas.

3.5 PERSONAL PROTECTION EQUIPMENT

- A. The Contractor must furnish their employees with the proper type of personal protective equipment as required by the operations being performed, including, but not necessarily limited to the following:
 - 1. Hard Hats must be furnished to employees and worn at ALL times when on this project, whether or not an overhead hazard exists or what state the project may be in.
 - 2. The Owner requires that appropriate attire be worn at all times while employees are working on-site. Appropriate attire shall be as deemed necessary by the Owner and in accordance with all applicable OSHA regulations.

3.6 SAFETY MEETINGS

- A. The Contractor is required to conduct, and all employees are required to attend a "Tool Box" type safety meeting once a week. The meetings may either be presided over by the Contractor's foreman or another competent representative designated by the General Contractor.

3.7 FIRE PROTECTION

- A. The Contractor must supply approved fire extinguishers for emergency use within his own immediate area of operation, including the Contractor's office, tool and storage enclosures.

3.8 TREATMENT OF INJURIES

- A. The Contractor shall require that all employees injured (no matter how slight) while working on this project, report immediately for First Aid Treatment. The General Contractor shall maintain adequate First Aid Facilities in the field.

3.9 COOPERATION

- A. Any deviation from this course of action will be called to the attention of the General Contractor for immediate correction.

3.10 INSTALLED SAFETY APPARATUS

- A. The Contractor is responsible for the reinstallation of safety apparatus installed by other Contractors if removed to facilitate the installation of their own Contract Work.

3.11 WEAPONS POLICY

- A. All persons are prohibited from carrying, possessing or storing a handgun, firearm, or weapon of any kind while on the Project site, regardless of whether the person has registered the weapon or is licensed to carry a concealed weapon.
- B. Failure to abide by all terms and conditions of this policy may result in discipline up to and including termination. Further, carrying any weapon onto the Owner's property in violation of this policy will be considered an act of criminal trespass and possession of a weapon will be grounds for immediate removal of the person from the Project Site, and may result in prosecution.

3.12 RADIOS

- A. The playing of radios will not be permitted on this project.

END OF SECTION 014101

SECTION 017200 - PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.
- B. Project Record Documents required include the following:
 - 1. Copies of Record Drawings.
 - 2. Record Samples.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" specifies general requirements for preparing and submitting Project Record Documents.
 - 2. Division 1 Section "Operation and Maintenance Data" for requirements regarding submittal of operation and maintenance manuals.
 - 3. Division 1 Section "Contract Closeout" specifies general closeout requirements.
 - 4. Divisions 2 through 16 Sections for specific Project Record Document requirements.
- D. Maintenance of Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and Samples available at all times for the Architect's inspections.

1.3 RECORD DRAWINGS

- A. Markup Procedure: During construction, maintain a set of black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes. Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.
 - 1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:

- a. Dimensional changes to the Drawings.
 - b. Revisions to details shown on the Drawings.
 - c. Depths of foundations below the first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by change order or Construction Change Directive.
 - k. Changes made following the Architect's written orders.
 - l. Details not on original Contract Drawings.
 2. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 3. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 4. Mark important additional information that was either shown schematically or omitted from original Drawings.
 5. Note Construction Change Directive numbers, alternate numbers, change-order numbers, and similar identification.
- B. Responsibility for Markup: The Contractor shall prepare the record drawings.
1. Accurately record information in an understandable drawing technique.
 2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
 3. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records. Organize into sets and bind and label sets for the Owner's continued use.
- C. Copies and Distribution: Print 3 black-line prints of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable-paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.
1. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
 2. Organize print sets. Place these sets in durable tube-type drawing containers with endcaps. Mark the end cap of each container with suitable identification.
 3. Submit the marked-up record set and 3 copy sets to the Architect for the Owner's records; the Architect will retain 1 copy set.

1.4 RECORD SAMPLE SUBMITTAL

- A. Immediately prior to date of Substantial Completion meet with the Architect and the Owner's personnel at the site to determine which of the Samples maintained during the construction period shall be transmitted to the Owner for record purposes. Comply with the Architect's instructions for packaging, identification marking, and delivery to the Owner's Sample storage space. Dispose of other Samples in a manner specified for disposing surplus and waste materials.

1.5 MAINTENANCE MANUAL SUBMITTAL

- A. Refer to Division 1 Section "Operation and Maintenance Data" for requirements regarding submittal of operation and maintenance manuals.

1.6 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to Individual Specification Sections in Divisions 2 through 16 for additional record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Architect for the Owner's records.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project.

END OF SECTION 017200

SECTION 017700 - CONTRACT CLOSEOUT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Contract closeout including, but not limited to, the following:
 - 1. Inspection procedures
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

1.3 SUBSTANTIAL COMPLETION

- A. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete and clean in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.
- B. When the General Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, and before the Architect and Owner issue a Certificate of Substantial Completion, the General Contractor shall submit a Punch List of observed items requiring completion or correction prior to final payment for review. The Punch List shall be prepared on the form provided in Division 1 Section “Contract Closeout.” Failure to include an item does not alter the responsibility of the Contractors to complete all Work in accordance with the Contract Documents.
- C. Upon receipt of the General Contractor’s Punch List, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect’s inspection discloses any item, whether or not included on the Contractor’s Punch List, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.
- D. When the work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion.

- E. Preliminary Procedures: Before requesting inspection for a Certificate of Substantial Completion, complete the following, list All exceptions in the request.
1. In the Application for Payment that first follows the date Substantial Completion is claimed, show 100% completion for the portions of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100% completion cannot be shown, include a punch list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - c. Refer to Division 1 Section "Applications for Payment" for additional information regarding the application which first follows Substantial Completion.
 2. Advise the Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys and similar final record information.
 6. Deliver tools, spare parts, extra stock, and similar items.
 7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
 9. Complete final cleanup requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred, exposed finishes.
- F. Inspection Procedures: Upon receipt of a request for inspection, the Architect will either proceed with the inspection or advise the Contractor of unfulfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will perform a follow-up inspection, when requested and assure that the Work is substantially complete and verify that all previously unfulfilled Work is substantially complete.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 FINAL ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for Certificate of Final Acceptance and final payment, complete the following. List ALL exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Contractor's final list of items to be completed or corrected, endorsed, and dated by the Contractor. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 4. Submit consent of surety to final payment.
 5. Submit evidence of final, continuing insurance coverage complying with insurancerequirements.
 6. Refer to Division 1 Section "Applications for Payment" for additional information regarding the Final Application for Payment.
 7. Refer to Division 1 Section "Contract Closeout" and "Final Cleaning" for additional information regarding the project closeout, cleaning and punch list requirements.
- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a Certificate of Substantial Completion. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated. If more than one (1) reinspection is required to assure final completion, all costs incurred by the Architect, both direct and indirect, shall be chargeable to the Contractor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
1. Maintenance manuals.
 2. Record documents.
 3. Spare parts and materials.
 4. Tools.
 5. Lubricants.
 6. Fuels.

7. Identification systems.
8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

3.2 PUNCH LIST FORM

A. The Punch List is a comprehensive list of the General Contractors' observed items requiring completion or correction within 30 days of the date of Substantial Completion.

1. Using the Punch List Form in Section 01700a, list the location, the date, a description of the item and the Contractor responsible for the item. Upon request this form can be provided in MS Excel format.

B. Upon receipt of the Punch List, the Architect will review; make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Punch List, that item will be added to the list to include location, date, description and the Contractor responsible for completing the item.

C. The Architect will return the Punch List and a Certificate of Substantial Completion that will establish the required completion date of the item. At the established completion date, a status notation on the form will indicate whether the item is complete or incomplete.

3.3 CONSTRUCTION PHASE: CONTRACT REQUIREMENT AND CLOSEOUT CHECK LIST

A. Information: The attached Construction Phase: Contract and Closeout Check List is a summary of the items required for Substantial Completion.

END OF SECTION 017700

CONSTRUCTION PHASE: CONTRACT REQUIREMENTS AND CLOSEOUT CHECKLIST



PROJECT		
DATE OF NOTICE TO PROCEED or DATE OF AGREEMENT		
DATE OF SUBSTANTIAL COMPLETION		
DATE OF FINAL COMPLETION		
COMPLETION OF CRA BASIC FIELD SERVICES		
ACTION / TASK	DATE REQUIRED	COMPLETE
Pre-Construction Conference - Specification Section 01200		
Distribution of the additional sets of contract documents to Contractor as identified in the Supplementary General Conditions of the Contract for Construction.		
Obtain all items required from the Contractor prior to the first application for payment: See Specification Section 01027		
Secure a Stipulation Against and Waiver of Liens Form from the Prime Contractor.		
Execute an Initial Statement of Contract Value.		
List of subcontractors.		
List of principal suppliers and fabricators.		
Schedule of Values.		
Contractor's Construction Schedule (preliminary if not final).		
Schedule of principal products.		
List of Contractor's staff assignments.		
Copies of building permits.		
Coordination Drawings due from Contractors - Specification Section 01041		
Submission of Submittal Schedule - Specification Section 01300		
Completion of Submittal / Shop Drawing Process		
Completion of all mock-up and sample panels - 90 days		
Initial Construction Schedule governing the first 120 days of construction. Specification Section 01320		
Complete a Final Construction Schedule governing the Work. Specification Section 01320		
Requests for Substitutions - Specification Section 01631		
Completion of Punch List Items - <u>30 days</u> to be established on the Certificate of Substantial Completion		
Completion of Contract Closeout - Specification Section 01700		
Obtain all items required from the Contractor prior to processing pay application at Substantial Completion: See Specification Section 01027		
Occupancy permits and similar approvals.		

Warranties (guarantees) and maintenance agreements.		
Test/adjust/balance records.		
Maintenance instructions.		
Startup performance reports.		
Changeover information related to Owner's occupancy, use, operation, and maintenance.		
Final cleaning.		
List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.		
Obtain all items required from the Contractor prior to processing pay application at Final Completion: See Specification Section 01027		
Execute a Contractor's Affidavit of Release of Liens Form (AIA Document G706A).		
Completion of Project closeout requirements.		
Completion of items specified for completion after Substantial Completion.		
Ensure that unsettled claims will be settled.		
Ensure that incomplete Work is not accepted and will be completed without undue delay.		
Application for reduction of retainage and consent of surety.		
Transmittal of required Project construction records to the Owner.		
Removal of temporary facilities and services.		
Removal of surplus materials, rubbish, and similar elements.		
Change of door locks to Owner's access.		
Attend the 11 month warranty walk through - Supplementary General Conditions for the Contract for Construction		

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
 - 1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
 - 2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
 - 3. Instruction of the Owner's operating personnel in the operation and maintenance of building systems and equipment.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" specifies preparation of Shop Drawings and Product Data.
 - 2. Division 1 Section "Contract Closeout" specifies general closeout requirements.
 - 3. Appropriate Sections of Divisions 2 through 16 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.
- C. Preparation of operation and maintenance manuals includes collecting material, collating and binding material, and submitting data. Being a single prime contract, the General Contractor shall prepare all operation and maintenance data for its own installations as well as those of its subcontractors.

1.3 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
 - 1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.

2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.
- B. Instructions for the Owner's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the Owner's operation and maintenance personnel.

1.4 SUBMITTALS

- A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:
1. Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit 2 draft copies of each manual to the Architect for review. Include a complete index or table of contents of each manual.
 - a. The Architect will return 1 copy of the draft with comments within 15 days of receipt.
 2. Submit 1 copy of data in final form at least 15 days before final inspection. The Architect will return this copy within 15 days after final inspection, with comments.
 3. After final inspection, make corrections or modifications to comply with the Architect's comments. Submit the specified number of copies of each approved manual to the Architect within 15 days of receipt of the Architect's comments.
- B. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.
1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11- inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
 - a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.

2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11- inch white bond paper.
5. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.5 MANUAL CONTENT

- A. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
 1. General system or equipment description.
 2. Design factors and assumptions.
 3. Copies of applicable Shop Drawings and Product Data.
 4. System or equipment identification, including:
 - a. Name of manufacturer.
 - b. Model number.
 - c. Serial number of each component.
 5. Operating instructions.
 6. Emergency instructions.
 7. Wiring diagrams.
 8. Inspection and test procedures.
 9. Maintenance procedures and schedules.
 10. Precautions against improper use and maintenance.
 11. Copies of warranties.
 12. Repair instructions including spare parts listing.
 13. Sources of required maintenance materials and related services.
 14. Manual index.

- B. Organize each manual into separate Sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of Product Data, supplemented by Drawings and written text; and copies of each warranty, bond, and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - a. Subject matter covered by the manual.
 - b. Name and address of the Project.
 - c. Date of submittal.
 - d. Name, address, and telephone number of the Contractor.
 - e. Name and address of the Architect.
 - f. Cross-reference to related systems in other operation and maintenance manuals.
 2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 3. General Information: Provide a general information Section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation and delete references to information that is not applicable.
 5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.

6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
7. Do not use original project record documents as part of operation and maintenance manuals. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

1.6 MATERIAL AND FINISHES MAINTENANCE MANUAL

- A. Submit three (3) copies of each manual, in final form, on material and finishes to the Architect for distribution. Provide one (1) section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.
 1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.
- B. Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
 1. Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:
 - a. Manufacturer's catalog number.
 - b. Size.
 - c. Material composition.
 - d. Color.
 - e. Texture.
 - f. Reordering information for specially manufactured products.
 2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.

1. Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Installation details.
 - d. Inspection procedures.
 - e. Maintenance information.
 - f. Repair procedures.
- D. Schedule: Provide complete information in the materials and finishes manual on products specified in the following Sections:
 1. Face Brick: Section 04810 - Unit Masonry.
 2. EPDM Sheet Roofing: Section 07530 - Single-Ply Membrane Roofing.
 3. Finish Hardware: Section 08710 - Door Hardware.
 4. Carpet: Section 09680 - Carpet.

1.7 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

- A. Submit 6 copies of each manual, in final form, on equipment and systems to the Architect for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
 1. Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.
- B. Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
 1. Description: Provide a complete description of each unit and related component parts, including the following:
 - a. Equipment or system function.
 - b. Operating characteristics.
 - c. Limiting conditions.
 - d. Performance curves.
 - e. Engineering data and tests.
 - f. Complete nomenclature and number of replacement parts.
 2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - a. Printed operation and maintenance instructions.
 - b. Assembly drawings and diagrams required for maintenance.
 - c. List of items recommended to be stocked as spare parts.

3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
 - a. Routine operations.
 - b. Troubleshooting guide.
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
4. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - a. Startup procedures.
 - b. Equipment or system break-in.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Shutdown and emergency instructions.
 - g. Summer and winter operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions.
5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
7. Coordination Drawings: Provide each Contractor's Coordination Drawings.
 - a. Provide as-installed, color-coded, piping diagrams, where required for identification.
8. Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.
9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following:
 - e. Electric service.
 - f. Controls.
 - g. Communication.

1.8 INSTRUCTIONS FOR THE OWNER'S PERSONNEL

- A. Prior to final inspection, instruct the Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times.

1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017823

SECTION 017900 – WARRANTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
 - 2. Division 1 Section "Contract Closeout" specifies contract closeout procedures.
 - 3. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- D. Being a single prime contract, the General contractor is responsible for warranties related to its own work as well as the work of all of their subcontractors.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

- A. Submit written warranties to the Architect **prior to the date certified for Substantial Completion.** If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
- C. Forms for special warranties are included at the end of this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
 - 1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- D. Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- E. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8- 1/2-by-11-inch paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the 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 the Installer.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 - 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 017900

SECTION 260511 - REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section applies to all sections of Division 26.
- B. Furnish and install electrical systems, materials, equipment, and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, transformers, conductors and cable, switchboards, switchgear, panelboards, and other items and arrangements for the specified items are shown on the drawings.
- C. Electrical service entrance equipment and arrangements for temporary and permanent connections to the electric utility company's system shall conform to the electric utility company's requirements. Coordinate fuses, circuit breakers and relays with the electric utility company's system and obtain electric utility company approval for sizes and settings of these devices.
- D. Conductor ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways sized per NEC.

1.2 MINIMUM REQUIREMENTS

- A. The International Building Code (IBC), National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) codes and standards are the minimum requirements for materials and installation.
- B. The drawings and specifications shall govern in those instances where requirements are greater than those stated in the above codes and standards.

1.3 TEST STANDARDS

- A. All materials and equipment shall be listed, labeled, or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc. (UL), standards where test standards have been established. Materials and equipment which are not covered by UL standards will be accepted, providing that materials and equipment are listed, labeled, certified or otherwise determined to meet the safety requirements of a NRTL. Materials and equipment which no NRTL accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as ANSI, NEMA, and NETA. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed: Materials and equipment included in a list published by an organization that is acceptable to the Authority Having Jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production or listed materials and equipment or periodic evaluation of services, and whose listing states that the materials and equipment either meets appropriate designated standards or has been tested and found suitable for a specified purpose.
2. Labeled: Materials and equipment to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the Authority Having Jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled materials and equipment, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
3. Certified: Materials and equipment which:
 - a. Have been tested and found by a NRTL to meet nationally recognized standards or to be safe for use in a specified manner.
 - b. Are periodically inspected by a NRTL.
 - c. Bear a label, tag, or other record of certification.
4. Nationally Recognized Testing Laboratory: Testing laboratory which is recognized and approved by the Secretary of Labor in accordance with OSHA regulations.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

- A. Manufacturer's Qualifications: The manufacturer shall regularly and currently produce, as one of the manufacturer's principal products, the materials and equipment specified for this project, and shall have manufactured the materials and equipment for at least three years.
- B. Product Qualification:
1. Manufacturer's materials and equipment shall have been in satisfactory operation, on three installations of similar size and type as this project, for at least three years.
 2. The Architect reserves the right to require the Contractor to submit a list of installations where the materials and equipment have been in operation before approval.
- C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within four hours of receipt of notification that service is needed. Submit name and address of service organizations.

1.5 APPLICABLE PUBLICATIONS

- A. Applicable publications listed in all Sections of Division 26 are the latest issue, unless otherwise noted.
- B. Products specified in all sections of Division 26 shall comply with the applicable publications listed in each section.

1.6 MANUFACTURED PRODUCTS

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, and for which replacement parts shall be available.
- B. When more than one unit of the same class or type of materials and equipment is required, such units shall be the product of a single manufacturer.
- C. Equipment Assemblies and Components:
 - 1. Components of an assembled unit need not be products of the same manufacturer.
 - 2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
 - 3. Components shall be compatible with each other and with the total assembly for the intended service.
 - 4. Constituent parts which are similar shall be the product of a single manufacturer.
- D. Factory wiring and terminals shall be identified on the equipment being furnished and on all wiring diagrams.
- E. When Factory Testing Is Specified:
 - 1. Four copies of certified test reports shall be furnished to the owner two weeks prior to final inspection and not more than 90 days after completion of the tests.
 - 2. When materials and equipment fail factory tests, and re-testing and re-inspection is required, the Contractor shall be liable for all additional expenses for the re-testing.

1.7 VARIATIONS FROM CONTRACT REQUIREMENTS

- A. Where the Architect or the Contractor requests variations from the contract requirements, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.8 MATERIALS AND EQUIPMENT PROTECTION

- A. Materials and equipment shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.

1. Store materials and equipment indoors in clean dry space with uniform temperature to prevent condensation.
2. During installation, equipment shall be protected against entry of foreign matter, and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
3. Damaged equipment shall be repaired or replaced, as determined by the Owner and Architect.
4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
5. Damaged paint on equipment shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.9 WORK PERFORMANCE

- A. All electrical work shall comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA, in addition to other references required by contract.
- B. Job site safety and worker safety is the responsibility of the Contractor.
- C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:
 1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
- D. For work that affects existing electrical systems, arrange, phase and perform work to assure minimal interference with normal functioning of the facility. Refer to Article OPERATIONS AND STORAGE AREAS under Division 01 Section "General Requirements."
- E. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Division 01 Section "General Requirements."
- F. Coordinate location of equipment and conduit with other trades to minimize interference.

1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS

- A. Equipment location shall be as close as practical to locations shown on the drawings.
- B. Working clearances shall not be less than specified in the NEC.
- C. Inaccessible Equipment:

1. Where the Architect determines that the Contractor has installed equipment not readily accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the Owner.
 2. "Readily accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.
- D. Electrical service entrance equipment and arrangements for temporary and permanent connections to the electric utility company's system shall conform to the electric utility company's requirements. Coordinate fuses, circuit breakers and relays with the electric utility company's system and obtain electric utility company approval for sizes and settings of these devices.

1.11 EQUIPMENT IDENTIFICATION

- A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as switchboards and switchgear, panelboards, cabinets, motor controllers, fused and non-fused safety switches, generators, automatic transfer switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.
- B. Identification signs for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Identification signs for Essential Electrical System (EES) equipment, as defined in the NEC, shall be laminated red phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 1/2 inch high. Identification signs shall indicate equipment designation, rated bus amperage, source name and location, voltage, number of phases, number of wires, and type of EES power branch as applicable. Secure nameplates with screws.
- C. Install adhesive arc flash warning labels on all equipment as required by NFPA 70E. Label shall indicate the arc hazard boundary (inches), working distance (inches), arc flash incident energy at the working distance (calories/cm²), required PPE category and description including the glove rating, voltage rating of the equipment, limited approach distance (inches), restricted approach distance (inches), prohibited approach distance (inches), equipment/bus name, date prepared, and manufacturer name and address.

1.12 SUBMITTALS

- A. Submit to the Architect in accordance with Division 01 Section "Shop Drawings, Product Data, And Samples."
- B. The Architect's approval shall be obtained for all materials and equipment before delivery to the job site. Delivery, storage or installation of materials and equipment which has not had prior approval will not be permitted.

1.13 SINGULAR NUMBER

- A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

1.14 ACCEPTANCE CHECKS AND TESTS

- A. The Contractor shall furnish the instruments, materials, and labor for tests.
- B. Where systems are comprised of components specified in more than one section of Division 26, the Contractor shall coordinate the installation, testing, and adjustment of all components between various manufacturer's representatives and technicians so that a complete, functional, and operational system is delivered to the Owner.
- C. When test results indicate any defects, the Contractor shall repair or replace the defective materials or equipment and repeat the tests. Repair, replacement, and retesting shall be accomplished at no additional cost to the Owner.

1.15 WARRANTY

- A. All work performed and all equipment and material furnished under this Division shall be free from defects and shall remain so for a period of one year from the date of acceptance of the entire installation by the Owner.

1.16 INSTRUCTION

- A. Instruction to designated Architect personnel shall be provided for the particular equipment or system as required in each associated technical specification section.
- B. Furnish the services of competent instructors to give full instruction in the adjustment, operation, and maintenance of the specified equipment and system, including pertinent safety requirements. Instructors shall be thoroughly familiar with all aspects of the installation and shall be trained in operating theory as well as practical operation and maintenance procedures.
- C. A training schedule shall be developed and submitted by the Contractor and approved by the Owner at least 30 days prior to the planned training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 260511

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Metal-clad cable, Type MC, rated 600 V or less.
 - 3. Photovoltaic cable, Type PV, rated 2000 V or less.
 - 4. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. PV: Photovoltaic
- B. VFC: Variable-frequency controller

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer's authorized service representative
- B. Field quality-control reports

1.6 QUALITY ASSURANCE

- A. Test Agency Qualifications: Member company of NETA
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Alpha Wire Company](#).
 - 2. [Belden Inc.](#)
 - 3. [Cerro Wire LLC](#).
 - 4. [Encore Wire Corporation](#).
 - 5. [General Cable Technologies Corporation](#).
 - 6. [Okonite Company \(The\)](#).
 - 7. [Southwire Company](#).
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

Common insulation types are described below; however, numerous other insulation types and flame-resistance options are available. Coordinate with Drawings.

- E. Conductor Insulation:
 - 1. Type NM: Comply with UL 83 and UL 719.
 - 2. Type TC-ER: Comply with NEMA WC 70/ICEA S-95-658 and UL 1277.
 - 3. Type THWN-2: Comply with UL 83.
 - 4. Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
 - 5. Type UF: Comply with UL 83 and UL 493.
 - 6. Type XHHW-2: Comply with UL 44.
- F. Shield:
 - 1. Type TC-ER: Cable designed for use with VFCs, with oversized crosslinked polyethylene insulation, spiral-wrapped foil plus 85 percent coverage braided shields and insulated full-size ground wire, and sunlight- and oil-resistant outer PVC jacket.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Alpha Wire Company.](#)
 - 2. [Belden Inc.](#)
 - 3. [Encore Wire Corporation.](#)
 - 4. [General Cable Technologies Corporation.](#)
 - 5. [Okonite Company \(The\).](#)
 - 6. [Southwire Company.](#)
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. Comply with UL 1569.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Circuits:
 - 1. Single circuit.
 - 2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.
- E. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- F. Ground Conductor: Insulated.
- G. Conductor Insulation:
 - 1. Type TFN/THHN/THWN-2: Comply with UL 83.
 - 2. Type XHHW-2: Comply with UL 44.
- H. Armor: Steel, interlocked
- I. Jacket: PVC applied over armor

2.3 PHOTOVOLTAIC CABLE, TYPE PV

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600V

- B. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - 1. [Encore Wire Corporation.](#)
 - 2. [General Cable; General Cable Corporation.](#)
 - 3. [Southwire Company.](#)
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.
- E. Conductor Insulation: Comply with UL 44 and UL 4703.

2.4 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - 1. [3M Electrical Products.](#)
 - 2. [AFC Cable Systems; a part of Atkore International.](#)
 - 3. [Hubbell Power Systems, Inc.](#)
 - 4. [Ideal Industries, Inc.](#)
 - 5. [ILSCO.](#)
 - 6. [O-Z/Gedney; a brand of Emerson Industrial Automation.](#)
 - 7. [Thomas & Betts Corporation; A Member of the ABB Group.](#)

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. VFC Output Circuits Cable: Extra-flexible stranded for all sizes.

- D. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.
- E. PV Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

This article provides example of application requirements for conductors and cables. Revise to retain wiring methods for various environments in Project. Add other methods if required. Revise conductor insulation and cable type designations to suit Project conditions, authorities having jurisdiction, and practice. See NFPA 70 and UL's "Wire and Cable Marking and Application Guide" for additional application information about conductor sizes, insulation temperature ratings in cables, and product-use classifications and restrictions.

See the Evaluations for use of Type MI cable as service entrance conductor inside a building.

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway
- E. Exposed Branch Circuits: Type THHN/THWN-2, single conductors in raceway
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway
- G. Branch Circuits Concealed in Concrete, below slabs-on-Grade, and underground: Type THHN/THWN-2, single conductors in raceway
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application
- I. VFC Output Circuits: Type TC-ER cable with braided shield
- J. PV Circuits: Type PV for PV source circuits rated at 600V

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated
- B. Complete raceway installation between conductor and cable termination points according to Division 26 Section "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible
- F. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements:
 - a. Generator and associated transfer switch.
3. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.

C. Cables will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that comply with requirements.
3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans showing dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Ground rings.
 - 4. Grounding arrangements and connections for separately derived systems.
- B. Qualification Data: For testing agency and testing agency's field supervisor.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

- a. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1) Test wells.
 - 2) Ground rods.
 - 3) Ground rings.
 - 4) Grounding arrangements and connections for separately derived systems.
- b. Instructions for periodic testing and inspection of grounding features at test wells ground rings grounding connections for separately derived systems based on NFPA 70B.
 - 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - 2) Include recommended testing intervals.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Certified by NETA.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Advanced Lightning Technology, Ltd.](#)
 - 2. [Burndy; Part of Hubbell Electrical Systems.](#)
 - 3. [Dossert; AFL Telecommunications LLC.](#)
 - 4. [ERICO; a brand of nVent.](#)
 - 5. [Harger Lightning & Grounding.](#)
 - 6. [O-Z/Gedney; a brand of Emerson Industrial Automation.](#)
 - 7. [Robbins Lightning, Inc.](#)
 - 8. [Siemens Industry, Inc., Energy Management Division.](#)
 - 9. [Thomas & Betts Corporation; A Member of the ABB Group.](#)

2.3 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Tinned Conductors: ASTM B 33.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wireterminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

- K. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- L. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
- M. Straps: Solid copper, cast-bronze clamp. Rated for 600 A.
- N. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal one-piece clamp.
- O. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- P. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, sectional type; 5/8 by 96 inches.
- B. Ground Plates: 1/4-inch-thick, hot-dip galvanized.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 24 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

- D. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

- A. Generator: Install grounding electrode(s) at the generator location. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than 6 inches from the foundation.

3.5 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- F. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.
- G. Metallic Fences: Comply with requirements of IEEE C2.
 - 1. Grounding Conductor: Bare, tinned copper, not less than No. 8 AWG.
 - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
 - 3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.
- C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
 - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - 1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column, extending around the perimeter of building.
 1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
 2. Bury ground ring not less than 24 inches from building's foundation.
- J. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.

3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- D. Grounding system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
 5. Pad-Mounted Equipment: 5 ohms.
 6. Manhole Grounds: 10 ohms.
- G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Steel slotted support systems.
- 2. Aluminum slotted support systems.
- 3. Nonmetallic slotted support systems.
- 4. Conduit and cable support devices.
- 5. Support for conductors in vertical conduit.
- 6. Structural steel for fabricated supports and restraints.
- 7. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, togglebolts, and hanger rods.
- 8. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.
 - i. Brackets.
- 2. Include rated capacities and furnished specialties and accessories.

- B. Shop Drawings: For fabrication and installation details for electrical hangers and support systems.
 - 1. Hangers. Include product data for components.
 - 2. Slotted support systems.
 - 3. Equipment supports.
 - 4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
- C. Delegated-Design Submittal: For hangers and supports for electrical systems.
 - 1. Include design calculations and details of hangers.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Suspended ceiling components.
 - 2. Ductwork, piping, fittings, and supports.
 - 3. Structural members to which hangers and supports will be attached.
 - 4. Size and location of initial access modules for acoustical tile.
 - 5. Items penetrating finished ceiling, including the following:
 - a. Luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Projectors.
- B. Welding Certificates

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M.
 - 2. AWS D1.2/D1.2M.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. Flex-Strut Inc.
 - d. Gripple Inc.
 - e. Thomas & Betts Corporation; A Member of the ABB Group.
 - f. Unistrut; Part of Atkore International.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 4. Channel Width: Selected for applicable load criteria.
 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Aluminum Slotted Support Systems: Extruded-aluminum channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches o.c. in at least one surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper Industries, Inc.
 - b. Flex-Strut Inc.
 - c. Thomas & Betts Corporation; A Member of the ABB Group.
 - d. Unistrut; Part of Atkore International.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 3. Channel Material: 6063-T5 aluminum alloy.
 4. Fittings and Accessories Material: 5052-H32 aluminum alloy.
 5. Channel Width: Selected for applicable load criteria.
 6. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Hilti, Inc.
 - 3) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 5. Toggle Bolts: All-steel springhead type.
 - 6. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA 1.
 - 2. NECA 101
 - 3. NECA 105.
- B. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1- 1/2-inch and smaller raceways serving branch circuits and communication systems abovesuspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT and RMC may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchorfasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP- 69.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site- fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Miscellaneous Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.3 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Nonmetal conduits, tubing, and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes, enclosures, and cabinets.
7. Handholes and boxes for exterior underground cabling.

- B. Related Requirements:

1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.
2. Division 27 Section "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

1.4 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AFC Cable Systems; a part of Atkore International.
 - 2. Allied Tube & Conduit; a part of Atkore International.
 - 3. FSR Inc.
 - 4. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - 5. Picoma Industries, Inc.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- E. EMT: Comply with ANSI C80.3 and UL 797.
- F. FMC: Comply with UL 1; zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- H. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
 - 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
 - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- I. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

- A. **Manufactures:** Subject to compliance with requirements, provide products by one of the following:
1. [AFC Cable Systems; a part of Atkore International.](#)
 2. [Anamet Electrical, Inc.](#)
 3. [Arnco Corporation.](#)
 4. [Electri-Flex Company.](#)
 5. [FRE Composites.](#)
 6. [Kraloy.](#)
 7. [Lamson & Sessions.](#)
 8. [RACO; Hubbell.](#)
 9. [Thomas & Betts Corporation; A Member of the ABB Group.](#)
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fiberglass:
1. Comply with NEMA TC 14.
 2. Comply with UL 2515 for aboveground raceways.
 3. Comply with UL 2420 for belowground raceways.
- D. ENT: Comply with NEMA TC 13 and UL 1653.
- E. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated
- F. LFNC: Comply with UL 1660.
- G. Rigid HDPE: Comply with UL 651A.
- H. RTRC: Comply with UL 2515A and NEMA TC 14.
- I. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- J. Fittings for LFNC: Comply with UL 514B.
- K. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. **Manufactures:** Subject to compliance with requirements, provide products by one of the following:

1. [B-line, an Eaton business](#)
 2. [Hoffman; a brand of nVent.](#)
 3. [MonoSystems, Inc.](#)
 4. [Square D.](#)
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

- A. [Manufacturers](#): Subject to compliance with requirements, provide products by one of the following:
1. [Allied Moulded Products, Inc.](#)
 2. [Hoffman; a brand of nVent.](#)
 3. [Lamson & Sessions.](#)
 4. [Niedax Inc.](#)
- B. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
- D. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
- E. Solvents and Adhesives: As recommended by conduit manufacturer.

2.5 SURFACE RACEWAYS

- A. Listing and Labeling: Surface raceways and tele-power poles shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Surface Metal Raceways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hubbell Incorporated; Wiring Device-Kellems.
 - b. MonoSystems, Inc.
 - c. Panduit Corp.
 - d. Wiremold / Legrand.

2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Crouse-Hinds, an Eaton business.
 2. Erickson Electrical Equipment Company.
 3. FSR Inc.
 4. Hoffman; a brand of nVent.
 5. Hubbell Incorporated.
 6. O-Z/Gedney; a brand of Emerson Industrial Automation.
 7. RACO; Hubbell.
 8. Thomas & Betts Corporation; A Member of the ABB Group.
 9. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Metal Floor Boxes:
1. Material: Cast metal.
 2. Type: Fully adjustable.
 3. Shape: Rectangular.
 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- G. Nonmetallic Floor Boxes: Nonadjustable, round.
 - 1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- H. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- I. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- J. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- K. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- L. Device Box Dimensions: 4 inches square by 2-1/8 inches deep or 4 inches by 2-1/8 inches by 2-1/8 inches deep.
- M. Gangable boxes are allowed.
- N. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- O. Cabinets:
 - 1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.7 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armorcast Products Company.
 - b. Oldcastle Enclosure Solutions.
 - c. Oldcastle Precast, Inc.
 - d. Quazite: Hubbell Power Systems, Inc.
 2. Standard: Comply with SCTE 77.
 3. Configuration: Designed for flush burial with integral closed bottom unless otherwise indicated.
 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 6. Cover Legend: Molded lettering, "ELECTRIC."
 7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
 8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.5 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
1. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: PVC coated GRC.
 2. Concealed Conduit, Aboveground: GRC.
 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried or concrete encased.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.

3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Multi-purpose room.
 - b. Mechanical/Electrical Rooms
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: GRC.
 7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel in institutional and commercial kitchens and damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface raceways only where indicated on Drawings.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems" for hangers and supports.

- E. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inch of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
 - 5. Change from ENT to GRC before rising above floor.
- J. Stub-ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- L. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- N. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- P. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

- Q. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- R. Surface Raceways:
1. Install surface raceway with a minimum 2-inch radius control at bend points.
 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- S. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- T. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where an underground service raceway enters a building or structure.
 3. Where otherwise required by NFPA 70.
- U. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- V. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.

4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- W. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- AA. Locate boxes so that cover or plate will not span different building finishes.
- BB. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- CC. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- DD. Set metal floor boxes level and flush with finished floor surface.
- EE. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.

2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 - a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
 - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
5. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line, 36" below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but shorten enough to preserve adequate working clearances in enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.6 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.7 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings, including GRC and PVC-coated steel conduit.
 - 2. Rigid nonmetallic duct.
 - 3. Flexible nonmetallic duct.
 - 4. Duct accessories.
 - 5. Precast concrete handholes.
 - 6. Polymer concrete handholes and boxes with polymer concrete cover.
 - 7. Fiberglass handholes and boxes with polymer concrete cover.
 - 8. Fiberglass handholes and boxes.
 - 9. High-density plastic boxes.
 - 10. Precast manholes.
 - 11. Cast-in-place manholes.
 - 12. Utility structure accessories.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
 - 1. Two or more ducts installed in parallel, with or without additional casing materials.
 - 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include duct-bank materials, including spacers and miscellaneous components.
2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
3. Include accessories for manholes, handholes, boxes, and other utility structures.
4. Include underground-line warning tape.
5. Include warning planks.

B. Shop Drawings:

1. Precast or Factory-Fabricated Underground Utility Structures:

- a. Include plans, elevations, sections, details, attachments to other work, and accessories.
- b. Include duct entry provisions, including locations and duct sizes.
- c. Include reinforcement details.
- d. Include frame and cover design and manhole chimneys.
- e. Include ladder details.
- f. Include grounding details.
- g. Include dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
- h. Include joint details.

2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:

- a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
- b. Include duct entry provisions, including locations and duct sizes.
- c. Include cover design.
- d. Include grounding details.
- e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.5 INFORMATIONAL SUBMITTALS

A. Duct and Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer.

B. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.

- C. Product Certificates: For concrete and steel used in precast concrete manholes and handholes, as required by ASTM C 858.
- D. Source quality-control reports.
- E. Field quality-control reports.

1.6 MAINTENANCE MATERIALS SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Furnish cable-support stanchions, arms, insulators, and associated fasteners in quantities equal to [5] percent of quantity of each item installed.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1.8 FIELD CONDITIONS

- A. Ground Water: Assume ground-water level is 36 inches below ground surface unless a higher water table is noted on Drawings. See Civil plans for water table information.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. Coated Steel Conduit: PVC-coated GRC.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch, minimum.
- C. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [AFC Cable Systems; a part of Atkore International.](#)
 - 2. [Allied Tube & Conduit; a part of Atkore International.](#)
 - 3. [FSR Inc.](#)
 - 4. [O-Z/Gedney; a brand of Emerson Industrial Automation.](#)
 - 5. [Southwire Company.](#)
 - 6. [Thomas & Betts Corporation; A Member of the ABB Group](#)
 - 7. [Western Tube and Conduit Corporation](#)
 - 8. [Wheatland Tube Company](#)

- D. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 RIGID NONMETTALIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-80-PVC and Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. Underground Plastic Utilities Duct: Type DB-60 PVC and Type DB-120 PVC RNC, complying with NEMA TC 6 & 8 and ASTM F 512 for direct burial, with matching fittings complying with NEMA TC 9 by same manufacturer as duct.
- C. Underground Plastic Utilities Duct: Type EB-20 PVC RNC, complying with NEMA TC 6 & 8, ASTM F 512, and UL 651, with matching fittings complying with NEMA TC 9 by samemanufacturer as duct.
- D. Manufacturers: Subject to compliance with requirements, provide products by one of thefollowing:
 - 1. [ARNCO Corp.](#)
 - 2. [CANTEX INC.](#)
 - 3. [Manhattan/CDT](#)
 - 4. [National Pipe & Plastics](#)
 - 5. [Opti-Com Manufacturing Network, Inc \(OMNI\)](#)
 - 6. [Spiraduct/AFC Cable Systems, Inc](#)
- E. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, andmarked for intended location and application.
- F. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 DUCT ACCESSORIES

- J. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Allied Tube & Conduit; a part of Atkore International](#)
 - b. [CANTEX INC.](#)
 - c. [Carlson; a brand of Thomas & Betts Corporation](#)
 - d. [IPEX USA LLC.](#)
 - e. [Pen Cell Plastics](#)
 - f. [Underground Devices, Inc.](#)

- B. Underground- Line Warning Tape: Comply with requirements for underground-line warningtape specified in Division 26 Section "Identification for Electrical Systems."

2.4 PRECAST CONCTRETE HANDHOLES AND BOXES

- A. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure andshall have load rating consistent with that of handhole or box.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Christy Concrete Products.](#)
 - 2. [Elmhurst-Chicago Stone Co.](#)
 - 3. [Oldcastle Precast, Inc.](#)
 - 4. [Rinker Group, Ltd.](#)
 - 5. [Riverton Concrete Products](#)
 - 6. [Utility Concrete Products, LLC.](#)
 - 7. [Utility Vault Co.](#)
 - 8. [Wausau Tile Inc.](#)
- C. Comply with ASTM C 858 for design and manufacturing processes.
- D. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed coverhook eyes and tamper-resistant, captive, cover-securing bolts.
- E. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- F. Cover Legend: Molded lettering, "ELECTRIC."
- G. Configuration: Units shall be designed for flush burial and have integral closed bottom unless otherwise indicated.
- H. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
 - 1. Extension shall provide increased depth of 12 inches.
 - 2. Slab: Same dimensions as bottom of enclosure and arranged to provide closure.
- I. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.
- J. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional 12 inches vertically and horizontally to accommodate alignment variations.

1. Center window location.
 2. Knockout panels shall be located no less than 6 inches from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
 3. Knockout panel opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct.
 4. Knockout panels shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
 5. Knockout panels shall be 1-1/2 to 2 inches thick.
- K. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.5 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

- A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
6. [Armorcast Products Company.](#)
 7. [MacLean Highline.](#)
 8. [NewBasis.](#)
 9. [Oldcastle Enclosure Solutions.](#)
 10. [Quazite: Hubbell Power Systems, Inc.](#)
- C. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
- D. Color: Gray.
- E. Configuration: Units shall be designed for flush burial and have integral closed bottom unless otherwise indicated.
- F. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- G. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- H. Cover Legend: Molded lettering, "ELECTRIC."
- I. Handholes 12 inches wide by 24 inches long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

2.6 PRECAST MANHOLES

- A. Description: One-piece units and units with interlocking mating sections, complete with accessories, hardware, and features.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. [Carder Concrete Products](#)
 - 2. [Christy Concrete Products](#)
 - 3. [Elmhurst-Chicago Stone Co.](#)
 - 4. [Oldcastle Precast, Inc.](#)
 - 5. [Rinker Group, Ltd.](#)
 - 6. [Riverton Concrete Products](#)
 - 7. [Utility Concrete Products, LLC.](#)
 - 8. [Utility Vault Co.](#)
 - 9. [Wausau Tile Inc.](#)
- C. Comply with ASTM C 858.
- D. Structural Design Loading: Comply with requirements in "Underground Enclosure Application" Article.
- E. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional 12 inches vertically and horizontally to accommodate alignment variations.
 - 1. Center window location.
 - 2. Knockout panels shall be located no less than 6 inches from interior surfaces of walls, floors, or roofs of manholes, but close enough to corners to facilitate racking of cables on walls.
 - 3. Knockout panel opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie into concrete envelopes of duct.
 - 4. Knockout panel shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
 - 5. Knockout panels shall be 1-1/2 to 2 inches thick.
- F. Ground Rod Sleeve: Provide a 3-inch PVC sleeve in manhole floors 2 inches from the wall adjacent to, but not underneath, the duct entering the structure.
- G. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.

2.7 UTILITY STRUCTURE ACCESSORIES

- A. Accessories for Utility Structures: Utility equipment and accessory items used for utility structure access and utility support, listed and labeled for intended use and application.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. [BILCO Company \(The\)](#).
2. [Campbell Foundry Company](#).
3. [Carder Concrete Products](#).
4. [Christy Concrete Products](#).
5. [EJ](#).
6. [Elmhurst-Chicago Stone Co](#).
7. [McKinley Iron Works, Inc](#).
8. [Neenah Foundry Company](#).
9. [NewBasis](#).
10. [Oldcastle Precast, Inc](#).
11. [Osburn Associates, Inc](#).
12. [Pennsylvania Insert Corporation](#).
13. [Quazite: Hubbell Power Systems, Inc](#).
14. [Rinker Group, Ltd](#).
15. [Riverton Concrete Products](#).
16. [Underground Devices, Inc](#).
17. [Utility Concrete Products, LLC](#).
18. [Utility Vault Co](#).
19. [Wausau Tile Inc](#).

C. Manhole Frames, Covers, and Chimney Components: Comply with structural design loadings specified for manhole.

1. Frame and Cover: Weatherproof, gray cast iron complying with ASTM A 48/A 48M, Class 30B with milled cover-to-frame bearing surfaces; diameter, 29 inches.
 - a. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - b. Special Covers: Recess in face of cover designed to accept finish material in paved areas.
2. Cover Legend: Cast in. Selected to suit system.
 - a. Legend: "ELECTRIC-LV" for duct systems with power wires and cables for systems operating at 600 V and less.
 - b. Legend: "ELECTRIC-HV" for duct systems with medium-voltage cables.
3. Manhole Chimney Components: Precast concrete rings with dimensions matched to those of roof opening.
 - a. Seal joints watertight using preformed plastic or rubber complying with ASTM C 990. Install sealing material according to sealant manufacturers' written instructions.

- D. Pulling Eyes in Concrete Walls: Eyebolt with reinforcing-bar fastening insert, 2-inch-diameter eye, and 1-by-4-inch bolt.
 - 1. Working Load Embedded in 6-Inch, 4000-psi Concrete: 13,000-lbf minimum tension.
- E. Pulling Eyes in Nonconcrete Walls: Eyebolt with reinforced fastening, 1-1/4-inch-diameter eye, rated 2500-lbf minimum tension.
- F. Pulling-in and Lifting Irons in Concrete Floors: 7/8-inch-diameter, hot-dip galvanized, bent steel rod; stress relieved after forming; and fastened to reinforcing rod. Exposed triangular opening.
 - 1. Ultimate Yield Strength: 40,000-lbf shear and 60,000-lbf tension.
- G. Bolting Inserts for Concrete Utility Structure Cable Racks and Other Attachments: Flared, threaded inserts of noncorrosive, chemical-resistant, nonconductive thermoplastic material; 1/2-inch ID by 2-3/4 inches deep, flared to 1-1/4 inches minimum at base.
 - 1. Tested Ultimate Pullout Strength: 12,000 lbf minimum.
- H. Ground Rod Sleeve: 3-inch PVC sleeve in manhole floors 2 inches from the wall adjacent to, but not underneath, the ducts routed from the facility.
- I. Expansion Anchors for Installation after Concrete Is Cast: Zinc-plated, carbon-steel-wedge type with stainless-steel expander clip with 1/2-inch bolt, 5300-lbf rated pullout strength, and minimum 6800-lbf rated shear strength.
- J. Cable Rack Assembly: Steel, galvanized, except insulators.
 - 1. Stanchions: T-section or channel; 2-1/4-inch nominal size; punched with 14 holes on 1- 1/2-inch centers for cable-arm attachment.
 - 2. Arms: 1-1/2 inches wide, lengths ranging from 3 inches with 450-lb minimum capacity to 18 inches with 250-lb minimum capacity. Arms shall have slots along full length for cable ties and be arranged for secure mounting in horizontal position at any vertical location on stanchions.
 - 3. Insulators: High-glaze, wet-process porcelain arranged for mounting on cable arms.
- K. Duct-Sealing Compound: Nonhardening, safe for contact with human skin, not deleterious to cable insulation, and workable at temperatures as low as 35 deg F. Capable of withstanding temperature of 300 deg F without slump and adhering to clean surfaces of plastic ducts, metallic conduit, conduit and duct coatings, concrete, masonry, lead, cable sheaths, cable jackets, insulation materials, and common metals.
- L. Fixed Manhole Ladders: Arranged for attachment to roof or wall and floor of manhole. Ladder and mounting brackets and braces shall be fabricated from nonconductive, structural-grade, fiberglass-reinforced resin.

- M. Cover Hooks: Heavy duty, designed for lifts 60 lbf and greater. Two required.

2.8 SOURCE QUALITY CONTROL

- A. Test and inspect precast concrete utility structures according to ASTM C 1037.
- B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - 1. Tests of materials shall be performed by an independent testing agency.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to manholes and handholes, and as approved by Architect.
- C. Clear and grub vegetation to be removed and protect vegetation to remain according to Division 31 Section "Site Clearing." Remove and stockpile topsoil for reapplication according to Division 31 Section "Site Clearing."

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Cables More Than 600 V: Type EPC-80-PVC RNC, concrete-encased unless otherwise indicated.
- B. Underground Ducts Crossing Driveways Roadways and Railroads: Type EPC-40 PVC RNC, encased in reinforced concrete.
- C. Stub-ups: Concrete-encased PVC-coated GRC.

3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes for 600 V and less:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.
3. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer concrete units, SCTE 77, Tier 8 structural load rating.
4. Cover design load shall not exceed the design load of the handhole or box.

B. Manholes: Precast or cast-in-place concrete

1. Units Located in Roadways and Other Deliberate Traffic Paths by Heavy or Medium Vehicles: H-20 structural load rating according to AASHTO HB 17.
2. Units Not Located in Deliberate Traffic Paths by Heavy or Medium Vehicles: H-10 load rating according to AASHTO HB 17.

3.4 EARTHWORK

- A. Excavation and Backfill: Comply with Division 31 Section "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward manholes and handholes and away from buildings and equipment. Slope duct from a high point between two manholes, to drain in both directions.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations unless otherwise indicated.
1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.

- F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.
- G. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet outside the building wall, without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for RNC-to-GRC transition. Install GRC penetrations of building walls as specified in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- H. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig hydrostatic pressure.
- I. Pulling Cord: Install 200-lbf-test nylon cord in empty ducts.
- J. Concrete-Encased Ducts and Duct Bank:
 - 1. Excavate trench bottom to provide firm and uniform support for duct. Prepare trench bottoms as specified in Division 31 Section "Earth Moving" for pipes less than 6 inches in nominal diameter.
 - 2. Width: Excavate trench 4 inches wider than duct on each side.
 - 3. Depth: Install so top of duct envelope is at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 30 inches below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.
 - 4. Support duct on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 - 5. Elbows: Use manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct unless otherwise indicated. Extend encasement throughout length of elbow.
 - 6. Reinforcement: Reinforce concrete-encased duct where crossing disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
 - 7. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
 - 8. Concrete Cover: Install a minimum of 3 inches of concrete cover between edge of duct to exterior envelope wall, 2 inches between duct of like services, and 4 inches between power and communications ducts.
 - 9. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.

- a. Start at one end and finish at the other, allowing for expansion and contraction of duct as its temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written instructions or use other specific measures to prevent expansion-contraction damage.
 - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch reinforcing-rod dowels extending a minimum of 18 inches into concrete on both sides of joint near corners of envelope.
10. Pouring Concrete: Comply with requirements in "Concrete Placement" Article in Division 03 Section "Cast-in-Place Concrete." Place concrete carefully during pours to prevent voids under and between duct and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Allow concrete to flow around duct and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-installation application.

K. Direct-Buried Duct and Duct Bank:

1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Division 31 Section "Earth Moving" for preparation of trench bottoms for pipes less than 6 inches in nominal diameter.
2. Width: Excavate trench 12 inches wider than duct on each side.
3. Width: Excavate trench 3 inches wider than duct on each side.
4. Set elevation of bottom of duct bank below frost line.
5. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
6. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
7. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose and encase coupling with 3 inches of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and minimum 3 inches from conduit side to edge of slab.
 - c. Stub-ups to Indoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches from edge of wall. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches above finished floor and no less than 3 inches from conduit side to edge of slab.

8. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Division 31 Section "Earth Moving" for installation of backfill materials.
 - a. Place minimum 3 inches of sand as a bed for duct. Place sand to a minimum of 6 inches above top level of duct.
 - b. Place minimum 6 inches of engineered fill above concrete encasement of duct.
- L. Underground-Line Warning Tape: Bury conducting underground line specified in Division 26 Section "Identification for Electrical Systems" no less than 12 inches above all concrete- encased duct and duct banks and approximately 12 inches below grade. Align tape parallel to and within 3 inches of centerline of duct bank. Provide an additional warning tape for each 12- inch increment of duct-bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

3.6 INSTALLATION OF CONCRETE MANHOLES, HANDHOLES, AND BOXES

- A. Precast Concrete Handhole and Manhole Installation:
 1. Comply with ASTM C 891 unless otherwise indicated.
 2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
 3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- B. Elevations:
 1. Manhole Roof: Install with rooftop at least 15 inches below finished grade.
 2. Manhole Frame: In paved areas and trafficways, set frames flush with finished grade. Set other manhole frames 1 inch above finished grade.
 3. Install handholes with bottom below frost line, <36" below grade.
 4. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch above finished grade.
 5. Where indicated, cast handhole cover frame integrally with handhole structure.
- C. Drainage: Install drains in bottom of manholes where indicated. Coordinate with drainage provisions indicated.
- D. Manhole Access: Circular opening in manhole roof; sized to match cover size.
 1. Manholes with Fixed Ladders: Offset access opening from manhole centerlines to align with ladder.

2. Install chimney, constructed of precast concrete collars and rings, to support cast-iron frame to connect cover with manhole roof opening. Provide moisture-tight masonry joints and waterproof grouting for frame to chimney.
- E. Dampproofing: Apply dampproofing to exterior surfaces of manholes and handholes after concrete has cured at least three days. Dampproofing materials and installation are specified in Division 07 Section "Bituminous Dampproofing." After ducts are connected and grouted, and before backfilling, dampproof joints and connections, and touch up abrasions and scars. Dampproof exterior of manhole chimneys after mortar has cured at least three days.
 - F. Hardware: Install removable hardware, including pulling eyes, cable stanchions, and cable arms, and insulators, as required for installation and support of cables and conductors and as indicated.
 - G. Fixed Manhole Ladders: Arrange to provide for safe entry with maximum clearance from cables and other items in manholes.
 - H. Field-Installed Bolting Anchors in Manholes and Concrete Handholes: Do not drill deeper than 3-7/8 inches for manholes and 2 inches for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.
- 3.7 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE
- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.
 - B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
 - C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch above finished grade.
 - D. Install handholes and boxes with bottom below frost line, 36" below grade.
 - E. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

- F. For enclosures installed in asphalt paving and subject to occasional, nondeliberate, heavy- vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.
 - 1. Concrete: 3000 psi, 28-day strength, complying with Division 03 Section "Cast-in-Place Concrete," with a troweled finish.
 - 2. Dimensions: 10 inches wide by 12 inches deep.

3.8 GROUNDING

- A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
 - 2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch-long mandrel equal to duct size minus 1/4 inch. If obstructions are indicated, remove obstructions and retest.
 - 3. Test manhole and handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

3.10 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.
- B. Clean internal surfaces of manholes, including sump.
 - 1. Sweep floor, removing dirt and debris.
 - 2. Remove foreign material.

END OF SECTION 260543

SECTION 260544 – SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors
2. Sleeve-seal systems
3. Sleeve-seal fittings
4. Grout
5. Silicone sealants

B. Related Requirements

1. Division 07 Section "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product

PART 2 – PRODUCTS

2.1 SLEEVES

A. Wall Sleeves

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

- B. Sleeves for Conduits Penetrating Non-Fire-Rated Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel
2. Minimum Metal Thickness:

- a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
- b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Advance Products & Systems, Inc.](#)
 - b. [CALPICO, Inc.](#)
 - c. [Metraflex Company \(The\)](#)
 - d. [Pipeline Seal and Insulator, Inc.](#)
 - e. [Proco Products, Inc.](#)
2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Carbon steel.
4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. [HOLDRITE.](#)

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

PART 3 – EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using **[steel]** **[cast-iron]** pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTINGS INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1.

- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Comply with NFPA 70E and Division 26 Section "Overcurrent Protective Device Arc-Flash Study" requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - 4. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 5. Color for Neutral: White.
 - 6. Color for Equipment Grounds: Green.
 - 7. Colors for Isolated Grounds: Green with white stripe.

- C. Warning Label Colors:
 - 1. Identify system voltage with black letters on an orange background.
- D. Warning labels and signs shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.3 LABELS

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Champion America.](#)
 - c. [emedco.](#)
 - d. [Grafoplast Wire Markers.](#)
 - e. [HellermannTyton.](#)
 - f. [LEM Products Inc.](#)
 - g. [Marking Services, Inc.](#)
 - h. [Panduit Corp.](#)
 - i. [Seton Identification Products.](#)
- B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [HellermannTyton.](#)
 - c. [Marking Services, Inc.](#)
 - d. [Panduit Corp.](#)
 - e. [Seton Identification Products.](#)
- C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. [A'n D Cable Products.](#)
 - b. [Brady Corporation.](#)
 - c. [Brother International Corporation.](#)
 - d. [emedco.](#)
 - e. [Grafoplast Wire Markers.](#)
 - f. [Ideal Industries, Inc.](#)
 - g. [LEM Products Inc.](#)
 - h. [Marking Services, Inc.](#)
 - i. [Panduit Corp.](#)
 - j. [Seton Identification Products.](#)
- 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - 3. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
- 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [A'n D Cable Products.](#)
 - b. [Brady Corporation.](#)
 - c. [Brother International Corporation.](#)
 - d. [emedco.](#)
 - e. [Grafoplast Wire Markers.](#)
 - f. [HellermannTyton.](#)
 - g. [Ideal Industries, Inc.](#)
 - h. [LEM Products Inc.](#)
 - i. [Marking Services, Inc.](#)
 - j. [Panduit Corp.](#)
 - k. [Seton Identification Products.](#)
 - 2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameters and that stay in place by gripping action.

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [HellermannTyton.](#)
 - c. [Marking Services, Inc.](#)
 - d. [Panduit Corp.](#)
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Panduit Corp.](#)

2.5 TAPES AND STENCILS

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Carlton Industries, LP.](#)
 - b. [Champion America.](#)
 - c. [HellermannTyton.](#)
 - d. [Ideal Industries, Inc.](#)
 - e. [Marking Services, Inc.](#)
 - f. [Panduit Corp.](#)
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
 - c. [emedco.](#)
 - d. [Marking Services, Inc.](#)
- C. Tape and Stencil: 4-inch-wide black stripes on 10-inch centers placed diagonally over orange background and is 12 inches wide. Stop stripes at legends.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

- a. [HellermannTyton.](#)
 - b. [LEM Products Inc.](#)
 - c. [Marking Services, Inc.](#)
 - d. [Seton Identification Products.](#)
- D. Floor Marking Tape: 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and yellow stripes and clear vinyl overlay.
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Carlton Industries, LP.](#)
 - b. [Seton Identification Products.](#)
- E. Underground-Line Warning Tape:
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Ideal Industries, Inc.](#)
 - c. [LEM Products Inc.](#)
 - d. [Marking Services, Inc.](#)
 - e. [Reef Industries, Inc.](#)
 - f. [Seton Identification Products.](#)
 - 2. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
 - 3. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
- F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.6 TAGS

- A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.

1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
 - c. [emedco.](#)
 - d. [Marking Services, Inc.](#)
 - e. [Seton Identification Products.](#)
- B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023-inch-thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
 - c. [emedco.](#)
 - d. [Grafoplast Wire Markers.](#)
 - e. [LEM Products Inc.](#)
 - f. [Marking Services, Inc.](#)
 - g. [Panduit Corp.](#)
 - h. [Seton Identification Products.](#)

2.7 SIGNS

- A. Baked-Enamel Signs:
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Carlton Industries, LP.](#)
 - b. [Champion America.](#)
 - c. [emedco.](#)
 - d. [Marking Services, Inc.](#)
 2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 3. ¼-inch grommets in corners for mounting
 4. Normal size: 7 by 10 inches

2.8 CABLE TIES

- A. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 1. [Hellermann Tyton](#)
 2. [Ideal Industries, Inc.](#)

3. [Marking Services, Inc.](#)
4. [Panduit Corp.](#)

B. General-Purpose Cable ties: Fungus inert, self-extinguishing, one piece, self-locking, and type 6/6 nylon.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 12,000 psi
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black, except where used for color-coding

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 Deg F according to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.

- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "POWER."
 - 3. "UPS."
- M. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- N. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.

- O. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.
- P. Self-Adhesive Labels:
 - 1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2 inch-high label; where two lines of text are required, use labels 2 inches high.
- Q. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
- R. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- S. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- T. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
 - 1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- U. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- V. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- W. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
 - 2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- X. Metal Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using plenum rated cable ties.
- Y. Nonmetallic Preprinted Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using plenum-rated cable ties.

Z. Write-on Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using plenum-rated cable ties.

AA. Baked-Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

BB. Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1- 1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

CC. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1- 1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

DD. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50- foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
1. "EMERGENCY POWER."
 2. "POWER."
 3. "UPS."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use vinyl wraparound labels to identify the phase.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50- foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.
- G. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- H. Control-Circuit Conductor Termination Identification: For identification at terminations, provide self-adhesive labels with the conductor designation.
- I. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- J. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- K. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- L. Concealed Raceways and Duct Banks, More Than 600 V, within Buildings: Apply floor marking tape to the following finished surfaces:
1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
 2. Wall surfaces directly external to raceways concealed within wall.
 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

- M. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- N. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- O. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked- enamel warning signs.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- P. Arc Flash Warning Labeling: Self-adhesive labels.
- Q. Operating Instruction Signs: Baked-enamel warning signs.
- R. Emergency Operating Instruction Signs: Baked-enamel warning signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- S. Equipment Identification Labels:
 - 1. Indoor Equipment: Baked-enamel signs.
 - 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 - 3. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a self- adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchgear.
 - e. Switchboards.
 - f. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
 - g. Substations.
 - h. Emergency system boxes and enclosures.
 - i. Motor-control centers.
 - j. Enclosed switches.
 - k. Enclosed circuit breakers
 - l. Enclosed controllers

- m. Variable-speed controllers.
- n. Push-button stations.
- o. Power-transfer equipment.
- p. Contactors.
- q. Remote-controlled switches, dimmer modules, and control devices.
- r. Power-generating units.
- s. Monitoring and control equipment.
- t. UPS equipment.

END OF SECTION 260553

SECTION 270000 - GENERAL COMMUNICATIONS PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
Scope of Work.
 1. Intent of Drawings.
 2. Pre-Bid Site Visit.
 3. Definitions.
 4. General Standards of Materials.
 5. Products and Substitutions.
 6. Applicable Codes.
 7. Guarantees and Certificates.
 8. Quiet Operation and Vibration Control.
 9. Temporary Shutdown of Existing Systems.
 10. Coordination.
 11. Shop Drawings, Product Data, and Samples.
 12. Owner Instruction.

1.3 SCOPE OF WORK

- A. The scope of the work included under Division 27 of the specifications shall include complete systems as shown in the Contract Documents and specified herein. Any work reasonably inferable or required to result in a complete installation or the intended operation and performance of the systems, shall be included in the Base Bid except where there is specific reference to exclusion and incorporation in other quotations.

1.4 INTENT OF DRAWINGS

- A. Provide complete and functional systems for the project. The systems shall conform to the details stated in the specifications and shown on the drawings. Items or work not shown or specified, but required for complete systems, shall be provided and conform with accepted trade practices. The drawings and specifications are presented to define specific system requirements and serve to expand on the primary contract requirements of providing complete systems. The drawings are diagrammatic and indicate the general arrangement and routing of the systems included in this contractor's work.

- B. Do not scale the drawings. Because of the scale of the drawings, it is not possible to indicate offsets, fittings, valves, or similar items which may be required to provide complete operating systems. Carefully investigate conditions affecting the work associated with this project. Check and verify dimensions and existing conditions at the site. Install systems in such a manner that interferences between pipes, conduit, ducts, equipment, architectural and structural features are avoided. Provide items required to meet the project conditions without additional cost to the owner.
- C. These documents may not explicitly disclose final details required for a complete systems installation; however, contractors shall possess the expertise to include the necessary appointments of complete operating systems.
- D. Contractors shall be “Experienced” (as defined in Division 1) in this type of construction and realize the extent of the work required.
- E. BICSI Certification of Workers
 - 1. The contractor will employ a minimum of one Registered Communications Distribution Designer (RCDD) certified by and in good standing with BICSI. This RCDD must be a direct full time employee of the contractor and the contractor will continue a minimum of one RCDD throughout the duration of the project. An RCDD shall remain assigned to the project from start to finish and be available to provide guidance to the installation team.
 - 2. Ortronics/Berk-Tek must be able extend a NetClear 25-year Static, Dynamic and Applications Warranty to the end user once the Telecommunications contractor fulfills all requirements under Ortronics and Berk-Tek OASIS Program. At least 30 percent of the copper installation and termination crew must be certified by Berk-Tek and Ortronics or by BICSI with a Technician Level of training.

1.5 PRE-BID SITE VISIT

- A. Bidders shall visit the site and become completely familiar with existing conditions prior to submitting their bid. No extra charges shall be allowed as a result of existing conditions

1.6 DEFINITIONS

- A. Specific terminology, as used herein, shall have the following meanings:
 - 1. “Finished Space” ...Space other than mechanical rooms, electrical rooms, furred spaces, pipe chases, unheated spaces immediately below roof, space above ceilings, unexcavated spaces, crawl spaces, tunnels, and interstitial spaces.
 - 2. "Conditioned"...Spaces directly provided with heating and cooling.
 - 3. "Unconditioned"...Spaces without heating or cooling including ceiling plenums.
 - 4. "Indoors"...Located inside the exterior walls and roof of the building.
 - 5. "Outdoors"...Located outside the exterior walls and roof of the building.

1.7 GENERAL STANDARDS OF MATERIALS

- A. Equipment and materials, unless otherwise noted, shall be new and of first quality, produced by manufacturers who have been regularly engaged in the manufacture of these products for a period of not less than five years.
- B. Equipment of one type shall be the products of one manufacturer; similar items of the same classification shall be identical, including equipment, assemblies, parts and components.
- C. Materials furnished shall be determined safe by a nationally recognized testing organization, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corporation, and materials shall be labeled, certified or listed by such organizations. Where third party certification is required for packaged equipment, the equipment shall bear the appropriate certification label.
- D. With respect to custom made equipment or related installations which are constructed specially for this project, the manufacturer shall certify the safety of same on the basis of test data. The Owner shall be furnished copies of such certificates.

1.8 PRODUCTS AND SUBSTITUTIONS

- A. Where a specific manufacturer's product is specified, the Contract Amount shall be based on that product only. Any substitutions from the specified product shall be offered as a Substitution Request. Refer to Division 1 for requirements. Substitutions shall not be permitted after the bidding phase without a Substitution Request Form included with the bid.
- B. Where several manufacturers' products are specified, the Contract Amount shall be based upon the specified products only. Any substitutions from the specified products shall be offered as a Substitution Request. Refer to Division 1 for requirements. Substitutions shall not be permitted after the bidding phase without a Substitution Request Form included with the bid.
- C. Where only one manufacturer's product is specified, the associated systems have been designed on the basis of that product. Where several manufacturers' products are specified, the associated systems have been designed on the basis of the first-named manufacturer's product. When products other than those used as the basis of design are provided, the contractor shall pay additional costs related to submissions review, redesign, and system and/or structure modifications required by the use of that product.
- D. It is the intent of these specifications that service organizations follow the above substitution procedures.

1.9 APPLICABLE CODES

- A. Materials furnished and work installed shall comply with applicable codes listed in Division 1, with the requirements of the local utility companies, and with the requirements of governmental departments or authorities having jurisdiction.

1.10 GUARANTEES AND CERTIFICATES

- A. Defective equipment, materials or workmanship, including damage to the work provided under other divisions of this contract resulting from same, shall be replaced or repaired at no extra cost to the Owner for the duration of the stipulated guarantee periods.
 - 1. Unless specifically indicated otherwise, the duration of the guarantee period shall be one (1) year following the date of Substantial Completion. Temporary operation of the equipment for temporary conditioning, testing, etc., prior to occupancy will not be considered part of the warranty period.

1.11 QUIET OPERATION AND VIBRATION CONTROL

- A. Equipment and associated items shall operate under conditions of load without sound or vibration deemed objectionable by the Architect. In the case of moving equipment, sound or vibration noticeable outside of the room in which it is installed, or noticeable within the room in which it is installed, shall be deemed objectionable. Sound or vibration deemed objectionable shall be corrected in an approved manner at no extra cost to the Owner. Vibration control shall be provided by means of approved vibration isolators and installed in accordance with the isolator manufacturer's recommendations.
- B. The sound pressure levels around mechanical and electrical equipment (fans, pumps, motors, etc.) in equipment spaces shall not exceed 85 dBA at any point three (3) feet from the equipment, with all equipment in the room operating. The sound criteria applies to the complete range of each piece of equipment.

1.12 TEMPORARY SHUTDOWN OF EXISTING SYSTEMS

- A. Plan installation of new work and connections to existing work to insure minimum interference with regular operation of existing systems. Some temporary shutdowns of existing systems may be required to complete the work.
- B. Submit to the Owner in writing for approval, proposed date schedule, time, and duration of necessary temporary shutdowns of existing systems. Submit schedule at least fifteen (15) calendar days in advance of intended shutdown. Shutdowns shall be made at such times as shall not interfere with regular operation of existing facilities and only after written approval of Owner. The Owner reserves the right to cancel shutdowns at any time prior to the shutdowns. To ensure continuous operation, make necessary temporary connections between new and existing work. Bear costs resulting from temporary shutdowns and temporary connections. No additional charges shall be allowed for Owner-canceled shutdowns that must be rescheduled.

- C. Shutdowns must be performed by the Owner. Do not shut-down any system. The Owner reserves the right to require a walk-through of any shutdown prior to the shutdown. Following electrical shutdowns, verify that affected motors are rotating in the proper direction. Bear costs associated with reverse rotated motors.

1.13 COORDINATION

- A. Coordinate and furnish in writing to the Architect information necessary to permit the work to be installed satisfactorily and with the least possible interference or delay.
- B. Coordination drawings shall be prepared as defined in Division 1. No installation of permanent systems shall proceed until the coordination drawings are reviewed by the Architect. No extra charges shall be allowed for changes required to accommodate installation of systems provided under other divisions of this contract.
- C. Coordination drawings shall be developed from individual system shop drawings and contractor fabrication drawings. Electronic or other reproduced engineering design drawings used as coordination drawings are not acceptable.
- D. When work is installed without proper coordination, changes to this work deemed necessary by the Architect shall be made to correct the conditions without extra cost to the Owner.
- E. The value of the coordination drawings shall be identified as a line item in the Schedule of Values. If the coordination drawings are not submitted as required, their value shall be credited to Owner in accordance with the provisions of Article 7 of the General Conditions. The value of coordination drawings shall be a minimum of two (2.0) percent of this Contract Amount.

1.14 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

- A. Shop drawings, product data, and samples shall be submitted in accordance with the provisions of Division 1.
- B. The following shall be submitted by the Contractor for review:
 - 1. Scale shop drawings showing system components with sizing indicated, including butnot limited to:
 - a. equipment locations
 - b. raceways
 - c. insert and sleeve locations
 - d. hangers, anchors and guides
 - e. expansion joints
 - f. access doors
 - 2. Product data for system components and materials (including construction standards).

3. Samples of finishes and trim exposed to view, such as fixture trim, escutcheon plates and similar items.
- C. The value of shop drawings, product data and samples shall be identified as a line item in the Schedule of Values. If the shop drawings, product data and samples are not submitted as required, their value shall be credited to Owner in accordance with the provisions of Article 7 of the General Conditions. The value of these items shall be a minimum of one (1.0) percent of this Contract Amount.

1.15 OWNER INSTRUCTION

- A. After final tests and adjustments have been completed, furnish the services of qualified personnel to instruct representatives of the Owner in the operation and maintenance procedures for equipment and systems installed as part of this project. Operation and maintenance instructions for major items of equipment shall be directly supervised by the equipment manufacturer's representative. Supply qualified personnel to operate equipment for sufficient length of time as required to meet governing authorities' operation and performance tests and as required to assure that the Owner's representatives are properly qualified to take over operation and maintenance procedures. Minimum instruction period shall be 20 man hours. The instruction period shall be broken into segments at the discretion of the Owner.
 1. Notify the Architect, the Owner's representative and equipment manufacturers' representatives, by letter, as to the time and date of operating and maintenance instruction periods approved by the Owner at least one (1) week prior to conducting same.
 2. Forward to the Architect the signatures of all those present for the instruction periods.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 270000

SECTION 270500 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Communications equipment coordination and installation.
 - 2. Sleeves for pathways and cables.
 - 3. Sleeve seals.
 - 4. Grout.
 - 5. Common communications installation requirements.
 - 6. Training Requirements

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

1.5 COORDINATION

- A. Coordinate arrangement, mounting, and support of communications equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting pathways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 2 - PRODUCTS

2.1 SLEEVES FOR PATHWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
 - 1. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Metraflex Co.
 - d. Pipeline Seal and Insulator, Inc.
 - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.
 - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
 - 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

- A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
 - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel or cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

- B. Provide Specified Technologies, Inc (STI) EZ Path Cable Pathway sleeves at all cable penetrations through walls in the telecommunications rooms (MDF and IDF rooms). Provide multiple Series 33 and Series 44 as needed to serve cabling being installed plus 100% spare capacity.

3.5 TRAINING REQUIREMENTS

- A. All contractor-provided training and demonstrations required in Divisions 27 and 28 specification sections shall be video recorded. Contractor shall provide the services of an audio-video recording specialist for the recording and making of the DVD of each training session.

END OF SECTION 270500

SECTION 271000 – COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Telecommunications mounting elements.
 - 2. Backboards.
 - 3. Telecommunications service entrance pathways.
 - 4. Grounding.
- B. Related Sections:
 - 1. Division 27 Section "Communications Backbone Cabling" for voice and data cabling associated with system panels and devices.
 - 2. Division 27 Section "Communications Horizontal Cabling" for voice and data cabling associated with system panels and devices.
 - 3. Division 28 Section "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with system panels and devices.

1.3 DEFINITIONS

- A. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
- B. BICSI: Building Industry Consulting Service International.
- C. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel not exceeding 6 inches (152 mm) in width.
- D. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
- E. LAN: Local area network.
- F. RCDD: Registered Communications Distribution Designer.
- G. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of a bottom without ventilation openings within integral or separate longitudinal side rails.
- H. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks and cabinets. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For communications equipment room fittings. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Equipment Racks and Cabinets: Include workspace requirements and access for cable connections.
 - 3. Grounding: Indicate location of grounding bus bar and its mounting detail showing standoff insulators and wall mounting brackets.
- C. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings shall be under the direct supervision of RCDD.
 - 2. Installation Supervision: Installation shall be under the direct supervision of Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Field Inspector: Currently registered by BICSI as Commercial Installer, **Level 2** to perform the on-site inspection.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.
- D. Grounding: Comply with ANSI-J-STD-607-A.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install equipment frames and cable trays until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and work above ceilings is complete.

1.7 COORDINATION

- A. Coordinate layout and installation of communications equipment with Owner's telecommunications and LAN equipment and service suppliers. Coordinate service entrance arrangement with local exchange carrier.
 - 1. Meet jointly with telecommunications and LAN equipment suppliers, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 2. Record agreements reached in meetings and distribute them to other participants.
 - 3. Adjust arrangements and locations of distribution frames, cross-connects, and patch panels in equipment rooms to accommodate and optimize arrangement and space requirements of telephone switch and LAN equipment.
 - 4. Adjust arrangements and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in the equipment room.
- B. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. General Requirements: Comply with TIA/EIA-569-A.
- B. Cable Support: NRTL labeled. Cable support brackets shall be designed to prevent degradation of cable performance and pinch points that could damage cable. Cable tie slots fasten cable ties to brackets.
 - 1. Comply with NFPA 70 and UL 2043 for fire-resistant and low-smoke-producing characteristics.
 - 2. Support brackets with cable tie slots for fastening cable ties to brackets.
 - 3. Lacing bars, spools, J-hooks, and D-rings.
 - 4. Straps and other devices.
- C. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."
 - 1. Outlet boxes shall be no smaller than 2 inches (50 mm) wide, 3 inches (75 mm) high, and 2-1/2 inches (64 mm) deep.

2.2 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements for plywood backing panels specified in Division 06 Section "Rough Carpentry."

- B. Paint all backboards "BLACK".
- C. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems." for grounding conductors and connectors.
- D. Telecommunications Main Bus Bar:
 - 1. Connectors: Mechanical type, cast silicon bronze, solderless compression-type wireterminals, and long-barrel, two-bolt connection to ground bus bar.
 - 2. Ground Bus Bar: Copper, minimum 1/4 inch thick by 4 inches wide (6 mm thick by 100 mm wide) with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart.
 - 3. Stand-Off Insulators: Comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.
- E. Comply with ANSI-J-STD-607-A.

2.3 LABELING

- A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including labelstocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

- A. Contact telecommunications service provider and arrange for installation of demarcation point, protected entrance terminals, and a housing when so directed by service provider.
- B. Install underground pathways complying with recommendations in TIA/EIA-569-A, "Entrance Facilities" Article.
- C. Comply with NECA 1.
- D. Comply with BICSI TDMM for layout and installation of communications equipment rooms.
- E. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
- F. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.2 FIRESTOPPING

- A. Comply with requirements in Division 07 Section "Penetration Firestopping. "Comply with TIA/EIA-569-A, Annex A, "Firestopping."

- B. Comply with BICSI TDMM, "Firestopping Systems" Article.
- C. Provide Specified Technologies, Inc (STI) EZ Path Cable Pathway sleeves at all cable penetrations through walls in the telecommunications rooms (MDF and IDF rooms). Provide multiple Series 33 and Series 44 as needed to serve cabling being installed plus 100% spare capacity.

3.3 GROUNDING

- A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. Comply with ANSI-J-STD-607-A.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.
 - 1. Bond the shield of shielded cable to the grounding bus bar in communications rooms and spaces.

3.4 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements in Division 26 Section "Identification for Electrical Systems". Comply with requirements in Division 09 Section "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.
- B. See Division 27 Section "Communications Horizontal Cabling" for additional identification requirements. See Evaluations for discussion of TIA/EIA standard as it applies to this Section. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 3 level of administration including optional identification requirements of this standard.
- C. Labels shall be preprinted or computer-printed type.

END OF SECTION 271000

SECTION 274100 - AUDIOVISUAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification section outlines the minimum requirements and installation methods for the integrated audiovisual System, hardware, software, cables, accessories, and acceptance testing.
- B. System refers to the complete and functional assemblage of equipment required to achieve the specified functionality, performance, and design intent.

1.2 REFERENCES

- A. Comply with the following related specification sections:
 - 1. Division 01 – General Requirements.
 - 2. Section 078400 – Firestopping.
 - 3. Division 26 – Electrical.
 - 4. Division 27 – Communications.
- B. General References:
 - 1. City and State or District Ordinances, as applicable to location.
 - 2. IEEE C2, National Electrical Safety Code®.
 - 3. NFPA-70, National Electrical Code®.
 - 4. NFPA-72, National Fire Alarm Code®.
 - 5. NFPA-101, Life Safety Code®.
 - 6. NFPA-255, Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - 7. American National Standards Institute (ANSI).
 - 8. Federal Communications Commission (FCC).
 - 9. National Electrical Manufacturers Association (NEMA).
 - 10. Occupational Safety and Health Administration (OSHA).
 - 11. Americans with Disabilities Act (ADA)
- C. Audiovisual References:
 - 1. BICSI/INFOCOMM, Audiovisual Design Reference Manual.
 - 2. INFOCOMM, AV Installation Handbook.
 - 3. INFOCOMM, Audiovisual Best Practices.
 - 4. ANSI/INFOCOMM V202.01.2016, Display Image Size for 2D Content in Audiovisual Systems

5. INFOCOMM F501.01:2015, Cable Labeling for Audiovisual Systems
6. ANSI/INFOCOMM A102.01:2017, Audio Coverage Uniformity in Listener Areas
7. ANSI/INFOCOMM 2M-2010, Standard Guide for Audiovisual Systems Design and Coordination Processes
8. ANSI/INFOCOMM 3M-2011, Projected Image System Contrast Ratio
9. ANSI/INFOCOMM 4:2012, Audiovisual Systems Energy Management
10. ANSI/INFOCOMM 10:2013, AV Systems Performance Verification

- D. Work shall comply with the latest edition of applicable standards and codes including updates and addendums. In the event of a conflict, the more stringent standard or code shall be enforced.

1.3 DEFINITIONS

- A. Reference the Division 01 specification for additional definitions.
- B. Final Acceptance: Owner's Representative's acceptance of project from Contractor.
- C. Furnished by Others: Receive delivery at job site or where called for and install.
- D. Owner's Representative: Architect or Engineer having contract directly with Owner for professional services.
- E. Relocate: Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready to use.
- F. Replace: Remove and provide new item.
- G. Rough-in: Pipe, duct, conduit, equipment layout and installation.
- H. Authority Having Jurisdiction (AHJ): Federal, state, local, or other regional department, or individual having statutory authority.

1.4 CONTRACTOR QUALIFICATIONS

- A. Be a licensed dealer for equipment specified herein.
- B. Maintain a service department capable of supporting the installed systems as specified herein.
- C. An engineer shall be assigned to oversee technical aspects of this project and shall hold a current Certified Technology Specialist – Design (CTS-D) certification by INFOCOMM International.
- D. The lead field technician overseeing the installation of this project shall hold a current Certified Technology Specialist – Installation (CTSI-I) certification by INFOCOMM International.
- E. A master control system programmer shall be assigned to this project and shall be certified by the manufacturer of the control system utilized in the project.

1.5 SUBSTITUTIONS

- A. Comply with the Division 01 specification for contract modification procedures.
- B. The Contractor shall submit to the Owner's Representative supporting documentation that the item proposed for substitution is equivalent to the item specified herein.
- C. The Owner's Representative will make a final determination of approval or rejection.

1.6 SUBMITTALS

- A. Comply with the Division 01 specification related to submittal procedures.
- B. Submit electronic copies of submittals in PDF format, compiled and un-compiled, editable coding as required for future system modification. Additional live formats (CAD, Excel, Word, etc.) are preferred to be submitted at the Contractor's discretion for the Owner's administrative purposes.
- C. Bid Submittals:
 - 1. Shall include, but not be limited to, the following:
 - a. A completed equipment schedule, returned as an unmodified live Excel spreadsheet as originally included in the bid documentation, complete with quantities and pricing. The AV Contractor is responsible for confirming the accuracy of all formulas and pricing.
 - b. A completed equipment schedule, returned in PDF format for record and future auditing, as originally included in the bid documentation, complete with quantities and pricing.
 - c. A bid package outlining contractor qualifications, project approach, technical résumés of key personnel, and identification of subcontractors providing services under this scope of work along with a description of work to be performed by each subcontractor.

1.7 INSTALLATION SUBMITTALS

- A. Shall include, but not be limited to, the following:
 - 1. Drawing Index & Title Page.
 - 2. Symbols Legend showing all devices, cable types, labelling scheme and any other information required to decipher symbols in the submittal package.
 - 3. Floor Plans, Reflected Ceiling Plans, and Sectional View drawings as required to completely document all devices, dimensional locations, and infrastructure requirements.
 - 4. System wiring diagrams showing make and model of equipment, logical wire traces, cable types, and any other identifying labels for wiring or ancillary devices.
 - 5. Rack Elevations showing rack identifiers, equipment location within each rack, per-outlet power distribution details, and any rack accessories.

6. Plate and Panel drawings showing connections, size, finish, color, engraving, and any other information required to document fit and finish of wall plates or floor boxes.
7. Riser drawings showing cable routing between wall plates, floor boxes, ceiling devices, racks, and any other devices as required.
8. Additional drawings as required, including but not limited to:
 - a. Custom furniture and millwork.
 - b. Custom display details and equipment mounting.
 - c. Patch Panel and/or Network Switch Layouts that show port numbering schemes and IP information as required.
9. Product data sheets for equipment and cabling, organized logically by system type and indexed for reference. Any parts used but not approved may be rejected at any time.
10. Material samples as required.
11. Project schedule including key milestones including but not limited to submittal packages, material procurement, rack fabrication and shop testing, installation milestones as applicable, acceptance testing, and completion.
12. Images of proposed touch panel layouts, with functional descriptions of buttons and pages. The Contractor will make up to two iterative edits based on comments from the Owner's Representative at no additional cost.

1.8 CLOSEOUT SUBMITTALS:

- A. As-built documentation shall be submitted upon completion. This submittal package shall include, but not be limited to, the following:
 1. All information contained in the Installation Submittal package as organized above and edited to reflect final conditions.
 2. Documentation of equipment serial numbers and network/phone/ISDN addressing scheme.
 3. Software files for touch panel interfaces, source code, DSP, and equipment settings, both compiled and un-compiled code for future system modification.
 4. Manufacturer product guides and instruction manuals
 5. Warranty information and product registration as applicable.

1.9 ADDITIONAL ENGINEERING SERVICES

- A. If the Owner's Representative is required to provide additional engineering services as the result of changes or deviations from the contract documents or design intent, including but not limited to evaluation of product substitutions, product dimensions, weight, or power requirements, then the Owner's Representative expenses for additional services shall be paid by the Contractor and may be deducted from monies owed to the Contractor.

- B. If the Owner's Representative is required to provide additional engineering services as the result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents including the Verification Sequence outlined herein, then the Owner's Representative expenses for additional services shall be paid by the Contractor and may be deducted from monies owed to the Contractor.

PART 2 – SYSTEM DESCRIPTION

2.1 GENERAL

- A. All displays will be professional-grade, accept HDMI signals, will be HDCP compliant, and will have a native resolution of 2160 x 3840 UHD unless otherwise noted. Refer to Schedule A for make and model.

2.2 SHARED EQUIPMENT

- A. A central AV matrix switcher will be rack-mounted in Server Room A115. This will allow any input to be routed to any output in all classrooms and the MPR and will be used for overflow. Overflow video routing will be manually selected at the matrix switcher. None of the in-room touch panels will be configured for this.
- B. Paging speakers, located throughout the corridors and public spaces, will allow an administrator to use the phone system for paging. The AV Contractor will coordinate phone requirements with the Owner and configure the paging gateway for use with the Owner's VoiP system.
- C. A separate physical AV network will be used for all control, Dante audio, and QLAN. The AV Contractor will follow Division 27 for all telecommunication standards, but will purchase, install, and configure the AV LAN for use with the Audiovisual System.
- D. A shared audio DSP will serve all classrooms and MPR. Analog audio connections will be extended to each room with networked I/O extenders. All audio associated with video outputs on the central AV matrix switcher will be sent to the shared DSP over Dante.

2.3 LOBBY

- A. A single display will be mounted on a swing-arm wall mount.
- B. Video sources will include:
 - 1. Owner-furnished digital signage player

2.4 RECEPTION

- A. A single display will be mounted on a swing-arm wall mount.
- B. Video sources will include:
 - 1. Owner-furnished CATV Tuner
 - 2. HDMI input plate

- C. Control
 - 1. A control processor will be mounted behind the display
 - 2. A touch panel will be placed on the reception desk, and will control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute

2.1 OFFICES & LEARNING RESOURCE

- A. A single display will be mounted on a swing-arm wall mount.
- B. Video sources will include:
 - 1. Owner-furnished CATV Tuner
 - 2. HDMI input plate
- C. Control
 - 1. A control processor will be mounted behind the display
 - 2. A touch panel will be wall-mounted, and will control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute

2.6 WEIGHT ROOM

- A. Two (2) displays will be mounted on a swing-arm wall mount.
- B. Video sources will include:
 - 1. Owner-furnished CATV tuner, for each display
- C. Control
 - 1. A control processor will be mounted behind one display, and a controller expansion unit will be extended communication to the second display.
 - 2. A touch panel will be wall-mounted, and will control the following for each display:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute

2.7 CONFERENCE ROOM

- A. A single display will be mounted on a swing-arm wall mount.

- B. Video sources will include:
 - 1. Owner-furnished CATV Tuner
 - 2. HDMI, extended to the table with an optical HDMI cable
- C. Audio
 - 1. Side-mounted display speakers will play program audio
- D. Control
 - 1. A control processor will be mounted behind the display
 - 2. A touch panel will be placed on the table, and will control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute

2.8 LARGE & SMALL CLASSROOMS

- A. A single projector will be pole-mounted in the ceiling. It will have a WUXGA resolution but will be limited to 1920x1080 for uniformity with the display (add-alt). Refer to Schedule A for make/model.
- B. The Building General Contractor will provide and install a motorized, tab-tensioned projection screen, recessed in the ceiling. It will have a 16:9 aspect ratio.
- C. Video sources will include:
 - 1. Laptop
 - 2. In-room PC
 - 3. CATV Tuner
- D. Audio
 - 1. Inputs:
 - a. Lectern gooseneck microphone
 - b. A single wireless microphone channel, with the option to use a handheld or lavalier microphone.
 - 2. Outputs
 - a. RF-based assisted listening, located in the lectern
 - b. Ceiling speakers will play program audio
- E. Control
 - 1. A control processor will be mounted in a rack in room A115.
 - 2. A touch panel will be placed on the lectern, and will control the following:

- a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute
 - e. Projection screen up/down
 - f. Screen annotation
1. The touch panel will receive presentation video content from the central matrix switcher and allow annotated content to be displayed on any screen through the receiving graphics engine.

2.9 DIVISIBLE ROOM

- A. Three (3) projectors will be pole-mounted in the ceiling. They will have a WUXGA resolution but will be limited to 1920x1080 for uniformity with the display (add-alt). Referto Schedule A for make/model.
- B. The Building General Contractor will provide and install motorized, tab-tensioned projection screens, recessed in the ceiling. They will have a 16:9 aspect ratio.
- C. Video sources will include:
 1. Room B112
 - a. Floor Box 1
 - 1) Laptop
 - 2) In-room PC
 2. Room B110
 - a. Floor Box 2
 - 1) Laptop
 - 2) In-room PC, capable of web-based VTC with a USB bridge located in the floating lectern
 - b. Floor Box 3
 - 1) Laptop
 - 2) In-room PC, capable of web-based VTC with a USB bridge located in the floating lectern
 - c. Two (2) cameras; video extended to the AV matrix switcher
 3. AV Rack
 - a. Four (4) owner-furnished CATV tuners
- D. Audio
 1. Inputs:
 - a. Each (of 2) lectern will be wired with a gooseneck microphone

- b. Each (of 2) lecterns will have a single-channel wireless microphone receiver, with the option to use a handheld or lavalier microphone.
 - c. All three floor boxes will be wired to connect lectern audio
- 2. Outputs
- 3. RF-based assisted listening, located in each lectern
- 4. Two zones of ceiling speakers will play program audio
- E. Control
 - 1. A control processor will be mounted in a rack in room A115.
 - 2. When rooms are divided, a touch panel will be placed on each lectern, and will control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute
 - e. Projection screen up/down
 - f. Screen annotation
 - 1) The touch panel will receive presentation video content from the central matrix switcher and allow annotated content to be displayed on any screen through the receiving graphics engine.
 - 3. When rooms are combined, one touch panel will be disabled, and the other will allow the following:
 - a. Individual display power
 - b. Individual projection screen control
 - c. Matrix switching of all sources to any display
 - d. Individual CATV tuner control
 - e. Volume & mute
 - f. Audio zones will be automatically combined
 - g. Screen annotation

2.10 SIMULATION LAB

- A. Three (3) projectors will be pole-mounted in the ceiling. They will have a WUXGA resolution but will be limited to 1920x1080 for uniformity with the display (add-alt). Refer to Schedule A for make/model.
- B. The Building General Contractor will provide and install motorized, tab-tensioned projection screens, recessed in the ceiling. They will have a 16:9 aspect ratio.
- C. Video sources will include:
 - 1. Laptop
 - 2. In-room PC

3. Control booth PC w/3 HDMI outputs, capable of web-based VTC with a USB bridgelocated in the floating lectern
4. CATV tuner
5. Four (4) cameras; video extended to the AV matrix switcher

D. Audio

1. Inputs:
 - a. Lectern gooseneck microphone
 - b. Tabletop PTT microphone in the control booth
 - c. Two (2) Dante ceiling microphones
 - d. A single wireless microphone channel, with the option to use a handheld or lavaliermicrophone.
2. Outputs
 - a. RF-based assisted listening, located in the lectern
 - b. Ceiling speakers will play program audio
 - c. Wall-mounted speakers in the control room will play a mix of program and microphone audio

E. Control

1. A control processor will be mounted in a rack in room A115.
2. A touch panel will be placed on the lectern, and will control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute
 - e. Projection screen up/down
 - f. Screen annotation
 - 1) The touch panel will receive presentation video content from the central matrix switcher and allow annotated content to be displayed on any screen through the receiving graphics engine.

2.11 MULTI-PURPOSE ROOM (MPR)

A. Displays

1. Two (2) projectors will be pole-mounted in the ceiling. They will have a WUXGA resolution but will be limited to 1920x1080 for uniformity with the display (add-alt).Refer to Schedule A for make/model.
2. The Building General Contractor will provide and install motorized, tab-tensioned projectionscreens, recessed in the ceiling. They will have a 16:9 aspect ratio.
3. An alternate will add a wall-mounted 4x2 LCD video wall. It will be capable of

displaying two (2) 4K UHD images side-by-side, or one center image.

4. Two (2) desktop monitors will be located on the AV cart in the rear of the room.

B. Video Sources will include:

1. Front floor box
 - a. Laptop HDMI
 - b. In-room PC
2. Rear floor box
 - a. Laptop HDMI
 - b. In-room PC with two (2) HDMI outputs, capable of web-based VTC with a USB bridge located in the AV cart. This PC will be capable of driving the optional video wall.
3. Two (2) wall plates
 - a. Laptop HDMI
 - b. In-room PC
4. AV Rack
 - a. Owner-furnished CATV tuner
 - b. PC with two HDMI outputs, intended as the video wall source. USB will be extended to the rear wall box for remote keyboard/mouse control.
5. Two (2) cameras; video extended to the AV matrix switcher

C. Audio

1. Inputs:
 - a. Lectern gooseneck microphone
 - b. Nine (9) tabletop gooseneck microphones for discussion panels will be extended to the shared DSP using networked I/O expansions
 - c. Four (4) wireless microphone channels, with the option to use a handheld or lavalier microphone.
2. Outputs
 - a. Induction loop assisted listening. The driver will be rack-mounted in the adjacent storage room.
 - b. Ceiling speakers will play program audio
 - c. A Dante audio console will be located in the AV cart

D. Control

1. A control processor will be mounted in a rack in room A115.

2. A touch panel will be placed on the lectern and AV cart, and will independently control the following:
 - a. Display power
 - b. Source selection
 - c. CATV tuner control
 - d. Volume & mute
 - e. Projection screen up/down
 - f. Screen annotation
- 1) The touch panel will receive presentation video content from the central matrix switcher and allow annotated content to be displayed on any screen through the receiving graphics engine.

PART 3 - PRODUCTS

3.1 SPECIFIC EQUIPMENT

- A. Reference Schedule A "Equipment List".
- B. Schedule A is intended to identify the major components of the systems as it relates to the design intent, and to provide information on the quantities of equipment and systems to be installed.
- C. Provide additional equipment and accessories as required to produce a complete and functional system consistent with the design intent.
- D. Manufacturer master quotes shall be used to convey the design intent. The Contractor shall supplement components as required to provide a complete and functional system.

3.2 EQUIPMENT RACKS

- A. Provide all rack accessories as required at no additional cost.
- B. The AV Contractor will be responsible to coordinate proper airflow, ventilation, cooling, power, and dimensional requirements with the General Contractor. Provide ventilation if required to ensure rack temperatures do not exceed 100 degrees Fahrenheit after 3 hours of continuous operation.
- C. Provide low-noise ventilation when racks are open to work areas.
- D. Fill empty rack spaces with black finished blank panels, unless otherwise noted.
- E. Provide and install security covers to restrict access to equipment when adjustment is not required by the end user.
- F. Provide rack shelves for ancillary and/or owner-furnished equipment.

3.3 INTERFACES

- A. Provide a cable with factory molded connectors for each audio, video, and control interface location as specified. Cables shall be flexible, light weight, and of an appropriate length for the application.

- B. Provide AV connection plates within furniture hatches as required for cable terminations and pass-through connections as indicated on the Drawings.

PART 4 – EXECUTION

4.1 INSTALLATION

A. General:

1. Provide a complete and fully functional AV system; installed, configured, inspected, tested and documented as per the construction documents herein.
2. Provide site presence and full coordination with design team, all involved consultants, contractors, manufacturer representatives, including but not limited to field verification of precursory work, layout and dimensioning, architectural details, power, data, and HVAC requirements.
3. Provide all licenses, permits, tests, independent testing, factory testing, reports, fees, inspections, and warranties as required.
4. Provide hoisting, rigging, scaffolding as required to install your work.
5. Unless otherwise noted, provide specialty boxes (speakers, touch screens, cameras, etc.), trim rings, escutcheons, faceplates, wall plates for your work.
6. Include any additional cost for labor escalation, material cost increases, etc. associated with this work.

B. Labor

1. The Contractor understands that work contemplated by this document will be performed in and adjacent to facilities that are occupied and in full operation by the Owner after the move-in date specified by the project schedule. The Contractor will utilize the utmost care to maintain the Owner's use of occupied spaces and the entire campus facility in the execution of this work. The proposed bid amount shall include all temporary measures necessary including protection, off-hour work, etc., to maintain the Owner's full use of the operation of the facility.

C. Layout

1. The Drawings are diagrammatic in nature and, unless explicitly dimensioned, indicate approximate locations of equipment and components. Changes in the location, and offsets of equipment and components which are not shown on the Drawings but are necessary to accommodate building conditions and coordination with the work of other trades, shall be made prior to installation, without additional cost.
2. Coordinate layout and sizing for backing, bracing, and structural steel requirements.
3. Field measure conditions necessary to ensure correct fabrication of materials provided by the Contractor.

D. Mounting

1. Permanently attach equipment to the building structure with a minimum safety factor of 5. Suspended components that move or are otherwise subjected to continuous wear or friction shall be supported with a minimum safety factor of 8. When a higher safety factor is recommended by an equipment manufacturer or required by the AHJ, the more stringent requirement shall be met.
2. Provide seismic protection including supports and hangers, as required by applicable code, for your work.
3. Devices shall be securely mounted plumb and straight to walls, floors, or racks per the manufacturers recommended mounting practice. Cables wrapped in a neat, organized manner.

E. Protection and Cleanup

1. Provide temporary protection of your work, including wiring and junction boxes prior to hanging drywall and painting. Protect final equipment installations prior to final acceptance e.g. protect monitors/TVs, rack equipment, cameras, etc. from dust and other damage.
2. Painting and touchup of factory finishes and final cleaning of your work prior to Final Acceptance.
3. Perform daily cleanup of all trash and debris resulting from your work. Work areas should be kept broom clean.

F. Cabling

1. All cabling and devices shall be installed in accordance with current BICSI and INFOCOMM standards and best practices.
2. Provide cable service loops at devices for inspection, minor adjustment, and future flexibility.
3. Furnish, layout, and install “J” hooks and support for your work.

G. Labeling:

1. Reference and adhere to INFOCOMM F501.01.2015 – Cable Labeling for Audiovisual Systems.
2. Permanently label all devices mounted in equipment racks to coordinate with the nomenclature used on the Drawings. Indicate the location and function that the equipment serves. Use thermal ribbon labeling from label printers such as P-Touch or DYMO.
3. Permanently label receptacles, plates, ports, and jacks in a logical manner clearly indicating their function in the system. Architecturally visible plates shall be engraved if possible, otherwise use thermal ribbon labeling from label printers such as P-Touch or DYMO.

4. Provide unique cable markers on both ends of every cable in the system. This should use a logical numbering scheme and should coordinate with in-house numbering schemes already in use. Markers shall be a clear heat-shrink or self-adhesive type and shall be within 6 inches of each termination.
5. Clearly and logically label external devices such as audio mixers, wireless microphones, belt packs, and assistive listening receivers. Use thermal ribbon labeling from label printers such as P-Touch or DYMO.
6. Label relevant inputs and outputs on switchers, matrices, and mixers. This includes digital/virtual labelling of audio channels and video inputs and outputs.
7. Label telephone numbers, ISDN numbers and IP addresses of pertinent devices.

H. Electrical Power and Grounding:

1. Reference ANSI/INFOCOMM 4:2012 – Audiovisual Systems Energy Management.
2. Provide grounding and bonding for your work in accordance with applicable codes.
3. No circuit shall exceed 80% of full power.
4. Grounding shall be in compliance with the manufacturer’s specification for all appropriate equipment.

I. Equipment Racks:

1. Reference BICSI/INFOCOMM, Audiovisual Design Reference Manual.
2. Reference INFOCOMM, AV Installation Handbook.
3. Velcro style cable wraps shall be used in vertical wire management. Plastic cable ties or “zip” ties are not acceptable.

J. Control System Programming:

1. Reference INFOCOMM’S “Dashboard for Controls”.
2. Coordinate control system with Owner and adhere to the approved control system touch panel submittal.
3. Label buttons using notation that is consistent with the Drawings, unless otherwise noted in submittal comments.

4.2 ACCEPTANCE TESTING

A. Comply with ANSI/INFOCOMM 10:2013 – AV Systems Performance Verification.

B. Verification Sequence:

1. The Contractor shall identify parties responsible for verification and stakeholders who wish to be involved in the process
2. The Contractor shall identify when verification is to be performed, and confirm system completion, availability, and provide notice prior to performing verification

3. The Contractor shall identify test procedures and submit a testing check list for approval, including the definition of measurements and test equipment.
4. Installation shall be complete.
5. The Contractor shall independently perform system acceptance testing and submit all verification checklists and documentation to the Consultant.
6. The Owner's Representative will perform an independent verification. The Contractor shall perform all work necessary to determine and/or modify performance of the system to meet the requirements of this specification.
 - a. Provide a qualified technician knowledgeable with the system and the installation to assist the Owner's Representative with the acceptance procedure.
 - b. The Contractor shall provide all labor, materials, tools, and measurement equipment necessary for these demonstrations, tests and adjustments.
 - c. As-built documentation, as detailed herein, shall be on hand for reference.

4.3 PROJECT CLOSE OUT

A. Warranty:

1. For a period of one (1) year(s) from Final Acceptance, and for as long as product manufacturer's warranty is active, the Contractor shall replace equipment within 24 hours of first notification. Complete repairs to equipment within 72 hours. If repairs cannot be completed during this period, or if ordering of parts is required, provide a status update to the Owner every 72 hours documentation of repairs. These terms shall be accepted at no additional cost.
2. For a period of three (3) year(s) from Final Acceptance, the Contractor shall repair system deficiencies that result from improper installation, imperfect materials, or poor workmanship. These terms shall be accepted at no additional cost.
3. For a period of three (3) year(s) from Final Acceptance, the Contractor shall perform annual maintenance to make any necessary adjustments and bring the system back to optimal performance. These terms shall be accepted at no additional cost.

B. Demonstration and Training:

1. Provide 8 hours of system training and orientation for the Owner's personnel. A technician familiar with the system provided and qualified to give technical guidance should conduct the training.
2. To ensure a smooth transition of ownership, conduct training prior to the first use of the system. Training may be held at a time outside of normal business hours at no additional fee.
3. Training shall include, but not be limited to:
 - a. An overview of the physical installation, equipment, and cabling.

b. Review of systems documentation and test results.

c. Instructions on manufacturer maintenance procedures to enable Owner's personnel to successfully maintain the system.

C. Go-Live Support

1. Provide one service technician for 24 man-hours starting on the first scheduled use date. For a period of one (1) week(s) after this period, provide necessary support to ensure 2-hour response time to issues that arise.

END OF SECTION 274100

SECTION 275100 – COMMUNICATIONS HORIZONTAL CABLING

1.1 PUBLIC SAFETY TRAINING COMPLEX

- A. The intent of this document is to provide a standard specification that will be used for all Washington County Government facilities requiring structured cabling installations for networking devices. This document provides the performance criteria for the components and sub-systems comprising a complete cabling system that shall accommodate the Owner's requirements in excess, of ten years.
- B. Product specifications, general design considerations, and installation guidelines are provided in this written document. Quantities of telecommunications outlets, typical installation details, cable routing and outlet types for a specific Customer facility will be provided as an attachment to this document. If the bid documents are in conflict, the written specification shall take precedence. The successful vendor shall meet or exceed all requirements for the cabling system described in this document. **It is the Contractors' responsibility to ask questions and get clarifications from the owner.**
- C. Washington County Maryland Government Cable Infrastructure Projects require a **Berk-Tek Leviton Technologies Structured Cabling System.**
 - 1. **A Berk-Tek Leviton Technologies Warranty can can only be provided and certified by an authorized Leviton Authorized Network Installation company, Leviton Premier Network Installation company, or Berk-Tek OASIS Certified Contractor. The bidding contractor must provide proof they hold a current Leviton Authorized Network Installation certification, Leviton Premier Network Installation certification, or Berk-Tek OASIS Certified Contractor certification status prior to the contract being awarded as a pre- qualification.**
- D. The following are the standards and specifications that shall be followed by any Engineering or Contracting company performing business in Washington County Maryland Government facilities which affects the communication's infrastructure:

Leviton Network Solutions
2222 222nd Street SE
Bothell, Washington 98021
Phone: 425-486-2222
Fax: 425-485-3373
Website: www.leviton.com

Berk-Tek, A Nexans Company
132 White Oak Road
New Holland, PA 17557
Phone: 717-354-6200
Fax: 717-354-7944
Website: www.berktek.com

Program Web Site: www.BerkTekLevitonTechnologies.com

1.2 COMMUNICATIONS CABLING

- A. General Information: The Washington County Maryland Government Information Technology Department provides all of the technology services county-wide including infrastructure, program development, support and maintenance, data systems, and geographic information systems.
- B. Description of Specifications: The work covered in this Specification consists of low voltage work including the design, installation, maintenance, and repair of the following equipment:
 - Telephone systems
 - Wireless Access Points
 - LAN and various computer related systems
 - Video Systems
 - Other miscellaneous low voltage cabling
- C. This document defines the cabling system and subsystem components to include cable, termination hardware, supporting hardware, and miscellaneous materials that the Contractor will furnish to install a complete telecommunications system supporting voice and data. The intent of this contract is to provide all pertinent information to allow the Contractor to bid the labor, materials supervision, tooling, and miscellaneous mounting hardware and consumables to install a complete system. However, it is the responsibility of the Contractor to propose any, and all items required for a complete system if not identified in the Bill of Materials attached to this specification. These specifications supersede any other specifications.

1.3 TELECOMMUNICATIONS SYSTEMS DESCRIPTION

- A. Installer deploys four data circuits to each user outlet as a standard configuration. The data circuits are provided via four Category 6 cables to each outlet. Horizontal data cables are terminated on rack-mounted Category 6 patch panels, Horizontal data circuits are connected to LAN electronics within each TC.
- B. A twenty-four strand OM3 50/125-micron multimode fiber optic backbone is employed between the data MC and each TC for data connectivity within the data MC and the TCs, backbone fiber strands are terminated and housed in rack-mount fiber optic enclosures.
- C. Wireless (Wi-Fi) installations will require two Category 6A cabling system to each Wireless Access Point to comply with 802.11ac and future standards.

1.4 STANDARDS AND WARRANTIES

- A. Reference Standards:
 - 1. ANSI/TIA -492.AAAC-B – Detail Specification for 850-nm Laser-Optimized, 50-um Core Diameter/125-um Cladding Diameter Class 1a Graded-index Multimode Optical Fibers (OM3/OM4). Current Edition

2. ANSI TIA-492-A Data Center Cabling
3. ANSI TIA -492.CAAB – Detail Specification for Class Iva Dispersion-Unshifted Single-Mode Optical Fibers with Low Water Peak. Current Edition
4. ANSI/TIA 526 – OFSTP-19 Optical Signal-to-Noise Ratio Measurement Procedures forDense Wavelength-Division Multiplexed Systems.
5. ANSI/TIA -568-0-D – Generic Communications Cabling for Customer Premises.
6. ANSI/TIA--568-1-D – Commercial Building Communications Cabling Standard Part 1:General Requirements.
7. ANSI/TIA 568-C.2 – Balanced Twisted-Pair Telecommunications Cabling and ComponentsStandards
8. ANSI/TIA 568-C.3 – Optical Fiber Cabling Components Standard
9. ANSI/TIA-569-D – Commercial Building Standard for Telecommunications Pathways andSpaces.
10. ANSI/TIA -606-B – Administration Standard for the Commercial TelecommunicationsInfrastructure.
11. ANSI/ISTD-607-C–Commercial Building Bonding and Grounding (Earthing) Requirements for Telecommunications.
12. NFPA 70– National Electrical Code (NEC).
13. BICSI-TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM)

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer’s product data sheets, including installation instructions verifying that materials comply with specified requirements and are suitable for intended application.
- B. Installer’s Project References: Submit installer’s list of successfully completed communications horizontal cabling projects, including project name and location, name of architect, and type and quantity of communications horizontal cabling installed.

1.6 QUALITY ASSURANCE

- A. Manufacturer’s Qualifications: Manufacturer regularly engaged, for past 10 years, in manufacture of communications horizontal cabling of similar type to that specified.
- B. Installer’s Qualifications: Contractor must be an approved Leviton Authorized Network Installer or Berk-Tek Oasis Integrator before, during, and through completion of the system installation. Supporting certification documentation will be required as part of the submittal. The Contract will, in general, be awarded to the lowest qualified bidder. The Washington County Government reserves the right to accept or reject any or all bids in

part or whole, whether from responsible bidders or otherwise, even though the bidder may not submit the lowest bid. Washington County Government has sole discretion in determining the best interest of the county and to waive any informality deemed to be in the best interest of Washington County Government. The Contractor will supply as built drawings/designs, all wiring, cabling and other equipment to meet the needs of any installation. The Contractor must maintain a minimum stock of parts and equipment to deal with any repair requests within 24 hours or one workday. The Contractor is responsible for workmanship and installation practices in accordance with Leviton Installer Program and the Berk-Tek Oasis Program.

C. Provide the services of a qualified manufacturer authorized vendor.

1. Prequalified security contractors include:

HP Cabling

13126 Pennsylvania Ave Suite 3

Hagerstown, MD 21742

Phone: (301) 739-8989

or approved equal.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements: Store and handle materials in accordance with manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until installation. Store materials in clean, dry area indoors. Protect materials during storage, handling, and installation to prevent damage.

1.8 WARRANTY

- A. The horizontal communications cabling system installed shall be eligible for coverage by a Limited Lifetime Warranty to the end user.
- B. Horizontal channels shall be completed with Leviton Network Solutions factory-terminated copper and/or fiber optic patch cords in order to be eligible for the applicable Berk-Tek or Leviton Warranty with channel performance guarantees.
- C. Approved product shall be listed on the most recent version of the applicable Berk-Tek Leviton Technologies data sheets for each Berk-Tek Leviton Technologies solution.
- D. Installer/Integrator shall provide labor, materials, and documentation in accordance with Berk-Tek Leviton Network Technologies requirements necessary to ensure that the Owner will be furnished with a Limited Lifetime Warranty.
- E. The installed structured cabling system shall provide a warranty guaranteeing installed channel performance above the ANSI/TIA 568-C requirements for Cat 6, and/or Cat 6A cabling systems or ISO 11801 requirements for Class D, Class E, and/or Class E.

- F. Standards-compliant channel or permanent link performance tests shall be performed in the field with a Berk-Tek Leviton Technologies approved certification tester in the appropriate channel or permanent link test configuration. See 1.8 A.1 above for channel requirements.
- G. Necessary documentation for warranty registration shall be provided to the manufacturer by the installer (within 10 days) following 100 percent testing of cables.
- H. Submit test results to Leviton Network Solutions or to Berk-Tek, in the certification tester's original software files.
- I. Installer shall ensure that the warranty registration is properly submitted, with all required documentation within 10 days of project completion.
- J. Contractor/Integrator must adhere to the terms and conditions of the respective manufacturer's warranty programs.
- K. Installer shall ensure that the Washington County Government receives the Berk-Tek Leviton Technologies manufacturer issued project warranty certificate within 90 calendar days of warranty registration.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Leviton Network Solutions
2222 222nd Street SE,
Bothell, Washington 98021
Phone 425-486- 2222.
Website: www.leviton.com.
- B. Berk-Tek, A Nexans Company
132 White Oak Road
New Holland, PA 17557
Phone: 717-354- 6200.
Website: www.berktek.com.
- C. Great Lakes Case & Cabinet
4193 Route 6N
Edinboro, PA 16412
Phone: 866-879-4522
Website: www.greatcabinets.com
- D. STI Specified Technologies Inc.
210 Evans Way,
Somerville, NJ 08876
Phone: 800-992-1180
Website: www.stifirestop.com
- E. WBT 115 Harting Drive, Centralia, IL 62801
Phone: 618-918-3824
Website: www.wbtray.com

2.2 SYSTEM DESCRIPTION

- A. Horizontal Distribution Subsystem: Intra-building twisted-pair and fiber optic communications cabling connecting Telecommunication Rooms (TRs) to Telecommunication Outlets (TOs) located at individual work areas.
- B. Horizontal Copper Cabling: Combination of the following types of cables from TR to TO: Category 6A (WAP locations) or Category 6 WO, (100-Ohm, 4-pair, unshielded twisted pair) cables from TRs to TOs, or Category 6A or Category 6 (100-Ohm, 4-pair, shielded twisted pair) cables from TRs to TOs.
- C. Horizontal and Backbone Fiber Cabling: 50/125 μ m, OM3, 850 nm Bend-insensitive Laser Optimized
- D. Communications Horizontal Cabling System: Includes cables, jacks, patch panels, connecting blocks, patch cords, fiber connectors, fiber adapter plates, fiber enclosures, jumpers, and necessary support systems, such as cable managers and faceplates.
- E. Cables: Route through conduit, cable trays, spaces below raised floors, open ceiling areas, non-ventilated spaces above ceiling tile, and through plenum air-handling spaces above ceiling tile.
- F. Furnish and install all materials necessary for a complete and working communications horizontal cabling system.

2.3 CABLING SYSTEMS MATERIAL SPECIFICATIONS

- A. Wireless Access Point Cabling - -Category 6A Unshielded Twisted Pair Category 6A UTP System
 - 100 ohm, Category 6A, 23 AWG, 4-pair unshielded twisted pair with innovative crosstalk prevention (XTP) technology. LANmark-XTP, CMP rated.
 - Jacket Color: White.
 - Electrical Characteristics: Characterized to 750 MHz.
 - Cable: Third-party verified by ETL.
 - Maximum Cable Diameter: 0.275 inch.
 - Berk-Tek LANmark-XTP Category 6A CMP:
All category cabling manufacturers must be able to provide documentation from an independent third-party testing agency that verifies through random sampling that cable components perform at or above the levels contained on their product specifications, not simply at or above the standard.
 - Channel margin guarantees for a **Category 6A UTP System** (margin vs. ANSI/TIA-568-C.2 and margin guarantees are for a 4-connector channel).

Insertion Loss	3%
NEXT	5dB
PSNEXT	6dB

ACR-F (ELFEXT)	10dB
Return Loss	4dB
ACR-N	7dB
PSACR-N	7dB
PSANEXT	5dB
PSAACR-F	11Db

A. Specified Vendor Product Selection:

Berk-Tek Category 6A, 23 AWG, 4-pair unshielded twisted pair with innovative crosstalk prevention (XTP) technology.
 Berk-Tek LANmark-XTP, White jacket CMP Plenum rated
 Berk-Tek Part Number 11082058

Category 6A Modular Jacks: **Category 6A UTP System**
 8-position eXtreme QuickPort modular jack, Category 6A, IDC terminals, T568A/B wiringscheme.
 Channel-rated jack.
 Each Jack: Identified on its face as CAT 6A. Jack Color: WHITE.
 Leviton Part Number 6110G-RW6 (White).

2.4 WORKSTATION CABLING

A. Category 6 Unshielded Twisted Pair: **Category 6 UTP System**

- 100 ohm, Category 6, 23 AWG, 4-pair unshielded twisted pair, Berk-Tek LANmark 1000, CMP rated.
- Jacket Color: Blue.
- O.D. 0.230"
- Electrical Characteristics: Characterized to 550 MHz.
- Each Pair in Cable: Insulated with FEP.
- Cable: Third-party verified by ETL.
- Berk-Tek LANmark-1000 CMP

All category cabling manufacturers must be able to provide documentation from an independent third-party testing agency that verifies through random sampling that cable components perform at or above the levels contained on their product specifications, not simply at or above the standard.

Channel margin guarantees for a **Category 6 UTP System** (margin vs. ANSI/TIA-568-C.2 and margin guarantees are for a 4-connector channel).

Insertion Loss	5%
NEXT	6dB
PSNEXT	6dB
ACR-F (ELFEXT)	8dB
Return Loss	9dB
ACR-N	3dB
PSACR-N	8dB

B. Specified Vendor Product Selection:

Category 6, 23AWG, 4-pair unshielded twisted pair cable
 Berk-Tek LANmark 1000, Jacket Color BLUE CMP Rated
Part Number 11074694 (1500' SmartPak box)
 Part Number 10032094 (1000' TekPak box)

Category 6 Modular Jacks: Cat 6 UTP System
 8-position Leviton eXtreme QuickPort modular jack, Category 6, IDC terminals,
 T568A/B wiringscheme, component-rated jack.
 Each Jack: Identified on its face as CAT 6. Color: Blue
 Part Number: Leviton 61110-RL6 (blue)

2.5 VIDEO CAMERA CABLING

A. Category 6 Unshielded Twisted Pair: **Category 6 UTP System**

- 100 ohm, Category 6, 23 AWG, 4-pair unshielded twisted pair, Berk-Tek LANmark 1000, CMP rated.
- Jacket Color: Green
- O.D. 0.230"
- Electrical Characteristics: Characterized to 550 MHz.
- Each Pair in Cable: Insulated with FEP.
- Cable: Third-party verified by ETL.
- Berk-Tek LANmark-1000 CMP

All category cabling manufacturers must be able to provide documentation from an independent third-party testing agency that verifies through random sampling that cable components perform at or above the levels contained on their product specifications, not simply at or above the standard.

Channel margin guarantees for a **Category 6 UTP System** (margin vs. ANSI/TIA-568-C.2 and margin guarantees are for a 4-connector channel).

Insertion Loss	5%
NEXT	6dB
PSNEXT	6dB
ACR-F (ELFEXT)	8dB
PSACR-F (PSELFEXT)	9dB
Return Loss	3dB
ACR-N	7dB
PSACR-N	8dB

B. Specified Vendor Product Selection:

Category 6, 23AWG, 4-pair unshielded twisted pair cable Berk-Tek LANmark 1000, Jacket Color GREEN CMP Rated **Part Number 11074895 (1500' SmartPak box)**

Part Number 10032097 (1000' TekPak box)

Category 6 Modular Jacks: Cat 6 UTP System

8-position Leviton eXtreme QuickPort modular jack, Category 6, IDC terminals, T568A/B wiring scheme, component-rated jack. Each Jack: Identified on its face as CAT 6. Color: Green

Part Number: Leviton 61110-RV6 (Green)

2.6 TELEVISION CABLING

A. Category 6 Unshielded Twisted Pair: **Category 6 UTP System**

- 100 ohm, Category 6, 23 AWG, 4-pair unshielded twisted pair, Berk-Tek LANmark 1000, CMP rated.
- Jacket Color: Black
- O.D. 0.230"
- Electrical Characteristics: Characterized to 550 MHz.
- Each Pair in Cable: Insulated with FEP.
- Cable: Third-party verified by ETL.
- Berk-Tek LANmark-1000 CMP

All category cabling manufacturers must be able to provide documentation from an independent third-party testing agency that verifies through random sampling that cable components perform at or above the levels contained on their product specifications, not simply at or above the standard.

Channel margin guarantees for a **Category 6 UTP System** (margin vs. ANSI/TIA-568-C.2 and margin guarantees are for a 4-connector channel).

Insertion Loss	5%
NEXT	6dB
PSNEXT	6dB
ACR-F (ELFEXT)	8dB
PSACR-F (PSELFEXT)	9dB
Return Loss	3dB
ACR-N	7dB
PSACR-N	8dB

B. Specified Vendor Product Selection:

Category 6, 23AWG, 4-pair unshielded twisted pair cable Berk-Tek LANmark 1000, Jacket Color BLACK CMP Rated **Part Number 11074899 (1500' SmartPak box)**

Part Number 10032208 (1000' TekPak box)

Category 6 Modular Jacks: Cat 6 UTP System

8-position Leviton eXtreme QuickPort modular jack, Category 6, IDC terminals, T568A/B wiring scheme, component-rated jack. Each Jack: Identified on its face as CAT 6. Color: BLACK

Part Number: Leviton 61110-RE6 (black)

For the TV's a LYNX Broadband Adapter shall be used (Cat 6 on the backside and coax on the front)

2.7 MODULAR JACKS AND FIBER ADAPTERS FOR WORKSTATION OUTLETS

A. Category 6 A and Category 6 Modular Jacks:

- 8-position modular jack, Category 6A and Category 6, IDC terminals, T568A/B wiring scheme.
- The modular connector shall exceed all component performance requirements in the ANSI/TIA-568-C.2 standard for Augmented Category 6 from 1 MHz to 500 MHz to support the IEEE 802.3an standard for 10GBASE-T network performance.
- The Modular Connector shall be terminated without the need for any punch down tool or other specialized or proprietary termination tool.
- The Connector Module shall feature a termination wire manager that holds individual conductors in place during termination.
- The Modular Connector termination method shall be consistent with the termination method available for UTP modules from the same manufacturer. The same termination method shall also be consistent with 6 and 6A shielded modules from the same manufacturer.
- The Modular Connector shall be reusable and support multiple termination and re-termination cycles and be facilitated by simple termination release levers.

- The modular connector shall be independently tested and verified by Intertek (ETL) to exceed Category 6A and Category 6 component performance.
- The eight-position connector module shall utilize a method of line tensioning that prevents six-position modular plug insertion from damaging either the cord or the module.
- The connector body shall be made of die-cast zinc and all plastic components shall be made of high-impact, fire-retardant plastic rated UL 94V-0.
- The connector shall also be in compliance with all National Electrical Codes; compliant with ANSI/TIA-1096-A (formerly FCC Part 68); cULus Listed; and independently tested for component compliance.
- In addition to Category 6A and Category 6 component compliance, the connector shall have the ability to support high megabit and shared sheath applications.
- Connector wiring shall be universal and will accommodate both T568A and T568B pair/pin assignments.
- The connector shall incorporate a triple-stage compensation design with integrated flexible circuit design that enhances link and channel performance.
- The modular connector shall fit a range of telecommunications faceplates, outlets, and field-configurable patch panels.
- The modular connector shall be available in 13 TIA 606-A compatible colors.
- Connector Modules shall be available with an internal shutter option to protect against dust and debris.
- Connector Module shall have a maximum depth of 1.31.”
- Each connector shall be identified on its face as CAT 6A or CAT 6.
- Basis for design: Leviton eXtreme UTP Category 6A and Category 6 Connector.
- All jack colors are to match cable colors:

Wireless Access Points: White

Data: Blue

Camera: Green

Television: Black

2.8 WORK AREA OUTLETS

A. Flush-Mounted Stainless Steel ANGLED Faceplates:

Use 4-port flush ANGLED QuickPort faceplates. Faceplates shall be constructed of 304 Grade Stainless Steel in a brushed finish to provide corrosion resistance in a non-magnetic material and fit NEMA electrical boxes. Each faceplate shall contain four Category 6 jacks for data. There shall be four Category 6 cables terminated as noted in 3.1 above. Each port shall be provided with an icon to indicate its function. Faceplates shall

accommodate two labels and provide a clear polycarbonate cover for each. Faceplates shall be LEVITON part number 43081-2L4 or an approved equivalent. The faceplates shall be mounted to in-wall single gang boxes.

- B. Specified Vendor Product Selection
4-port dual-gang Stainless Steel ANGLED wall plate with ID windows.
Stainless Steel Plates
Part Number: Leviton 43081-2L4

2.9 WIRELESS ACCESS POINT OUTLETS

- A. In-Ceiling Brackets - Mounting QuickPort Jacks, Connectors, 1 & 2 Port Surface Mounted Box, with 10 foot Slack Loops.
- B. Specified Vendor Product Selection

QuickPort In-Ceiling 2 Port Bracket, includes clip for drop wire/rod Colors: Metal
Part Number: Leviton 49223-CBC.

QuickPort In-Ceiling 2 Port Bracket, no clip .Colors: Metal
Part Number: Leviton 49923-CB0.

2.10 COPPER RACKMOUNT PATCH PANELS

- A. Modular Patch Panels: **Category 6A UTP System and Category 6 UTP System**
- B. Specified Vendor Product Selection – QuickPort Patch Panel with Magnifying Lens Label Holder. Cable Management bar included. Suitable to accept all colors of QuickPort modular jacks and adapters. These panels are unloaded. The panel fits all industry-standard 19-inch racks and cabinets. The installer must obtain QuickPort modular jacks to insert based on solution color.

All jack colors are to match cable colors:

Wireless Access Points:	White
Data:	Blue
Camera:	Green
Television:	Black

Specified Vendor Product Selection
24-port, flat panel, Part Number: Leviton 49255-L24.48-port, flat panel
Part Number: Leviton 49255-L48

2.11 OPTICAL FIBER CABLE, OM3 FIBER OPTIC SYSTEM

- A. Each Multimode Fiber shall be:
 - Graded-index optical fiber wave-guide with nominal OM4 50/125mm-core/cladding diameter.

- The fiber shall comply with the latest revision of ANSI/EIA/TIA-492AAAC.
- Attenuation shall be measured in accordance with ANSI/EIA/TIA-455-78.
- Information transmission capacity shall be measured in accordance with the latest revision of ANSI/EIA/TIA-455-204.
- The measurements shall be performed at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
- Maximum attenuation dB/km @ 850/1300 nm: 3.0/1.0
- EMB Bandwidth 2000 MHz-km @ 850nm.
- OFL Bandwidth 500 MHz-km @ 1300nm.
- Optical Fiber shall be Bend-insensitive Laser Optimized and guarantee 1 Gigabit Ethernet distances of 1000m/600m for 850nm and 1300nm, respectively.
- Optical fiber shall guarantee a 10 Gigabit Ethernet distance of 300m at 850nm.

B. Physical Characteristics:

- Shall be suitable for use in indoors or in indoor/outdoor applications.
- Appropriately flame rated optical cable shall be suitable for use in risers, plenums and horizontal applications.
- Plenum rated optical cables shall have and be marked with an UL-OFNP and OFN FT6 Flame Rating. Riser rated optical cables shall have and be marked with an UL-OFNR and OFN FT4 Flame Rating
- Shall comply with the requirements of ICEA S-83-596 (Premises), ICEA S-104-696 (I/O), or ANSI/ICEA S-87-640 (Outside Plant, OSP).
- Suitable for underground or aboveground conduits.
- Optical cables and fibers shall be color coded in accordance with EIA/TIA-598-C.
- Shall have a ripcord for overall jacket.

C. Specified Vendor Product Selection:

Berk-Tek INDOOR/OUTDOOR Plenum ARMORED optical fiber cable with OM3 Bend-insensitive Laser Optimized 50/125 micron fiber (24 Bend-insensitive Laser Optimized optical fibers, Indoor/Outdoor Tight Buffer)
Berk-Tek Part Number: PDPK024EB3010/25-I/O-C4C5(AQU)

2.12 FIBER OPTIC TERMINATION ENCLOSURES AND SPLICE TRAYS

- A. Opt-X 1000i SDX Fiber Optic Enclosures: all metal enclosure, rack mountable, holds various fiber adapter plates, splice trays, or MTP modules, based on connector choice and density requirements.

- 1RU Opt-X 1000i rack-mount Fiber Optic Enclosure, empty, with sliding tray.
 - Capacity: 72 fiber strands (LC), 3 fiber adapter plates and 3 splice trays, or 3 MTPmodules Part Number: Leviton 5R1UM-S03.
 - 2RU Opt-X 1000i rack-mount Fiber Optic Enclosure, empty, with sliding tray.
 - Capacity: 144 fiber strands (LC), 6 fiber adapter plates and 6 splice trays, or 6 MTPmodules Part Number: Leviton 5R2UM-S06.
 - 3RU Opt-X 1000i rack-mount Fiber Optic Enclosure, empty.
 - Capacity: 216 fiber strands (LC), 9 fiber adapter plates and 9 splice trays, or 9 MTPmodules Part Number: Leviton 5R3UM-F09.
 - 4RU Opt-X 1000i rack-mount Fiber Optic Enclosure, empty.
 - Capacity: 288 fiber strands (LC),12 fiber adapter plates and 12 splice trays, or 12 MTPmodules Part Number: Leviton 5R4UM-F12.
- B. Opt-X 1000 Fiber Optic Wall-mount Enclosures: All metal enclosure, holds various fiber adapter plates, splice trays, or MTP modules, based on connector choice and density requirements. Part numbers shown have a split metal door with key lock.
- Small Opt-X 1000 wall-mount Fiber Optic Enclosure, empty.
 - Capacity: 48 fiber strands (LC), 2 fiber adapter plates Part Number: Leviton 5W120-00N.
 - Medium Opt-X 1000 wall-mount Fiber Optic Enclosure, empty.
 - Capacity: 96 fiber strands (LC), 4 fiber adapter plates and 6 splice trays Part Number: Leviton 5W320-00N.
 - Large Opt-X 1000 wall-mount Fiber Optic Enclosure, empty.
 - Capacity: 288 fiber strands (LC),12 fiber adapter plates and 6 splice trays Part Number: Leviton 5W720-00N.

2.13 FIBER OPTIC ADAPTER PLATES

- A. 50µm Laser-optimized Multimode (LOMM) SDX Adapter Plates, for **OM3 50/125µm Fiber OpticSystem**
- 6-LC duplex (12-fiber) multimode OM3/OM4, aqua adapter plate, zirconia-ceramicsleeves. Part Number: Leviton 5F100-2QL.
 - 6-SC duplex (12-fiber) multimode OM3/OM4, aqua adapter plate, zirconia-ceramicsleeves. Part Number: Leviton 5F100-2QC

2.14 FIBER OPTIC CONNECTORS

- A. OM3 and OM4 Laser-optimized Multimode (LOMM) Field Installable Fiber Optic Connectors(aqua): Use for OM3 50/125µm Fiber Optic System

- FastCam LC Connector Part Number: Leviton 49991-LLC
- FastCam SC Connector Part Number: Leviton 49991-LSC

2.15 PATCH CORDS/JUMPERS

- A. Atlas-X1 Category 6A Modular Patch Cords:
Cat 6A UTP System Slim-Line style
Category 6A shielded cord
4-pair, stranded wire construction.

1. Part Numbers: WIRELESS ACCESS POINT PATCH CORD ASSEMBLIES

- Leviton 6AS10-03W (3 feet, White)
- Leviton 6AS10-05W (5 feet, White)
- Leviton 6AS10-07W (7 feet, White)
- Leviton 6AS10-10W (10 feet, White)
- Leviton 6AS10-15W (15 feet, White)
- Leviton 6AS10-20W (20 feet, White)

- B. Atlas-X1 Category 6 Modular Patch Cords:
Cat 6 UTP System Slim-Line style
Category 6 UTP patch cord
4-pair, stranded wire construction.

1. Part Numbers: DATA PORT PATCH CORD ASSEMBLIES

- Leviton 6D560-03L (3 feet, Blue)
- Leviton 6D560-05L (5 feet, Blue)
- Leviton 6D560-07L (7 feet, Blue)
- Leviton 6D560-10L (10 feet, Blue)
- Leviton 6D560-15L (15 feet, Blue)
- Leviton 6D560-20L (20 feet, Blue)

2. Part Numbers: CAMERA PATCH CORD ASSEMBLIES

- Leviton 6D560-03G (3 feet, Green)
- **Leviton 6D560-05G (5 feet, Green)**
- Leviton 6D560-07G (7 feet, Green)
- **Leviton 6D560-10G (10 feet, Green)**
- Leviton 6D560-15G (15 feet, Green)
- **Leviton 6D560-20G (20 feet, Green)**

3. Part Numbers: TELEVISION PORT PATCH CORD ASSEMBLIES

- Leviton 6D560-03E (3 feet, Black)
- **Leviton 6D560-05E (5 feet, Black)**
- Leviton 6D560-07E (7 feet, Black)
- **Leviton 6D560-10E (10 feet, Black)**
- Leviton 6D560-15E (15 feet, Black)
- **Leviton 6D560-20E (20 feet, Black)**

2.16 OM3 FIBER OPTIC SYSTEM: FACTORY-TERMINATED, DOUBLE-ENDED, 2-STRAND MULTIMODECORDAGE, COLOR (AQUA).

A. Duplex LC-Duplex LC:

- Leviton 5LDLC-M01 (1 meter)
- **Leviton 5LDLC-M02 (2 meter)**
- Leviton 5LDLC-M03 (3 meter)
- **Leviton 5LDLC-M05 (5 meter)**
- Leviton 5LDLC-M10 (10 meter)

B. Duplex SC-Duplex SC:

- Leviton 5LDSC-M01 (1 meter)
- **Leviton 5LDSC-M02 (2 meter)**
- Leviton 5LDSC-M03 (3 meter)
- **Leviton 5LDSC-M05 (5 meter)**
- Leviton 5LDSC-M10 (10 meter)

2.17 DISTRIBUTION RACKS AND WIRE MANAGEMENT

A. DISTRIBUTION RACKS

1. Distribution racks shall be from **Great Lakes Case & Cabinet:**

- 2 Post Distribution Rack
Two Post Rack with mounting hardware:
84" x 20.31W X 14" D, 45 RMU
1500 lb. capacity
Black anodized finish

2. Specified Vendor Product Selection - **Great Lakes Case & Cabinet P/N GLRR-1984BA**

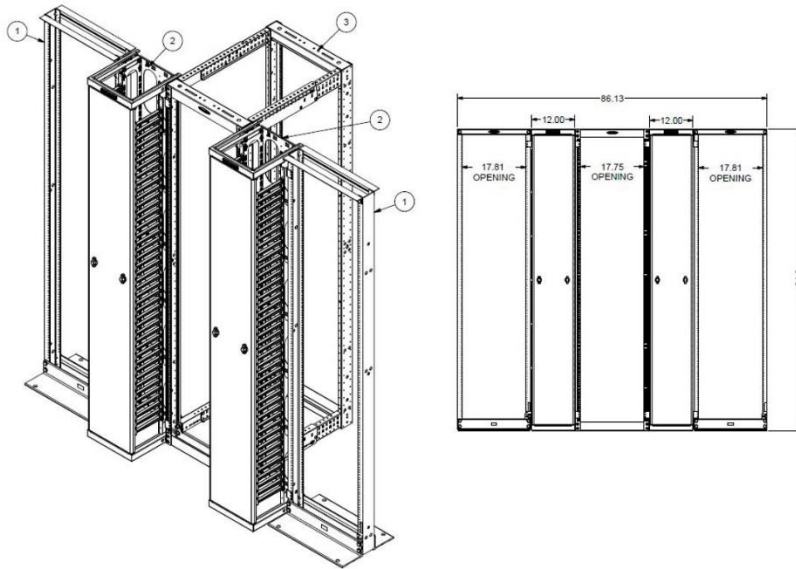
- 4 Post Distribution Rack
Four Post Rack with Variable Depth with mounting hardware:
84"H, Variable depth 4 Post Rack, 45 RMU
Side rail offers variable depth from 24-36"
Black anodized finish

3. Specified Vendor Product Selection - **Great Lakes Case & Cabinet P/N VD4P1224-2436**

2.18 WIRE MANAGEMENT

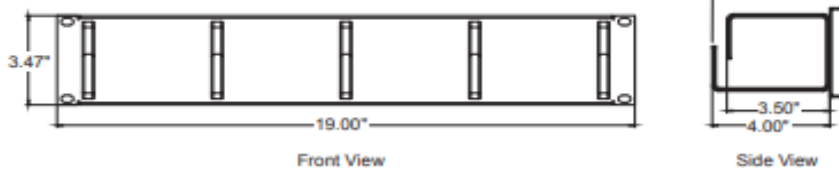
- A. Metal Vertical Cable Management
12" Channel x 80" Length
Vertical Front Only Manager includes dual hinged cover.
- B. Specified Vendor Product Selection
Great Lakes Case & Cabinet P/N VCM12
BASIS OF RACK LAYOUT

Figure 3.0



- C. Horizontal Cable Management for rack mount systems
2U Horizontal Wire Manager with Snap-On Cover
Front Only Manager includes cover.
- D. Specified Vendor Product Selection
Leviton P/N 49253-BCM

49253-BCM



2.19 FIRESTOP SYSTEMS – COMMUNICATIONS CABLING

- A. A firestop system is comprised of: the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, heat, vapor and pressurized water stream.
- B. All penetrations through fire rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating items i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire stopped.
- C. Product Specifications: Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state where the work is to be performed. A drawing showing the proposed fire stopped system, stamped/embossed by the cognizant PE shall be provided to the County's Technical Representative prior to installing the firestop system(s).
- D. Firestop System Installation: All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by the local inspection authorities prior to cable system acceptance.

2.20 FIRESTOP PERFORMANCE REQUIREMENTS

- A. Fire rated cable pathway devices shall be used in fire-rated construction for ALL low-voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:
 - Meet the hourly fire-rating of fire rated wall and or floor penetrated.
 - Be tested for the surrounding construction and cable types involved.
 - Have UL Systems permitting cable loads from; *"Zero to 100% Visual Fill."* This requirement eliminates need for fill-ratio calculations to be made by cable technicians to ensure cable load is within maximum allowed by UL System.
 - Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.
 - Be "Zero-Maintenance", zero-maintenance is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
 - Opening or closing of doors.
 - Spinning rings to open or close fabric liner

- Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.
 - Evaluation Services Report (ESR) from an accredited Nationally Recognized Third-party Laboratory certifying compliance with this definition of “Zero-Maintenance” and all relevant codes and standards.
 - Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
 - Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
 - Cable Pathway Devices passing vertically through floors shall have equal F & T Rating. (See UL System # F-A-3037, Item #4 “EZ-PATH Grid T-Rating Kit” Part # TRK444)
 - Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
- B. Non-rated cable pathway devices shall be used in non-fire-rated construction for ALL low- voltage, video, data and voice cabling, optical fiber raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the prints. Such devices shall:
- C. Limit the movement of smoke and sound of wall and or floor penetrated. Restore the STC Rating of the penetrated assembly.
- D. Provide L Ratings of <1 CFM when empty and <2.5 CFM at all other loading up to 100 percent.
- E. Accommodate cable loads from; *“Zero to 100% Visual Fill.”*
- F. Not have inner fabric liner that tightens around and compresses cables tightly together encouraging potential cable damage or interference.
- G. Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
- H. Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
- I. Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
- J. Be “Zero-Maintenance”, zero-maintenance is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:

Opening or closing of doors.

Spinning rings to open or close fabric liner.

Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam, foam plugs, foam blocks, or foam closures of any sort.

Furnish letter from manufacturer certifying compliance with this definition of “Zero-Maintenance”.

1. As an alternate to using a fire-rated or non-rated cable pathway device for single low voltage cables (up to 0.27 in. (7 mm) O.D) penetrating one or two-hour, gypsum board/stud wall assemblies or non-rated assemblies, either as a through-penetration or as a membrane-penetration, a fire-rated cable grommet may be substituted. The product shall consist of a molded, two-piece, plenum-rated grommet having a foam fire and smoke sealing membrane that conforms to the outside diameter of the individual cable. The grommet product shall be capable of locking into place to secure the cable penetration within the wall assembly. The grommet shall be UL Classified and tested to the requirements of ASTM E814 (UL1479) and CAN/ULC S115.
2. Where non-mechanical pathways must be utilized, such as sealing (caulking) around single or grouped conduits, provide products that upon curing do no re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during or after construction. Provide letter from manufacturer certifying compliance with this section.
3. Cable pathway shall replace conduit sleeves in walls and floors, and;
 - When installed individually in floors, devices shall pass through core-drilled opening utilizing tested floor plates.
 - When multiple units are ganged in floors, devices shall be anchored by means of a tested grid.
 - When installed individually in walls, devices shall pass through core drilled opening utilizing tested wall plates or integrated flanges.
 - When multiple units are ganged in walls, devices shall be anchored by means of a tested grid.
4. Cable tray shall terminate at each barrier and resume on the other side such that cables pass independently through devices. Cable tray shall be properly supported on each side of the barrier.
5. Firestop Manufacturers: Acceptable Manufacturer: Specified Technologies Inc., 210 Evans Way, Somerville, NJ 08876. Tel: (800) 992-1180, Fax: (908) 526-9623, Email: techserv@stifirestop.com, Website: www.stifirestop.com.
Substitutions: Not permitted. No known equal.
Single Source: Obtain firestop systems for each type of penetration and construction condition indicated only from a single manufacturer.

2.21 FIRESTOP MATERIALS

- A. General: Use only products that have been tested for specific fire resistance rated construction conditions or acoustical and smoke related requirements conforming to construction assembly type, penetrating item type, annular space requirements, and rating involved for each separate instance.
- B. Fire-Rated Cable Pathways: STI EZ-PATH® Fire-Rated Pathway device modules comprised of steel pathway with self-adjusting intumescent foam pads allowing 0 to 100 percent cable fill, the following products are acceptable:
- C. Specified Vendor Product Selection
- D. Specified Technologies Inc. (STI) EZ-PATH® Fire Rated Pathway
- E. Smoke and Acoustical Pathways: STI EZ-PATH® Smoke & Acoustical Pathway device module comprised of a nonmetallic pathway with integral self-adjusting smoke and sound sealing system for cable penetrations through non-fire-resistance rated wall or floor assemblies, the following products are acceptable:
- F. Specified Vendor Product Selection
- G. Specified Technologies Inc. (STI) EZ-PATH® Smoke & Acoustical Pathway; Model No. NEZ33or NEZ33CK

2.22 HORIZONTAL CABLE TRAY – COMMUNICATIONS CABLING PATHWAYS

- A. CABLE TRAY
 - Cable Tray Materials shall consist of tray sections, tray fittings, connectors, supports and all accessories as required for a complete and permanent cable tray infrastructure. Provide all incidental and/or miscellaneous hardware not explicitly specified or shown on the contract documents that is required for a fully operational and warranted system.
 - Cable tray components shall be manufactured by a single manufacturer. Components shall not be intermixed between different manufacturers. The cable tray manufacturer shall be: WBT Shaped Wire series, or approved equivalent Substitution is not acceptable unless the cable tray manufacturer has been pre-approved prior to bidding. Contractors, in order to obtain approval for cable tray manufacturer substitution, shall submit their request for substitution to the Engineer at least two weeks prior to the bid date. Approval or denial of a substitution request will be based on upon the sole judgment of the Engineer.
 - Product Specifications: Carbon steel wire, ASTM A653, Continuous galvanization before fabrication. Additional finishing not required.
 - Cable Tray Finishes: Finish for Carbon Steel Wire after welding; Orange powder-coated surface treatment,
 - Cable tray will consist of continuous, rigid, welded steel wire mesh cable management system, to allow continuous ventilation of cables and maximum dissipation of heat, with UL Classified splices where tray acts as Equipment.

Grounding Conductor (EGC). Wire mesh cable tray will have continuous T-welded top wire to protect cable insulation and installers. All cross wires to be WBT's **SHAPED** wire for maximum support.

- Provide splices, supports, and other fittings necessary for a complete, continuously grounded system.
- Mesh: 2 x 4 inches.
- Straight Section Lengths: 118 inches.
- Wire Diameter: 5mm minimum construction as specified by manufacturer drawings.
- Continuous T-Weld top wire to protect cable insulation and installers' hands.
- Fittings: PreForm UL Classified fittings for pathway transitions (90's, Tee's and Intersections), or utilize standard field-fabricated tray fittings from straight tray sections, in accordance with manufacturer's instructions and Item 2.3.
- Cable Tray Size:
 - Depth: Cable tray depth will be 6 inches
 - Width: Cable tray width will be 20 inches
 - Length: Cable tray section length will be 118 inches
- Fill Ratio: Cable tray may be filled to 60% of total fill capacity. Size cable tray to accommodate future cabling changes or additions.

B. Specified Vendor Product Selection

- WBT Part Number: WBT6x20 S ORG
- Load Span Criteria:
Install and support cable management system in accordance with the following:
[NEMA VE-1 (2002), with Safety Factor of 1.5]

Cable tray will be capable of carrying a uniformly distributed load of pounds per foot on a support span, according to load tests of standard shown in above.

2.23 CABLE TRAY SUPPORTS & ACCESSORIES

A. Fittings/Support:

- Wire mesh cable tray fittings are to utilize WBT Pre Form parts or field-fabricated from straight tray sections, in accordance with manufacturer's instructions.
- Ceiling-mounted supports mount to ceiling structure directly or with 1/4", 3/8" or 1/2" threaded rod.
- Wall-mounted supports.
- Underfloor supports mount directly to floor or to floor posts.

- Splices, including those approved for electrical continuity (bonding), as recommended by cable tray manufacturer.
- Accessories: As required to protect, support, and install a cable tray system.

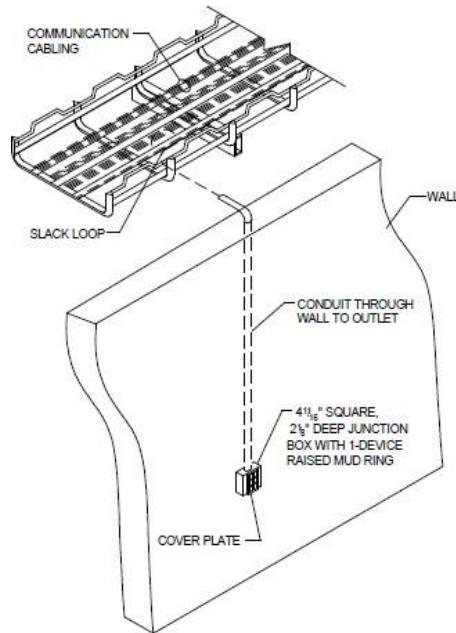
PART 3 – EXECUTION

3.1 INSTALLATION – COPPER UTP CABLES

- A. Examine areas to receive communications horizontal cabling.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.
- D. Install communications horizontal cabling in accordance with manufacturer's instructions, ANSI/TIA-568-C.0, ANSI/TIA-568-C.1, ANSI/TIA-569-C, BICSI TDMM, and NFPA 70.
- E. Field Terminated Copper and Fiber Optic Patch Cords and Jumpers: Not allowed.
- F. Copper Patch Cords and Fiber Jumpers: Manufactured by Leviton Network Solutions.
- G. Install cables after building interior has been physically protected from weather and mechanical work likely to damage cabling has been completed.
- H. Ensure cable pathways are completely and thoroughly cleaned before installing cabling.
- I. Inspect installed conduit, wireway, cable trays, and innerduct.
- J. Clean additional enclosed raceway and innerduct systems furnished.
- K. Provide protection for exposed cables where subject to damage.
- L. Abrasion Protection:
 1. Provide abrasion protection for cable or wire bundles which pass through holes or across edges of sheet metal.
 2. Use protective bushings to protect cables.
- M. Cable Ties and Other Cable Management Clamps:
 1. No more than hand tightened.
 2. Fit snugly, but not compress, crimp, or otherwise change physical characteristics of cable jacket or distort placement of twisted-pair components.
 3. Replace cables exhibiting stresses due to over tightening of cable management devices.

- 4. Use plenum-rated cable ties in plenum spaces.
- 5. Velcro wraps are preferred over cable ties for all cable bundles. Plenum-rated Velcrowraps are available from Leviton.
- N. Where possible, route cables in overhead cable trays and inside wire management systems attached to equipment cabinets and racks. Use Velcro, plastic ties or ducts to restrain cabling installed outside of wire management systems on racks or in cabinets.
- O. Cable Trays: Do not exceed 50 percent fill.
- P. Cable Raceways: Do not fill greater than ANSI/TIA-569-B maximum fill for particular raceway type.
- Q. When not in horizontal cable tray, support horizontal cables at a maximum of 48-inch (1.2 to 1.5-m) irregular intervals, if J-hook or trapeze system is used to support cable bundles.
- R. Do not allow cables to rest on acoustic ceiling grids, plumbing pipes, or electrical conduits.
- S. Bundle horizontal distribution cables in groups of no more than amount of cables designed for by cable support manufacturer, based on cable OD and weight.
- T. Fire-Sprinkler System:
- U. Install cables above fire-sprinkler system.
- V. Do not attach cables to fire-sprinkler system or ancillary equipment or hardware.
- W. Install cable system and support hardware so that it does not obscure valves, fire alarm conduit, boxes, or other control devices.
- X. Do not attach cables to ceiling grid or lighting fixture wires.
- Y. Install appropriate carriers to support cabling, where support for horizontal cables are required.
- Z. Replace before final acceptance, cables damaged or exceeding recommended installation parameters during installation.
- AA. All Communication cables from horizontal cable tray to outlets must be in 1" metal conduit as shown in Figure 6.0.

FIGURE 6.0



- BB. Install unshielded twisted-pair cables in accordance with manufacturer's instructions.
- CC. Install cables in continuous lengths from origin to destination, without splices, except for transition points or consolidation points.
- DD. Where transition points or consolidation points are allowed, they shall be located in accessible locations and housed in enclosure intended and suitable for the purpose.
- EE. Cable Minimum Bend Radius and Maximum Pulling Tension:
- FF. Do not exceed bend radius for UTP = 4 X Cable OD, FTP = 4 X Cable OD.
- GG. Install unshielded twisted-pair cables so that there are no bends smaller than 4 times cable outside diameter at any point in the run and at the termination field.
- HH. Pulling Tension on 4-Pair UTP Cables: Do not exceed 25 ft.lb. for 4-pair UTP cable.
- II. Separation from Power Lines: Provide following minimum separation distances between pathways for copper communications cables and power wiring of 480 volts or less:
 - Open or Nonmetal Communications Pathways: Electric motors, fluorescent light fixtures, and unshielded power lines carrying up to 3 kVA: 12 inches.
 - Electrical equipment and unshielded power lines carrying more than 5 kVA: 36 inches.
 - Large electrical motors or transformers: 48 inches.
- JJ. Grounded Metal Conduit Communications Pathways:

- KK. Electrical equipment and unshielded power lines carrying up to 2 kVA: 2-1/2 inches.
- LL. Electrical equipment and unshielded power lines carrying from 2 kVA to 5 kVA: 6 inches.
- MM. Electrical equipment and unshielded power lines carrying more than 5 kVA: 12 inches.
- NN. Power lines enclosed in grounded metal conduit (or equivalent shielding) carrying from 2 kVA to 5 kVA: 3 inches.
- OO. Power lines enclosed in grounded metal conduit (or equivalent shielding) carrying more than 5kVA: 6 inches.
- PP. Coil cables to house cable coil without exceeding manufacturer's bend radius.
- QQ. In hollow wall installations where box eliminators are used, store excess wire in wall.
- RR. Store no more than 12 inches of UTP and 36 inches of fiber slack.
- SS. Loosely coil excess slack and store in ceiling above each drop location, when there is not enough space present in outlet box to store slack cables.
- TT. Dress and terminate cables in accordance with ANSI/TIA-568-C.0, ANSI/TIA- C.1, BICSI TDMM, and manufacturer's instructions.
- UU. Terminate 4-pair cables on jack and patch panels using T568-B or T568-A wiring scheme.
- VV. Pair Untwist at Termination: Do not exceed 12 mm (1/2 inch).
- WW. Bend Radius of Horizontal Cables:
- XX. Not less than 4 times OD of UTP cables. YY. Not less than 4 times OD of FTP cables.
- ZZ. Maintain cable jacket to within 25 mm (1 inch) of termination point.

AAA. Neatly bundle cables and dress to their respective panels or blocks.

- Feed each panel or block by individual bundle separated and dressed back to point of cable entrance into rack or frame.

3.2 INSTALLATION – OPTICAL FIBER CABLES

- A. Place fiber optic cables to maintain minimum cable bend radius limits specified by manufacturer or 15 times cable diameter, whichever is larger.
- B. Use care when handling fiber optic cables.
 - Carefully monitor pulling tension so as not to exceed limits specified by manufacturer.
- C Do not splice horizontal fiber optic cables.

3.3 FIELD QUALITY CONTROL

A. Cables and termination hardware:

- Test 100 percent for defects in installation and verify cabling system performance underinstalled conditions in accordance with ANSI/TIA-568-C.0.
 - Verify all pairs of each installed cable before system acceptance.
 - Defects in cabling system installation, including but not limited to cables, connectors, patch panels, and connector blocks shall be repaired or replaced to ensure 100 percent useable conductors in all cables installed.
- Test all cables in accordance with this specification section, ANSI/TIA-568-C.2, and ANSI/TIA-568-C.3 standards, and Berk-Tek Leviton Network Solutions instructions
- If any of these are in conflict, bring discrepancies to the attention of the Architect for clarification and resolution.
- Cables, Jacks, Connecting Blocks, and Patch Panels:
 - Verify all pairs of each installed cable before system acceptance.
 - Defects in cabling system installation, including but not limited to cables, connectors, patch panels, and connector blocks shall be repaired or replaced to ensure 100 percent useable conductors in all cables installed.
 - Testing Unshielded Twisted-Pair Cables: (NOTE: Permanent Link Test results are recommended and are the expected norm – unless patch cords that will remain installed at the work area and cross-connect are also being tested, in which case Channel Test results would be expected and accepted).
 - Test twisted-pair copper cable links for continuity, pair reversals, shorts, opens, and performance as specified.
- Additional testing is required to verify Category performance.
- Test horizontal cabling using approved certification tester for Category 6A, Category 6, and Category 5e performance compliance in accordance with ANSI/TIA-568-C.2.
 - (NOTE: Appropriate Fluke, Agilent, Ideal, or JDSU certification testers may be used).
- Category 6A shall conform to ANSI/TIA-568-C.2 for augmented Category 6 to 500 MHz.
- Category 6 shall conform to ANSI/TIA-568-C.2 for Category 6 to 250MHz
- Follow ANSI/TIA-568-C.2. Basic Tests Required:
 - Wire map.
 - Length (feet).
 - Insertion loss (dB), formerly attenuation.
 - NEXT (Near end crosstalk) (dB).
 - Return loss (dB).
 - ELFEXT (dB).
 - Propagation delay (ns).
 - Delay skew (ns).
 - PSNEXT (Power sum near-end crosstalk loss) (dB).

- PSELFEXT (Power sum equal level far-end crosstalk loss) (dB).
- Test Category 6A by auto test to 500 MHz.
 - Alien Crosstalk (AXT) testing and AXT test results are NOT required by Leviton or Berk-Tek for warranty of a Category 6A system. (**Note:** AXT testing may be required by the customer, in which case these tests WOULD have to be performed).
 - Test Category 6 by auto test to 250 MHz.
 - Test Category 5e by auto test to 100 MHz.
 - Provide test results in approved certification testers original software format on CD, with the following minimum information per cable:
 - Circuit ID.
 - Information from specified basic tests required.
 - Test Result: "Pass" or "Fail".
 - Date and time of test.
 - Project name.
 - NVP.
 - Software version.
 - An occasional asterisk-Pass (*Pass) will be accepted by Leviton or Berk-Tek at the manufacturer's discretion, but rework of these links should be done in an attempt to achieve clean "Pass" results prior to submission of test results.
 - To receive Manufacturer's Warranty for the project, submit software copy of test results, in original tester software format, to the Owner and to the Manufacturer (either Berk-Tek or Leviton).
 - Submit fully functional version of tester software for use by the Owner in reviewing test results.
 - Report in writing to the Owner immediately, along with copy of test results, failed test results that cannot be remedied through re-termination (as in the case of reversed or split pairs).

3.4 TESTING OPTICAL FIBER

A. Testing procedures shall be in accordance with the following: ANSI/TIA-568-C.3.

1. ANSI/TIA-526-7, Method B.
Proposed TSB-140 Tier One Fiber Certification, C.
Encircled Flux testing per the TSB-4979 and TIA-526-14-B standard.
 - Test Equipment: Certification tester (Note: Fluke or equivalent Level III testers may be used).
 - Testing:
 - Test optical fibers at both 850 nm and 1300 nm wavelengths for multimode
 - Telecommunications Room (TR) to Telecommunications Outlet (TO), Telecommunications Outlet (TO) to Telecommunications Room (TR).
 - Maximum insertion loss for horizontal fiber optic cables without consolidation point: 2.0dB.
 - Test horizontal fiber runs TR to TO, TO to TR, at wavelength of operation to desktop applications.

- Submit software copy of test results, in original tester software format, to the Owner and to the Manufacturer (either Berk-Tek or Leviton).

3.5 LABELING

- A. All labeling is to be in accordance with ANSI/TIA-606-B and manufacturer's instructions.
- B. Label horizontal cables using machine-printed label at each end of cable at approximately 12 inches from termination point and again at approximately 48 inches from termination point. **Handwritten Labels: Not acceptable.**
- C. Label patch panel ports and wall plate ports with cable identifier
- D. Labels: Denote TO ID and unique cable number for that TO, i.e. A-001-A for cable number 1, A- 001-B for cable number 2, and so forth.
- E. Owner may provide specific labeling requirements. Coordinate with the Owner.
- F. Note labeling information on as-built drawings.

3.6 AS-BUILT DRAWINGS

- A. The installation contractor will be provided with 2 sets of D or E-size drawings at the start of the project. One set will be designated for as the central location to document all as-built information as it occurs throughout the project. The central set will be maintained by the Contractor's Foreman on a daily basis and will be available to the Technical representative upon request during the course of the project. Anticipated variations from the build-to drawings may be for such things as cable routing and actual outlet placement. No variations will be allowed to the planned termination positions of horizontal and backbone cables, and grounding conductors unless approved in writing by the Owner.
- B. The Contractor shall provide the central drawing set to the owner at the conclusion of the project. The marked up drawing set will accurately depict the as-built status of the system including termination locations, cable routing, and all administration labeling for the cabling system. In addition, a narrative will be provided that describes any areas of difficulty encountered during the installation that could potentially cause problems to the telecommunications system.

3.7 TEST DOCUMENTATION

- A. Test documentation shall be provided in a three-ring binder(s) within three weeks after the completion of the project. The binder(s) shall be clearly marked on the outside front cover and spine with the words "Test Results", the project name, and the date of completion (month and year). The binder shall be divided by major heading tabs, Horizontal and Backbone. Each major heading shall be further sectioned by test type. Within the horizontal and backbone sections, scanner test results (Category 3 or 6), fiber

optic attenuation test results, OTDR traces, and green light test results shall be segregated by tab. Test data within each section shall be presented in the sequence listed in the administration records. The test equipment by name, manufacturer, model number and last calibration date will also be provided at the end of the document. Unless a more frequent calibration cycle is specified by the manufacturer, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test.

- B. Scanner tests shall be printed on 8-1/2" x 11" paper. Handwritten test results (attenuation results and green light results) shall be documented on the attached test form (Appendix C). OTDR test results shall be printed or attached and copied on 8-1/2" x 11" paper for inclusion in the test documentation binder.
- C. When repairs and re-tests are performed, the problem found, and corrective action taken shall be noted, and both the failed and passed test data shall be collocated in the binder.

3.8 CABLING SYSTEM ACCEPTANCE

- A. The Owner's Technical Representative will make periodic inspection of the project in progress. All work must be approved by Owner's Technical Representative before installation. This includes cabling tray, cable, all telecommunications room equipment, etc.

3.9 FINAL INSPECTION

- A. Upon completion of the project, the Owner's Technical Representative will perform a final inspection of the installed cabling system with the Contractor's Project Foreman. The final inspection will be performed to validate that all horizontal and backbone cables were installed as defined in the drawing package, and that the installation meets the aesthetic expectations of the Owner.

END OF SECTION 275100

SECTION 275200 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide all materials and labor for the installation of a grounding and bonding system for communications infrastructure. This section includes requirements for providing a permanent grounding and bonding infrastructure for communications circuits, raceways, and cable tray.
- B. Related Sections
 - 1. Division 27 Section — "Conduit and Backboxes for Communications Systems"
 - 2. Division 27 Section — "Communications Equipment Room Fittings"

1.3 REFERENCES

- A. The applicable portions of the following specifications, standards, codes and regulations shall be incorporated by reference into these specifications.
 - 1. General:
 - a. National Electrical Code (NEC)
 - b. National Electrical Safety Code (NESC)
 - c. Occupational Safety and Health Act (OSHA)
 - 2. Communications:
 - a. TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*
 - b. TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*
 - c. TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*
 - d. TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*
 - e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*
 - f. BICSI: *BICSI Telecommunications Cabling Installation Manual*
 - g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*
 - h. BICSI: *BICSI Customer-Owned Outside Plant Design Manual (CO-OSP)*

1.4 DIFINITIONS

- A. “TMGB” shall mean *Telecommunications Main Grounding Busbar*. There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.
- B. “TGB” shall mean *Telecommunications Grounding Busbar*. There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.
- C. “TBB” shall mean *Telecommunications Bonding Backbone*. The TBB is a conductor used to connect TMGBs to TGBs.

1.5 SYSTEM DESCRIPTION

- A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete, permanent Grounding and Bonding infrastructure for communications circuits, raceways, and cable trays as hereinafter specified and/or shown on the Contract Documents. The Grounding and Bonding system shall support an ANSI/TIA/EIA and ISO/IEC compliant communications Structured Cabling System (SCS).
- B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the plans but which are necessary to make a complete working ANSI/TIA/EIA and ISO/IEC compliant Grounding and Bonding system.

1.6 SUBMITTAL INFORMATION

- A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.
 - 1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.
 - 2. For those items noted as allowing “or equal,” and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.
 - 3. Provide standard manufacturer’s cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment.

and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the Designer in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.
2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets.
 - a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.
 - b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.
 - c. Keep Record Drawings current throughout the course of construction. ("Current" is defined as not more than one week behind actual construction).
 - d. Show identifiers for major infrastructure components on Record Drawings.

1.7 SEQUENCING

1.8 CONTRACTOR WARRANTY:

- A. Provide a Contractor-endorsed two-year service warranty against defects in materials and workmanship.
 1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.
 2. The Contractor Warranty period shall commence upon Owner acceptance of the work.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials shall consist of busbars, supports, bonding conductors and other incidentals and accessories as required

2.2 MATERIALS

- A. Grounding/Bonding:

1. Telecommunications Main Grounding Bus Bar (TMGB):
 - a. Large (20" x 4" x 1/4"), Pre-drilled: CPI 10622-020, or equal
 - b. Small (10" x 4" x 1/4"), Pre-drilled: CPI 10622-010, or equal
 2. Telecommunications Grounding Bus Bar (TGB):
 - a. Large (20" x 4" x 1/4"), Pre-drilled: CPI 10622-020, or equal
 - b. Small (10" x 4" x 1/4"), Pre-drilled: CPI 10622-010, or equal
 3. Telecommunications Bonding Backbone: #6 AWG insulated (green in color) copperconductor.
 4. Grounding Conductor: #6 AWG insulated (green in color) copper conductor.
- B. Firestopping material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.
- C. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, and created by a hand-carried label maker or a computer/software-based label making system. Handwritten labels are not acceptable.
1. Hand-carried label maker:
 - a. Brady: ID Pro Plus (or approved equal).
 2. Labels:
 - a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal)

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.
- B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NEC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.
- C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.
- D. All work shall comply with the requirements and recommendations of the product

manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.

- E. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.
- F. Install the grounding and bonding system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.
- G. Remove surplus material and debris from the job site and dispose of legally.

3.1 INSTALLATION

- A. The grounding and bonding infrastructure system shall not make use of the building plumbing system, unless required to do so by the NEC.

1. Coordinate the installation of the grounding and bonding system with the electrical power distribution system grounding infrastructure.

- B. Ground/Bonding:

- 1. TMGB: Provide a minimum of one TMGB per telecommunications entrance room for each building and as shown on the Contract Documents. Install TMGB(s) and directly bond TMGB(s) to electrical service ground and to associated TBB(s). Group protector, busbar bonding, and approved building grounding conductors toward one end of the TMGB and leave space for equipment grounding conductors on the other end.
- 2. TGB: Provide a minimum of one TGB per telecommunications room for each building and as shown on the Contract Documents and as required by the standards, references and codes listed in PART 1 -- REFERENCES above. Directly bond each TGB to its associated TBB and to the nearest building structural steel or other permanent metallic system. Group protector, busbar bonding, and approved building grounding conductors toward one end and leave space for equipment grounding conductors on the opposite end.
- 3. TBB(s) and Grounding Conductors: Provide TBB(s) and grounding conductors as shown on the Contract Documents and as required to bond all non-current carrying metal telecommunications equipment and materials to the nearest TGB. Use TBB(s) to connect the TMGB to each TGB. Route along the shortest and straightest path possible with minimal bends. Bends shall be sweeping. Insulate TBB(s) and conductors from their support. TBB(s) and grounding conductors shall be continuous (without splices).
 - a. Ensure that bonding breaks through paint to bare metallic surface of all painted metallic hardware.

- C. Firestopping

- 1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.

2. Maintain the fire rating of all penetrated fire barriers. Fire stop and seal all penetrations made during construction.
 - a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.
 - b. Install firestops in strict accordance with manufacturer's detailed installation procedures.
 - c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply sealing material in a manner acceptable to the local fire and building authorities.
 - d. For demolition work, apply firestopping to open penetrations in fire rated barriers where cable is removed. Apply firestopping regardless of whether or not the penetrations are used for new cable or left empty after construction is complete.
 - e. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.

D. Labels:

1. Label TMGB(s) with "TMGB"
2. Label TGB(s) with "TGB".
3. Label TBB(s) and bonding conductors "WARNING! TELECOMMUNICATIONS BONDING CONDUCTOR. DO NOT REMOVE OR DISCONNECT!"

END OF SECTION 275200

SECTION 275800 - CONDUIT AND BACKBOXES FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide all materials and labor for the installation of a pathway system for inside plant communications circuits. This section includes requirements for horizontal and building backbone raceways, fittings, and boxes specific to communications circuits (cabling) for voice and data.
- B. Related Sections:
 - 1. Division 27 Section — "Grounding and Bonding for Communications Systems"
 - 2. Division 27 Section — "Inside Plant Communications Systems"

1.3 REFERENCES

- A. Incorporate by reference the applicable portions of the following specifications, standards, codes into this specification section.
 - 1. General:
 - a. National Electrical Code (NEC)
 - b. National Electrical Safety Code (NESC)
 - c. Occupational Safety and Health Act (OSHA)
 - 2. Communications:
 - a. ANSI/TIA/EIA - 568: *Commercial Building Telecommunications Cabling Standard*
 - b. ANSI/TIA/EIA - 569: *Commercial Building Standard for Telecommunication Pathways and Spaces*
 - c. ANSI/TIA/EIA - 606: *The Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*
 - d. ANSI/TIA/EIA - 607: *Commercial Building Grounding and Bonding Requirements for Telecommunications*
 - e. ISO/IEC IS 11801: *Generic Cabling for Customer Premises*
 - f. BICSI: *BICSI Telecommunications Cabling Installation Manual*
 - g. BICSI: *BICSI Telecommunications Distribution Methods Manual (TDMM)*

1.4 DEFINITIONS

- A. “EMT” shall mean Electrical Metallic Tubing.
- B. “RMC” shall mean Rigid Metal Conduit.
- C. “SMR” shall mean Surface Metal Raceway.
- D. “Raceway” shall mean any enclosed channel for routing wire, cable or busbars.
- E. “TMGB” shall mean *Telecommunications Main Grounding Busbar*. There is typically one TMGB per building, located in the main telecommunications room. This busbar is directly bonded to the electrical service ground.
- F. “TGB” shall mean *Telecommunications Grounding Busbar*. There is typically one TGB per telecommunications room. The TGB is connected both to the TMGB and to building structural steel or other permanent metallic systems.
- G. “TBB” shall mean *Telecommunications Bonding Backbone*. The TBB is a conductor used to connect TMGBs to the TGBs.
- H. “Pullbox” shall mean a metallic box with a removable cover, used to facilitate pulling cable through conduit runs longer than 100’ or in which there are more than 180 degrees of bends.
- I. “Junction box” shall mean a pullbox wherein a feeder conduit transitions to multiple distribution conduits.

1.5 SYSTEM DESCRIPTION

- A. Furnish, install, and place into satisfactory and successful operation all materials, devices, and necessary appurtenances to provide a complete Raceway system as hereinafter specified and/or shown on the Contract Documents. The Raceway system shall support an ANSI/TIA/EIA and ISO/IEC compliant communications Structured Cabling System (SCS) as specified in 271500 - Inside Plant Communications Systems
- B. The work shall include materials, equipment and apparatus not specifically mentioned herein or noted on the Contract Documents, but which are necessary to make a complete working Raceway system.

1.6 SUBMITTALS

- A. Product Data Submittals: Provide submittal information for review before materials are delivered to the job site. Provide product data submittals for all products at the same time.
 - 1. Submit a letter stating that the materials will be provided as specified, and specifically listing any items that will not be provided as specified. The letter shall also state that the Contractor has reviewed the specified items and agrees that they are applicable to this project in all respects.

2. For those items noted as allowing “or equal,” and which are not being provided as specifically named, submit standard manufacturer's cut sheets or other descriptive information, along with a written description detailing the reason for the substitution.
3. Provide standard manufacturer’s cut sheets and the operating and maintenance (O&M) instructions at the time of submittal review for each device in the system, regardless of whether it is submitted as specified or as an approved equal. These instructions shall detail how to install and service the equipment and shall include information necessary for rough-in and preparation of the building facilities to receive the materials.

B. Closeout Submittals: Provide submittal information for review as follows:

1. O&M Manual for Communications - At the completion of the project, submit all O&M information from product data submittals (above), updated to reflect any changes during the course of construction, to the College in the telecommunications-specific O&M Manual for Communications binder labeled with the project name and description.
2. Records - Maintain at the job site a minimum of one set of Record Drawings, Specification, and Addenda. Record Drawings shall consist of redline markups of drawings, specifications and spreadsheets, including maintenance hole/handhole butterfly drawings.
 - a. Document changes to the system from that originally shown on the Contract Documents and clearly identify system component labels and identifiers on Record Drawings.
 - b. Keep Record Drawings at the job site and make available to the Owner and Designer at any time.
 - c. Keep Record Drawings current throughout the course of construction. (“Current” is defined as not more than one week behind actual construction).
 - d. Show identifiers for major infrastructure components on Record Drawings.

1.7 CONTRACTOR WARRANTY:

- A. Provide a Contractor-endorsed one-year service warranty against defects in materials and workmanship.
 1. Provide labor attributable to the fulfillment of this warranty at no cost to the Owner.
 2. The Contractor Warranty period shall commence upon Owner acceptance of the work

1.8 QUALITY ASSURANCE

- A. Listing and Labeling: Provide raceways and boxes specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NEC, Article 100.
 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.
- B. Comply with NECA's "Standard of Installation."
- C. Comply with NEC.

1.9 COORDINATION

- A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Materials shall consist of conduit, surface metal raceway, outlet boxes, fittings, enclosures, pull boxes, and other raceway incidentals and accessories as required for inside plant communications circuits.

2.2 MATERIALS

- A. Conduit:
1. EMT. 1" minimum conduit size. Flexible metal conduit (FMC) is not acceptable.
 - a. Conduit: Galvanized steel tubing meeting ANSI C80.3.
 - b. Couplings: Steel, cast iron, or malleable iron compression type employing a split, corrugated ring and tightening nut, with integral bushings and locknuts. Indent- type and setscrew-type couplings are not permitted.
 2. RMC. 1" minimum conduit size.
 - a. Conduit: Hot dipped galvanized steel with threaded ends meeting ANSI C80.1.
 - b. Couplings: Unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.
 - c. Nipples: Same as conduit, factory-made up to 8 inches in diameter, no running threads.
- B. Sleeves: EMT conduit, with insulated throat bushings for each end
- C. Surface Raceway: Wiremold V2400 series or equivalent – Two piece, steel, single channel surface raceway.
- D. Outlet boxes: Minimum 4"x4" size, 2 1/8" minimum depth, with extension rings (if needed) and single gang covers (i.e.: mud rings), unless otherwise noted on the Contract

Documents. Combined interior depth of outlet box, extension ring and cover shall be a minimum 2-1/2". Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for 1" trade size conduit or connector entrance, meeting NEMA OS 1.

1. Acceptable manufacturers:
 - a. Appleton, Raco, Steel City, or equal
 2. Wiremold Extra Deep Switch and Receptacle Box: V5744-2 (two gang), or equal
- E. Junction Boxes and Pull Boxes: Stamped steel, deep drawn one piece (without welds or tab connections), galvanized, with knockouts for conduit or connector entrance. Boxes 6"x6"x4" or larger may be code gauge fabricated steel continuously welded at seams and painted after fabrication.
1. Dry locations: meeting NEMA OS 1.
 2. Wet locations: NEMA OS 3R.
- F. Miscellaneous Fittings:
1. Locknuts and conduit bushings: Malleable iron
 - a. Appleton, Crouse Hinds, OZ Gedney, or equal
 2. Through wall seals and floor seals shall be:
 - a. OZ Gedney FS and WS series, or equal.
- G Pull Strings: Plastic or nylon with a minimum test rating of 200 lb.

2.3 FIRESTOPPING

- A. Material: Conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions.

2.4 LABELING AND ADMINISTRATION

- A. Labels: As recommended in ANSI/TIA/EIA 606. Permanent (i.e. not subject to fading or erasure), permanently affixed, typed, and created by a hand-carried label maker or an approved equivalent software-based label making system. Handwritten labels are not acceptable.
1. Hand-carried label maker:
 - a. Brady: ID Pro Plus (or approved equal).
 2. Labels:
 - a. Brady: Bradymaker Wire Marking Labels WML-511-292 (or approved equal).

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is solely responsible for the safety of the public and workers in accordance with all applicable rules, regulations, building codes and ordinances.
- B. All work shall comply with applicable safety rules and regulations including OSHA. All work shall comply with the requirements of the National Electrical Safety Code (NESC) and the NEC except where local codes and/or regulations are more stringent, in which case the local codes and/or regulations shall govern.
- C. All work shall comply with the standards, references and codes listed in PART 1 -- REFERENCES above. Where questions arise regarding which standards, references, or codes apply, the more stringent shall prevail.
- D. All work shall comply with the requirements and recommendations of the product manufacturers. Where questions arise regarding which requirements and recommendations apply, the more stringent shall prevail.
- E. Install the raceway system in a manner ensuring that communications circuits, when installed, are able to fully comply with the ANSI/TIA/EIA and other references listed in Part 1 — References, above.
- F. Replace and/or repair to original (or better) condition any existing structures, materials, equipment, etc. inadvertently demolished or damaged by the Contractor during the course of construction at no additional cost to the Owner.
- G. Remove surplus material and debris from the job site and dispose of legally.

3.2 EXAMINATION

- A. Examine surfaces and spaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions. Provide a raceway for each location indicated. Do not gang raceway into wireways, pullboxes, junction boxes, etc., without specific approval from the Designer.
- B. Conduit:
 - 1. Install EMT unless other conduit is shown on the Contract Documents or is required by Code.
 - 2. Install conduit as a complete, continuous system without wires, mechanically secured and electrically connected to metal boxes, fittings and equipment. Blank-off unused openings using factory-made knockout seals.

3. Run conduit in the most direct route possible, parallel to building lines. Do not route conduit through areas in which flammable material may be stored.
4. Keep conduit at least 6 inches away from parallel runs of flues and steam or hot-water pipes or other heat sources operating at temperatures above one-hundred degrees Fahrenheit. Install horizontal conduit runs above water piping.
5. Keep conduit away from sources of electromagnetic interference as follows:
 - a. 5 inches from fluorescent lighting
 - b. 12 inches from conduit and cables used for electrical power distribution
 - c. 48 inches from motors or transformers
6. Do not exceed 90 meters total length for a given conduit run to be used for distribution cabling (from outlet box to telecommunications room), including intermediate conduits and junction boxes.
7. Install conduit exposed, except in finished areas or unless shown otherwise on the drawings. Do not install conduit below grade/slab unless specifically shown on the Contract Documents as being installed below grade/slab.
8. Install exposed conduit in lines parallel or perpendicular to building lines or structural members except where the structure is not level. Follow the surface contours as much as practical. Do not install crossovers or offsets that can be avoided by installing the conduit in a different sequence or a uniform line.
 - a. Run parallel or banked conduits together, on common supports where practical.
 - b. Make bends in parallel or banked runs from same centerline to make bends parallel.
9. Conduits concealed above ceilings, furred spaces, etc., which are normally inaccessible may be run at angles not parallel to the building lines.
10. Wherever practical, route conduit with adjacent ductwork or piping and support on common racks. Base required strength of racks, hangers, and anchors on combined weights of conduit and piping.
11. Where conduits cross building expansion joints, use suitable sliding or offsetting expansion fittings. Unless specifically approved for bonding, use a suitable bonding jumper.
12. Support conduits as specified in Section "Basic Electrical Materials and Methods."
 - a. Provide anchors, hangers, supports, clamps, etc. to support the conduits from the structures in or on which they are installed. Do not space supports farther apart than five feet.
 - b. Provide sufficient clearance to allow conduit to be added to racks, hangers, etc. in the future.

- c. Support conduit within three feet of each outlet box, junction box, gutter, panel, fitting, etc.
- 13. Ream conduits to eliminate sharp edges and terminate with metallic insulated grounded throat bushings. Seal each conduit after installation (until cable is installed) with a removable mechanical-type seal to keep conduits clean, dry and prevent foreign matter from entering conduits.
- 14. Install a pull string in each conduit.
- 15. For conduits entering through the floor of a telecommunications room, terminate conduits 6" above the finished floor.
- 16. Do not install communications conduits in wet, hazardous or corrosive locations.
- 17. Where conduit is shown embedded in masonry, embed conduit in the hollow core of the masonry. Horizontal runs in the joint between masonry units are not permitted.
- 18. Where conduit is shown embedded in concrete, embed conduit a minimum of two inches from the exterior of the concrete. Do not place conduit in concrete less than 4 inches thick.
 - a. One inch trade size conduit shall be used. Conduits sized smaller than one inch trade size conduit are not permitted embedded in concrete without approval from the College.
 - b. Run conduit parallel to main reinforcement.
 - c. Conduit crossovers in concrete are not permitted.
- 19. Where conduit exits from grade or concrete, provide a rigid steel elbow and adapter.
- 20. Where conduit enters a space through the floor and terminates in that space, terminate the conduit at 6" above the finished floor.
- 21. Where conduits terminate at a cable tray, the conduits shall be consistently terminated no more than 8" from the cable tray and have a visually uniform appearance.
- 22. Where several circuits follow a common route, stagger pullboxes or fittings.
- 23. Where several circuits are shown grouped in one box, individually fireproof each conduit.
- 24. Bend and offset metal conduit with standard factory sweeps or conduit fittings. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
 - a. Conduit sweeps:
 - 1) Sweeps shall not exceed 90 degrees.
 - 2) Do not exceed 180 degrees for the sum total of conduit sweeps for a section of conduit (between conduit termination points).

- 3) Sweep radius shall be at least 10 times the internal diameter of the conduit.
 - 4) 90-degree condulets (LB's) and electrical elbows are not acceptable.
 - b. Factory-manufactured sweeps are required for bends in conduit larger than 1- $\frac{1}{4}$ " trade size.
 - c. For bends in 1 $\frac{1}{4}$ " trade size conduit and larger, field-manufactured bends (using a hydraulic bender with a 1 $\frac{1}{4}$ " boot) are permitted only when factory-manufactured sweeps are not suitable for the conditions. In all other cases, factory-manufactured sweeps are required. "Hickey-bender" use is prohibited.
25. Connect conduit to hubless enclosures, cabinets and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Make conduit connections to enclosures at the nearest practicable point of entry to the enclosure area where the devices are located to which the circuits contained in the conduit will connect.
26. Penetrations for raceways:
- a. Do not bore holes in floor and ceiling joists outside center third of member depth or within two feet of bearing points. Holes shall be 1- $\frac{1}{4}$ " diameter maximum.
 - b. Penetrate finished walls and finished surfaces with a PVC or sheet metal sleeve with an interior diameter (ID) at least 1/4" greater than the outer diameter (OD) of the conduit, set flush with walls, pack with fiberglass, seal with silicone sealant.
 - c. Penetrate poured-in-place walls and free slabs with a cast iron sleeve (or Schedule 40 PVC black pipe sleeve for above-grade only) with retaining ring or washer. Set sleeves flush with forms or edges of slab. Pack around conduit with fiberglass and seal with silicone sealant.
27. Raceway terminations and connections:
- a. Join conduits with fittings designed and approved for the purpose and make joints tight. Do not use set indent-type or screw-type couplings.
 - b. Make threaded connections waterproof and rustproof by applying a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.
 - c. Make conduit terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
 - d. Cut ends of conduit square using a hand saw, power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Where conduit threads are cut in the field, cut threads to have same effective length, same thread dimensions and same taper as specified for factory-cut threads.

- e. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts.
 - f. Where conduits are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
28. Install conduit sealing fittings according to manufacturer's written instructions. Locate fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed conduits, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
- a. Where conduits pass from warm to cold locations, such as the boundaries of air conditioned or refrigerated spaces and where conduits enter or exit buildings from outdoor areas, including underground ducts or conduit runs.
 - b. Where otherwise required by the NEC.
29. Conduit shall be clean and dry.

C. Sleeves:

- 1. Provide sleeves where required, sized as noted on the Contract Documents. Where not noted, sleeve sizing shall be determined by the type and quantity of cable to be routed through the sleeve per TIA/EIA 569A cable capacity standards, plus an additional 20% for future expansion.
- 2. Provide roto-hammering or core drilling where required for installation.
- 3. Seal between sleeve and wall or floor in which the sleeve is installed. Firestop all penetrations to restore wall or floor to pre-penetration fire-rating.

D. Surface Raceway:

- 1. Provide surface raceway for all surface mounted telecommunications outlet boxes and as shown on the Contract Documents.
- 2. Surface raceway shall be routed parallel to and perpendicular to surfaces or exposed structural members and follow surface contours.
- 3. Surface raceway color shall match as closely as possible the existing wall finish. Do not paint Surface Raceway.
- 4. Surface raceway systems shall be completely installed, including insulating bushings and inserts as required by manufacturer's installation requirements. Unused openings in the surface raceway shall be closed using manufactured fittings.

5. Surface raceway shall have a minimum two inch radius control at all bend points.
6. Surface raceway shall be securely supported by screws or other anchor-type devices at intervals not exceeding 10 feet and with no less than two supports per straight raceway section. Surface raceway shall be securely supported in accordance with the manufacturer's requirements. Tape and glue are not acceptable support methods.
7. Mechanically and electrically continuous surface raceway shall be bonded and grounded to the Telecommunications Grounding system.

E. Outlet Boxes:

1. Provide outlet boxes and covers as shown on the Contract Documents and as needed. Verify that the appropriate cover type and depth is provided for each type of wall and finish. Provide extension rings as needed.
2. Coordinate box locations with building surfaces and finishes to avoid bridging wainscots, joints, finish changes, etc.
3. Install boxes in dry locations (not wet, corrosive, or hazardous).
4. Attach boxes securely to building structure with a minimum of two fasteners. Provide attachments to withstand a force of one hundred pounds minimum, applied vertically or horizontally.
5. Install boxes at the following heights to the bottom of the box, except where noted otherwise:
 - a. Wall mounted telephones: 48" above finished floor.
 - b. Workstation outlets: 18" above finished floor.
 - c. Place boxes for outlets on cabinets, countertops, shelves, and similar boxes located above countertops two inches above the finished surface or two inches above the back splash. Coordinate and verify size, style, and location with the supplier or installer of these items prior to outlet box installation.
6. Recessed mounted outlet boxes:
 - a. Recess boxes in the wall, floor, and ceiling surfaces in finished areas. Set boxes plumb, level, square and flush with finished building surfaces within one-sixteenth inch for each condition. Set boxes so that box openings in building surfaces are within one-eighth inch of edge of material cut-out and fill tight to box with building materials. Single gang opening shall extend at least to the finished wall surface and extend not more than 1/8 inch beyond the finished wall surface. Provide backing for boxes using structural material to prevent rotation on studs or joists.

- b. Install floor boxes level and adjust to finished floor surface.
- 7. Surface-mounted outlet boxes:
 - a. For boxes surface-mounted on finished walls, provide Wiremold outlet box or equivalent. Cut box as necessary to accept conduit.
 - b. For boxes surface-mounted on unfinished walls (i.e. electrical rooms, mechanical rooms), provide 4"x4" (minimum) outlet box with single gang cover.

F. Floor Boxes:

- 1. Provide floor boxes as shown on the Contract Documents.
- 2. Set device boxes plumb, level, square and flush with floor, within 1/16" tolerance foreach condition.
- 3. For floor boxes with combined power and telecommunications circuits, provide metaldividers to separate power from telecommunications circuits.

G. Junction Boxes:

- 1. Provide junction boxes as shown on the Contract Documents and as required.
 - a. Where sizing is not shown on the Contract Documents, size junction box length and depth according to the size of the feeder conduit in the following table:

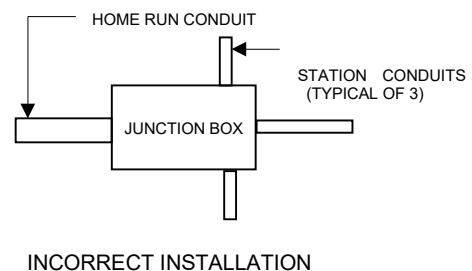
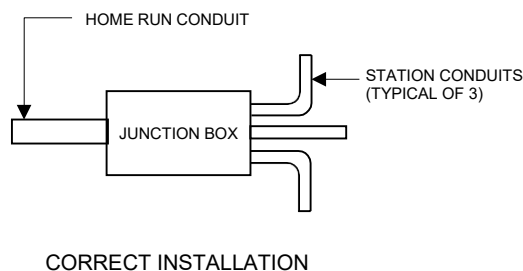
Feeder Conduit Size	Box Lengt h	Box Depth
1"	12"	4"
1-1/4"	12"	4"
1-1/2"	12"	4"
2"	24"	4"
2-1/2"	24"	6"
3	36"	6"
3-1/2"	48"	6"
4"	60"	6"

- b. Where sizing is not shown on the Contract Documents, size junction box widthaccording to the following formula:

- 1) From the table below, select the width associated with the largest conduit on the distribution side of the box. For each additional distribution conduit, add the “Increase Width” value associated with the size of that distribution conduit to the box width for the largest distribution conduit.
 - a) For example, if the distribution side of the junction box has one 1- $\frac{1}{4}$ ” distribution conduit and three 1” distribution conduits, the total distribution-side width would be 6”+2”+2”+2”=10”.
- 2) Repeat the above process for the feeder side of the junction box. Junction boxes are typically fed by a single conduit, therefore unless the box has more than one feeder conduit, the “Increase Width” part of the formula is unnecessary.
 - a) For example, if the feeder side of the junction box has two 2” feeder conduits the total feeder-side width would be 8”+5”=13”.
- 3) The larger of the two width calculations (distribution side vs. feeder side) shall be the width of the junction box to be provided.
 - a) For example, if the distribution-side width were 10” and the feeder- side width were 13”, provide a 13” wide junction box.

Conduit Size	Box Width	For each additional conduit Increase Width
1”	4”	2”
1- $\frac{1}{4}$ ”	6”	3”
1- $\frac{1}{2}$ ”	8”	4”
2”	8”	5”
2- $\frac{1}{2}$ ”	10”	6”
3	12”	6”
3- $\frac{1}{2}$ ”	12”	6”
4”	15”	8”

2. A junction box may not be substituted for a 90-degree bend. *90 degree condulets (LB's) are not acceptable.*
3. Install junction boxes in a location readily accessible both at time of construction and after building occupation. Do not install junction boxes in inaccessible interstitial building spaces.
4. Where junction boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4' above grid.
5. Install hinged-cover enclosures and cabinets plumb and supported at each corner.
6. Install junction boxes so that the access door opens from the side where the cable installer will normally work – typically from the bottom (floor side) of the box.
 - a. Where a junction box is installed in a ceiling space, coordinate with other trades to provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.
 - b. Provide a lockable access cover (or junction box door if junction box is exposed) in hard lid ceilings.
7. Install junction boxes such that conduits enter and exit at opposite ends of the box as follows:

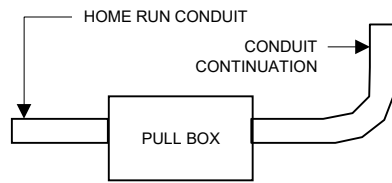


H. Pull Boxes:

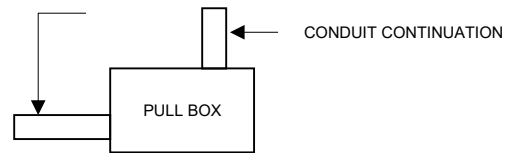
1. Provide pull boxes as shown on the Contract Documents and as required
 - a. Where sizing is not shown on the Contract Documents, size pull boxes as follows:

Size of Largest Conduit	Box Width	Box Length	Box Depth
1"	4"	12"	4"
1-1/4"	6"	12"	4"
1-1/2"	8"	12"	4"
2"	8"	24"	4"
2-1/2"	10"	24"	6"
3"	12"	36"	6"
3-1/2"	12"	48"	6"
4"	15"	60"	6"

- b. Where a pull box is required with conduits 1" trade size or smaller, an outlet box may be used as a pull box. Where outlet boxes are used as pull boxes, the outlet boxes shall be dedicated for use as a pull box and shall not host cable termination hardware.
2. A pull box may not be substituted for a 90-degree bend. *90 degree condulets (LB's) are not acceptable.*
3. Install pull boxes in an accessible location, readily accessible both at time of construction and after building occupation. Do not install pull boxes in inaccessible interstitial building space.
4. Where pull boxes are to be mounted on ceiling structure above ceiling grid, do not mount higher than 4' above grid (mount on wall instead).
5. Install hinged-cover enclosures and cabinets plumb and supported at each corner.
6. Install pull boxes so that the access door opens from the side where the cable installer will normally work (typically from the bottom, or floor side, of the box).
 - a. Where a pull box is installed in a ceiling space, provide full access to the junction box door and adequate working room for both the installation personnel and for proper looping of cable during installation.
 - b. Provide a lockable access cover (or pull box door if pull box is exposed) in hard lid ceilings.
7. Install pull boxes such that conduits enter and exit at opposite ends of the box as follows:



CORRECT INSTALLATION



INCORRECT INSTALLATION

I. Firestopping:

1. Only employees trained/certified by the firestopping manufacturer shall apply firestopping materials.
2. Maintain fire rating of penetrated fire-rated walls. Firestop and seal each penetration made during construction.
 - a. Provide firestopping material for through and membrane penetrations of fire-rated barriers.
 - b. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
 - c. Install firestops in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and standards referenced in PART 1 – REFERENCES. Apply all sealing material in a manner acceptable to the local fire and building authorities.

J. Grounding/Bonding: Grounding and bonding work shall comply with the Virginia Uniform Statewide Building Code, Uniform Fire Code, National Electrical Code, and UL 467, ANSI/TIA/EIA standards and the references listed in PART 1 – REFERENCES above, as well as local codes which may specify additional grounding and/or bonding requirements.

1. Bond metallic raceway together and to the nearest TGB (as provided under Division 27 Section — “Grounding and Bonding for Communications Systems”). Ensure that bonding breaks through paint to bare metallic surface of painted metallic hardware.

3.4 LABELS:

- A. Conduits: For any conduit extending beyond the space or room in which it starts, label each such conduit end in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.). Indicate conduit length on the label.

1. Where a conduit is intended for future cabling use outside of the Contract, the conduit shall be labeled in a clear manner by designating the location of the other end of the conduit (i.e. room name, telecommunications room name, pull box identifier, etc.) along with a sequential number for each spare conduit terminated into a single room. Indicate conduit length on the label.
 - a. Suggestion: The second spare conduit (whether spare or in use) between Room 100 and telecommunications room 1A might be labeled in the telecommunications room as "Room 100 - #2, feet." In Room 100 the same conduit might be labeled "1A - #2, feet."
- B. Pull Boxes: Label each pullbox with a unique identifier. Identifiers shall be of the form "RN-Y" where "RN" is the room name of the room closest to (or containing) the pull box, and "Y" is the sequential number of the pull box for each "RN".
 1. Example: The second pull box in the vicinity of room "100" would have the label "100- 2".
- C. Pull Strings: For any conduit extending beyond the space or room in which it starts, label its pull string in a clear manner by designating the location of the other end of the pull string (i.e. room name, telecommunications room name, pull box identifier, outlet identifier (use the label of the first port of the outlet as the outlet identifier), etc.).
 1. Where a pull string is installed in a conduit intended for future cabling use outside of the Contract, the pull string shall be labeled similar to the spare conduit in which it is installed.

3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and in accordance with accepted industry practice, that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.6 CLEANING

- A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 275800