

SPECIFICATIONS

for

Vet Path Research Building Lab B002-B003A Renovation- 2024

**Purdue University
West Lafayette, Indiana**

**WBSE: C.40.12658
Building Index No: V-2**

October 18, 2024

Vet Path Research Building Lab B002-B003A Renovation- 2024

Purdue University
West Lafayette, Indiana

October 18, 2024

Certified by:

Name
Professional Engineer # _____

Architectural
Certified by:

Name Jamison Sills
Registered Architect # _____

Electrical
Certified by:

Name Mark Lehman
Professional Engineer # _____

Mechanical
Certified by:

Name N/A
Professional Engineer # _____

TABLE OF CONTENTS

Vet Path Research Building Lab B002-B003A Renovation- 2024

Purdue University, West Lafayette, Indiana

October 18, 2024

BIDDING DOCUMENTS (UNBOUND) Provided loose with this Specification

Bid Form - Form 96

Standard Questionnaire and Financial Statement for Bidders (Form 96A)

BIDDING DOCUMENTS TO BE PROVIDED HEREIN OR BY ADDENDUM

Advertisement for Bids A-1

BIDDING DOCUMENTS

Instructions to Bidders B-1

Supplementary Instructions to Bidders C-1

Check List and Assembly of Bid D-1

Bid Form Insert E-1

Principal Subcontractor Questionnaire F-1

Subcontractor and Material Questionnaire G-1

Alternate Proposals H-1

Unit Prices I-1

Minority Business Enterprise Program Form J-1

Combination Bid Bond & Bond for Construction K-1

CONTRACTS

AIA A101-2017 Standard Form of Agreement Between Owner and Contractor L-1

AIA A101-2017 Exhibit A Insurance and Bonds L-8

CONTRACT FORMS

Certificate of Insurance (Acord 25 Form) M-1

Contract Change Order (Purdue Form 85) N-1

Construction Invoice Voucher (Purdue Form CIV) O-1

Compliance Affidavit (Purdue Form 25) P-1

Breakdown of Application for Payment (Purdue Form 87) Q-1

Contractor's Affidavit, Waiver of Claim and Lien, Certification and Guarantee (Purdue Form 86) R-1

E-Verify Program Affidavit S-1

Contribution by Tier 1 Contractor Affidavit T-1

GENERAL CONDITIONS

General Conditions of the Contract GC-1

ADDITIONAL INFORMATION

Project Location Map PLM-1

SPECIFICATIONS

Division 01 - General Requirements

Section 01 0100 - Project Requirements	01 0100 - 1
Section 01 2900 – Payment Procedures	01 2900 - 1
Section 01 3100 – Project Management and Coordination	01 3100 - 1
Section 01 3216 - Construction Progress Schedules	01 3216 - 1
Section 01 3523 – Owner Safety Requirements	01-3523 - 1
Section 01 5000 - Temporary Facilities and Controls	01 5000 - 1
Section 01 7700 – Contract Close-Out	01 7700 - 1

DIVISION 02 – EXISTING CONDITIONS

Section 024119 – Selective Demolition

DIVISION 03 – CONCRETE

Section 033546 – Concrete Topical Treatments

DIVISION 04 – MASONRY

Section 042200 – Concrete Unit Masonry

DIVISION 05 – METALS (Not Used)

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES (Not Used)

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 079200 – Joint Sealants

DIVISION 08 – OPENINGS

Section 081113 – Steel Doors and Frames
Section 087100 – Door Hardware
Section 088000 – Glazing

DIVISION 09 – FINISHES

Section 096513 – Resilient Base and Accessories
Section 096516 – Resilient Sheet Flooring
Section 099000 – Painting and Coating
Section 099600 – High Performance Coatings

DIVISION 10 – SPECIALTIES (Not Used)

DIVISION 11 – EQUIPMENT (Not Used)

DIVISION 12 – FURNISHINGS (Not Used)

DIVISION 14 - CONVEYING EQUIPMENT (Not Used)

DIVISION 22 – PLUMBING

- Section 220517 – Sleeves and Sleeve Seals for Plumbing Piping
- Section 220523.12 – Ball Valves for Plumbing Piping
- Section 220529 – Hangers And Supports for Plumbing Piping and Equipment
- Section 220553 – Identification For Plumbing Piping and Equipment
- Section 220719 – Plumbing Piping Insulation
- Section 221116 – Domestic Water Piping
- Section 221316 – Sanitary Waste and Vent Piping

DIVISION 26 - ELECTRICAL

- Section 260126 – Electrical Testing
- Section 260500 – Common Work Results for Electrical
- Section 260510 – Electrical Demolition
- Section 260519 – Low-Voltage Electrical Power Conductors and Cables
- Section 260526 – Grounding And Bonding for Electrical Systems
- Section 260528 – Mounting Heights
- Section 260529 – Hangers and Supports for Electrical Systems
- Section 260533 – Raceways and Boxes for Electrical Systems
- Section 260553 – Identification for Electrical Systems
- Section 260923 – Lighting Control Devices
- Section 262726 – Wiring Devices
- Section 262813 – Fuses
- Section 262816 – Switches and Circuit Breakers
- Section 265119 – LED Interior Lighting

END OF TABLE OF CONTENTS

ADVERTISEMENT FOR BIDS

The Trustees of Purdue University will receive sealed bids for the following projects until 3:00 p.m. Eastern Standard Time (EST) on the 21st day of November 2024 in the offices of Capital Asset Management, 2550 Northwestern Avenue, Suite 1100, West Lafayette, IN 47906.

1. West Lafayette Campus – Aquatic Center Roof Sections C and E Replacement – 2024
2. West Lafayette Campus – High Pressure Research Lab Roof Replacement, Masonry Repairs, and Painting – 2024
3. West Lafayette Campus – Knoy Hall Rooms 203 / 205 Electrical Upgrade – 2024
4. West Lafayette Campus – Vet Path Research Building Lab B002-B003A Renovation – 2024
5. West Lafayette Campus – Wetherill Lab Drain and Supply Line Replacement Phase II - 2024

Bids will then be publicly opened and read aloud in the offices of Capital Asset Management, 2550 Northwestern Avenue, Suite 1100, West Lafayette, IN 47906.

Bids received after such time will be returned unopened. Bids may be withdrawn prior to such time, but no bids shall be withdrawn for a period of sixty (60) days thereafter.

The Principal Subcontractor Questionnaire listing the names of the bidder's principal subcontractors shall be submitted with the bid. The remainder of the Questionnaires and Material Lists shall be submitted prior to 3:00 p.m. (EST) on the 28th day of November 2024, to:

Capital Asset Management
2550 Northwestern Avenue, Suite 1100
West Lafayette, IN 47906
Phone (765) 494-0580

Bids shall be for complete construction only, properly executed and submitted on Form 96, accompanied by executed Form 96A (as prescribed by the State Board of Accounts) giving financial data as recent as possible, and a Non-Collusion Affidavit together with other documents as required by the Instructions to Bidders and addressed to The Trustees of Purdue University, clearly marked with the project and the bid opening date.

Each bid must be accompanied by the Contractor's written plan for a program to test the contractor's employees for drugs in accordance with IC 4-13-18.

Each bid must be accompanied by a Contractor's Combination Bid Bond and Bond for Construction in the form included in the specifications made payable to The Trustees of Purdue University in an amount equal to the maximum total of the base bid and any alternate bids, guaranteeing the execution and faithful performance of the contract for the work if awarded.

The Instructions to Bidders contained in the specifications for the projects are by this reference made a part hereof, and all bidders shall be deemed advised of the provisions thereof, and of the General Conditions of the contract, specifications, plans and drawings for the project.

A voluntary pre-bid meeting for Project No. 1 will be held on October 30, 2024 at 10:00 a.m. EDT. The meeting will be held in the Aquatic Center (AQUA), located at 1226 Third St., West Lafayette, IN. Please meet at the North Entry/Main Entry of the building.

A voluntary pre-bid meeting for Project No. 2 will be held on October 30, 2024 at 2:00 p.m. EDT. The meeting will be held in the High Pressure Research Lab (ZL3), located at 500 Allison Rd., West Lafayette, IN. Please meet at the Main Entrance.

A voluntary pre-bid meeting for Project No. 3 will be held on October 31, 2024 at 1:00 p.m. EDT. The meeting will be held in Knoy Hall (KNOY), located at 401 N. Grant St., West Lafayette, IN. Please meet in the Lobby.

A voluntary pre-bid meeting for Project No. 4 will be held on October 29, 2024 1:00 p.m. EDT. The meeting will be held virtually. Please email Mike Greene at mcgreene@purdue.edu for the meeting invitation.

A voluntary pre-bid meeting for Project No. 5 will be held on October 29, 2024 at 10:00 a.m. EDT. The meeting will be held at Wetherill Lab (WTHR), located at 560 Oval Dr., West Lafayette, IN. Please meet in the breezeway between Wetherill Lab and Brown Hall.

The architectural/engineering firms for these projects are:

- | | |
|--------------------|---|
| Project Nos. 1 & 2 | Etica Group
10848 Rose Ave., Suite 4
New Haven, IN 46774
Phone (260) 748-0591 |
| Project No. 3 | Loftus Engineering, Inc.
201 South Capitol Ave, Suite 310
Indianapolis, IN 46225
Phone (317) 352-5822 |
| Project No. 4 | DELV Design Studio LLC
1411 Roosevelt Ave., Suite 302
Indianapolis, IN 46201
Phone (317) 296-7400 |
| Project No. 5 | Applied Engineering Services
5975 Castle Creek Parkway, North Drive, Suite 300
Indianapolis, IN 46250
Phone (317) 810-4141 |

To view or obtain bid documents online:

Repro Graphix Inc.
437 N. Illinois St
Indianapolis, IN 46204

Web: PurduePlanroom.com
Phone: 1-800-718-0035
Email: Plans@Reprographix.com

A \$300 deposit will be required for each hardcopy set of bidding documents. One compact disk or download is available at no charge. Postage and handling fee may apply.

All orders must be placed online but bidders may choose to pick up orders at:

Purdue Print & Digital Services delivered by Xerox:
698 Ahlers Drive
West Lafayette, IN 47907
Phone: 765-494-2006

Bidding Documents are on file in the office of:

Senior Vice President for Administrative Operations
2550 Northwestern Avenue, Suite 1100
West Lafayette, IN 47906
Phone (765) 494-0580

The Board of Trustees of The Trustees of Purdue University reserves the right to reject any and all bids and to waive, to the extent permitted by law, any of the terms, conditions and provisions contained in this Advertisement for Bids or the Instructions to Bidders or any informality, irregularity or omission in any bid, provided that such waiver shall, in the discretion of the Board of Trustees, be to the advantage of The Trustees of Purdue University.

THE TRUSTEES OF PURDUE UNIVERSITY

By

DocuSigned by:
James K Keefe
95F8C862C768449...

James K. Keefe
Senior Director for Capital Asset Management

Date: 10/7/2024

INSTRUCTIONS TO BIDDERS

IB1.01 GENERAL

These Instructions to Bidders are a part of the Advertisement for Bids for the complete construction of the project in strict accordance with the Specifications, Plans and Drawings.

IB1.02 BID INCLUDES ALL COSTS

The amount of each Bid shall be deemed to include the entire cost and expense of every item of labor and material necessary to complete the work bid upon, in full detail ready for use and occupancy; and the risk of all such costs and expenses shall be deemed assumed by the successful Bidder. Bidders will not be given extra payment for conditions which could have been determined by examining the site and Contract Documents.

IB1.03 INTERPRETATION OF DOCUMENTS

Bidders contemplating submitting a Bid for the proposed project who are in doubt as to the true meaning of any part of the Contract Documents shall submit to the Architect listed in the Advertisement for Bids, (Legal company name) at least 10 days prior to the date for opening Bids, a written request for an interpretation.

Requests for interpretation may include (but are not limited to) any ambiguity, inconsistency, discrepancy, error or omission which occurs in the Contract Documents or for materials, equipment, or methods which in the Bidder's opinion adversely affect the cost or quality of the project, or are unavailable.

A Bidder's failure to request a clarification, interpretation, or correction of any ambiguity, inconsistency or error will preclude that Bidder from thereafter claiming for any reason, including the withdrawal of the Bid or in connection with a claim for "extras", any ambiguity, inconsistency or error which was either discovered by the Bidder or which should have been discovered by a reasonably prudent Bidder.

Any interpretation of the Contract Documents and any modification of the Contract Documents will be made only by an Addendum duly issued. A copy of such Addendum will be mailed or delivered to each person receiving a set of the Contract Documents and to such other prospective Subcontractors and material suppliers as have requested that they be furnished with a copy of each Addendum.

IB1.04 QUANTITIES

Stated quantities, if any, in the Contract Documents are approximate only and each Bidder shall make its own estimate of quantities and calculate its Bid accordingly.

IB1.05 SITE CONDITIONS

Bidders shall inform themselves of all the conditions under which the work is to be performed, including the site of the proposed work, any obstacles which may be encountered thereon, and all other relevant matters concerning the proposed work. Each Bid shall be deemed to include all costs and expenses in connection with all such conditions, obstacles and matters.

INSTRUCTIONS TO BIDDERS

Bidders shall make arrangements with the Owner's Physical Facilities Office for site visit. The Bidder's attention is directed to the provisions of Article 10 of the General Conditions and the Supplementary Conditions, if any, relating to Hazardous Waste.

IB1.06 SUBMISSION OF BIDS AND QUESTIONNAIRES

The Bidder shall submit its Bid on Form 96 as required in the Advertisement for Bids. Alternate Proposals and Unit Prices (if included in the Specifications) and acknowledgment of each Addendum (including date of Addendum and signature) shall be entered on Bid Form 96.

- A. In order for a Bid to be considered, each Bid shall be accompanied by the following documents:
1. Non-collusion affidavit
 2. Form 96A (See Section IB1.06C)
 3. Combination Bid Bond and Bond for Construction, in the form as set forth in the Specifications. The successful Bidder's bonding company will be notified of a contract to a firm they are bonding. The Bidder will need to provide contact name, mailing address and phone number of the bonding company with the bid. Bonds of unsuccessful Bidders will only be returned on request.
 4. Principal Subcontractor Questionnaire (if included in the Specifications). Principal Subcontractors listed are not permitted to be changed without the permission and approval of the Architect/Engineer.
 5. Proof of status as licensed Plumbing Contractor (if required by IB1.11).
 6. Proof of minority business enterprises (MBE) participation in accordance with the requirements of IB1.12 MINORITY CONTRACTORS.
 7. Contractor's written plan for a program to test the Contractor's employees for drugs in accordance with IC 4-13-18 (see Section IB1.14).
- B. Bid and accompanying documents shall be enclosed in a sealed opaque envelope. Envelope shall be addressed to the Trustees of Purdue University and clearly labeled with the following information:
1. Contents
 2. Project Title
 3. Name and Address of the Bidder
 4. Date and Time of Bid Opening
- C. Financial Information Form 96A:
- The financial information required by Form 96A shall be furnished as of the most recent date for which such information is available, and in no event shall such date be more than 12 months prior to the date of the Bid; furthermore, if such date is more than 90 days prior to the date of the Bid, the Bidder shall also furnish a written statement to the effect that as of the date of the Bid there have not been any changes which have materially and adversely affected the financial condition as set forth in Form 96A.

INSTRUCTIONS TO BIDDERS

D. Subcontractor Lists and Material Lists:

The low Bidder (and the second and third Bidders, if requested) shall execute and submit to the Owner within seven (7) days after the date and time for receiving Bids, in the forms included in the Specifications, the SUBCONTRACTOR LIST and MATERIAL LIST stating the names of the Bidder's Subcontractors and the various materials and appliances proposed to be furnished for the Project.

1. On these lists the Bidder shall submit only the names of the Subcontractors and manufacturers (or fabricators) of materials, appliances and specialties that the Bidder can, if required, fully demonstrate or prove they are capable of meeting the requirements of the Drawings and Specifications in all respects.
2. In such cases, the Architect shall give careful consideration to all matters submitted to the Architect by the Bidder. If in the Architect's opinion there is just cause for rejection, the Bidder shall submit substitute names for consideration until approved. The Bidder shall not be entitled to extra compensation for any such required substitute. Upon approval, the name submitted may not be changed by the Bidder without the permission and approval of the Architect.
3. Contractor shall submit evidence of all required certifications and other qualifications as detailed in the project specifications with these lists.

OWNER RESERVES THE RIGHT TO REJECT BID IF BIDDER FAILS TO SUBMIT DOCUMENTS PURSUANT TO THE INSTRUCTIONS SET FORTH ABOVE.

In order to effectively implement the objectives of the foregoing provisions and to assure the timely receipt of accurate Bids, the Bidder is requested to urge all Subcontractors intending to submit a proposal for work involved in the project to submit to all Bidders to whom they intend to bid, a written proposal (or written abstract) with or without price, outlining in detail the specific sections of the Specifications to be included in their work as well as any exceptions or exclusions there from. It is suggested that such written proposal be submitted to the Bidder at least 48 hours in advance of the Bid Opening.

E. Bid Signatures

Bids which are not signed by individuals making them shall have attached thereto a power-of-attorney evidencing authority to sign the Bid in the name of the person for whom it is signed.

Bids which are signed for a partnership shall be signed by all of the partners or by an attorney-in-fact. If signed by an attorney-in-fact, there shall be attached to the Bid a power-of-attorney evidencing authority to sign the Bid, executed by the partners.

Bids which are signed for a corporation shall have the correct corporate name thereof and the signature of the president or other authorized officer of the corporation, manually written below the corporate name following the word "By". If such a Bid is manually signed by an official other than the president of the corporation a certified copy of a resolution of the Board of Directors evidencing the authority of such official to sign the Bid shall be attached to the Bid. Such Bid shall also bear the attesting signature of the secretary of the corporation and the impression of the corporate seal.

INSTRUCTIONS TO BIDDERS

F. Modification or Withdrawal of Bid:

Any Bidder may withdraw his Bid at any time prior to the scheduled time for the receipt of Bids.

Bids may be modified any time prior to the scheduled time for the receipt of Bids.

Any Bidder may modify its Bid by facsimile communication or by U.S. Mail at any time prior to the scheduled closing time for receipt of Bids, provided such communication is received by the Owner prior to the closing time, and provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the Bidder was mailed prior to the closing time. The modifying communication should not reveal the Bid price but should only provide the addition or subtraction or other modification(s) so that the final prices or terms will not be known by the Owner until the sealed Bid is opened.

If written confirmation of the facsimile communication is not received within two days after the closing time, no consideration will be given to facsimile communication.

IB1.07 TIME OF COMPLETION

The attention of each Bidder is directed to the provisions of § 8.3.3 of the General Conditions of the Contract and Division One pertaining to time of completion.

IB1.08 CONTRACT

The successful Bidder shall be required to execute and deliver two (2) original copies each of the Contract (and three (3) copies of the Escrow Agreement, if required) and to deliver the policies and/or Certificate of Insurance - all within 10 days after the Contract is awarded. The Contract shall be deemed awarded when written Notice of Award has been delivered to the successful Bidder by facsimile transmission, followed with the original delivered via U.S. Mail addressed to the address of the Bidder as shown on its Bid or accompanying documents.

IB1.09 FORM OF CONTRACT

The Contract to be executed by the successful Bidder shall be in the form entitled "The Standard Form of Agreement Between Owner and Contractor where the basis for payment is a Stipulated Sum" – published by the American Institute of Architects with such insertions, additions, and changes are required by the successful Bid and Specifications. (The Owner will provide form for execution.)

IB1.10 SPECIAL PROVISIONS REGARDING RETAINAGE, BONDS AND PAYMENT OF CONTRACTORS AND SUBCONTRACTORS

The laws of the State of Indiana (IC 5-16-5.5-3 as amended) contain certain special provisions regarding retainage, bonds and payment of Contractors and Subcontractors. The contracts and subcontracts entered into between a Contractor and the Trustees of Purdue University in excess of \$200,000 will be governed by these provisions. The attention of the Bidder is called to the AIA A101 Exhibit A, Insurance and Bonds, regarding these provisions.

INSTRUCTIONS TO BIDDERS

IB1.11 LICENSED PLUMBING CONTRACTORS

To the extent that all or any portion of the work to be performed hereunder involves the installation of plumbing then each Bidder who submits a Bid must also submit, together with its Bid, evidence that the Bidder is a licensed Plumbing Contractor as defined in I.C. 25-28.5-1.

The following information will be acceptable as the required "evidence" (accompanying proof of license) for Complete Construction Bids.

Submit the proposed Subcontractor's License Number opposite the Subcontractor's Name on the PRINCIPAL SUBCONTRACTOR QUESTIONNAIRE.

At the time of submittal of the SUBCONTRACTOR LIST - MECHANICAL CONSTRUCTION include a photocopy of the Contractors License.

IB1.12 MINORITY CONTRACTORS

Bidders shall take all necessary and reasonable steps to ensure that minority business enterprises (MBE's) have the maximum opportunity to compete for and perform work included in the contract documents. For assistance in identifying MBE/WBE subcontractors and suppliers for your project, contact Purdue University's Office of Supplier Diversity Development at (765) 494-7270.

The award of the Contract will be made to the lowest and best Bidder when all other requirements have been met and good faith efforts have been taken towards meeting the stated MBE goal.

The Owner, at its discretion, may waive in part or in whole the minority business enterprise requirement if in the opinion of the Owner it would be impractical, or not in the best interest of the Owner.

MBE/WBE Program Forms:

A. With the Bid:

1. **MBE/WBE Subcontractor Plan form** - Bidders shall indicate minority business enterprises accepted by completing this form and placing (MBE/WBE) after the name listed on the Principal Subcontractor Questionnaire submitted with the Bid.
2. **MBE/WBE Program Documentation form** - Submit, on this form, an explanation of what positive efforts have been taken to achieve the stated MBE/WBE goal. Documentation of all outreach, contacts, and responses should be included. Reasons for acceptance or non- acceptance shall be so stated. Submission of incomplete explanations and documentation may result in the Bid being rejected.

INSTRUCTIONS TO BIDDERS

- B. By the date in the ADVERTISEMENT FOR BID (usually 7 days after bid opening):
1. **MBE/WBE Letter of Intent to Perform form** – The low Bidder, and the second and third, if requested, shall complete and submit as per the instructions on the form. The low Bidder, and the second and third, if requested, shall indicate MBE/WBE participation by Subcontractors and material suppliers by placing MBE/WBE after the names listed on the Subcontractor and Material Questionnaire submitted in accordance with the ADVERTISEMENT FOR BID.
 2. Bidders shall also submit proof of MBE/WBE certification for each MBE/WBE listed. Certification shall be by: State of Indiana Department of Administration Minority Business Development; Indiana Regional Minority Development Council; or Indiana Department of Transportation.
- C. During construction:
1. **Monthly MBE/WBE Utilization form** – On the larger projects (as determined by the Owner), the Contractor must submit this form monthly with their pay application as per its instructions and the provisions of § 13.8 of the General Conditions of the Contract.

IB1.13 ORGANIZATION OF SPECIFICATIONS AND DRAWINGS

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 the work to be performed by any trade.

IB1.14 DRUG TESTING OF EMPLOYEES OF PUBLIC WORKS CONTRACTORS

The laws of the State of Indiana (IC 4-13-18 as amended) contain special provisions regarding drug testing of employees of public works Contractors and Subcontractors. As determined by the Owner, projects estimated to be in excess of \$150,000.00 will be governed by these provisions. The attention of the Bidder is called to the General Conditions of the Contract, §13.6, regarding these provisions.

IB1.15 SUBSTITUTIONS

- A. During Bidding, Architect will consider written requests from Prime Bidders for substitutions, received at least ten days prior to bid date; requests received after that time will not be considered.
- B. Submit two copies of request for substitution. Include in request:
1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 2. Product Data:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature:
 - i. Product description.
 - ii. Performance and test data.
 - iii. Reference standards.
 - c. Samples.

INSTRUCTIONS TO BIDDERS

- d. Name and address of similar projects on which product was used, and date of installation.
 3. Construction Methods:
 - a. Detailed description of proposed method.
 - b. Drawings illustrating methods.
 4. Itemized comparison of proposed substitution in comparison with product or method specified.
 5. Data relating to changes in construction schedule.
 6. Relation to other work.
 7. Accurate cost data on proposed substitution in comparison with product or method specified.
- C. In making request for substitution, Bidder/Contractor represents:
1. He has investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.
 2. He will provide the same guarantee for substitution as for product or method specified.
 3. He will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.
 4. He waives all claims for additional costs related to substitution which consequently become apparent.
 5. Cost data is complete and includes all related costs under this Contract.

IB1.16 (RESERVED)

IB1.17 OWNER SAFETY REQUIREMENTS

The Contractor performing work at the Project site shall, at no cost to the Owner, demonstrate commitment to workplace safety, safe work practices, and compliance with all applicable safety requirements. See Section 01 3523, Owner Safety Requirements.

The bidding contractor shall provide with the bid, their documentation in accordance with the requirements of Section 01 3523, unless the bidder is utilizing IOSHA's INSafe Program. If utilizing the INSafe Program, Contractor shall copy Purdue University with their request to INSafe for a consultation within 3 working days of being notified that they are the apparent low bidder.

IB1.18 CONTRACT AWARD AND SUBCONTRACTOR APPROVAL

Pursuant to I.C. 5-16-1-1.2 Purdue will award a contract for performance of the work to the "lowest and best bidder who submits a bid for the performance of the work." In determining the "lowest and best bidder" and the suitability of proposed subcontractors, Purdue reserves the right to consider all relevant factors including without limitation: ability and capacity, capital, character and reputation, competency and efficiency, energy, experience, facilities, faithfulness, fraud or unfairness in previous dealings, honesty, judgment, pending legal proceedings, promptness, quality of previous work, and suitability to the particular task. Information on pending litigation between Purdue and prospective bidders and subcontractors is available via the Court Records link at <http://www.tippecanoe.in.gov/>.

INSTRUCTIONS TO BIDDERS

IB1.19 CONTRACTOR PRE-QUALIFICATIONS

Pursuant to I.C. 5-16-13-10(c), bidders must be pre-qualified under I.C. 4-13.6-4 or I.C. 8-23-10. The attention of the Bidder is called to the General Conditions of the contract, § 13.15 regarding these provisions.

IB1.20 CONTRIBUTION BY TIER 1 CONTRACTOR

Pursuant to I.C. 5-16-13-9 The Tier 1 Contractor must contribute in work, material, services, or any combination thereof, at least fifteen percent (15%) of the awarded contract price. The Contractor shall execute and submit the Contribution by Tier 1 Contractor Affidavit to the Owner with its Waiver of Lien. The attention of the Bidder is called to the General Conditions of the Contract, § 13.13 regarding these provisions.

IB1.21 E-VERIFY PROGRAM

The laws of the State of Indiana (I.C. 5-16-13-11(1) and 22-5-1.7 as amended) contain special provisions regarding contractors enrolling and participating in the E-Verify program. The low Bidder (and the second and third Bidders, if requested), within seven (7) days after the date and time for receiving Bids, shall execute and submit the E-Verify Program Affidavit to the Owner. The attention of the Bidder is called to the General Conditions of the Contract, § 13.14 regarding these provisions.

SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

“THIS PAGE HAS BEEN LEFT BLANK INTENTIONALLY”

CHECK LIST AND ASSEMBLY OF BID

Complete and assemble bids as listed below (one set to be submitted):

I. Bid Form Insert

- a. Use Bid Form No. 96 as provided filling in all information applicable and required under PART I for a complete and correctly prepared Bid Submittal.
- b. Use the Bid Form Insert, succeeding page(s), as a supplement to Bid Form No. 96.
 - i. The Bid Form Insert as prepared for this Project has spaces for the Base Bid, Complete Construction amount, Alternate Bid Proposals requested, and Addendum acknowledgment.
- c. This "Bid Form Insert" should be the first page of the bid package submitted.
- d. Do not use PART II of Bid Form 96. Use General Form No. 96A, Revised 1949, as issued with the Specifications to all Prime Bidders.

II. Bid Form No. 96

- a. The Non-collusion Affidavit located on the last page of the Bid Form No. 96, is to be signed by an officer of the company or corporation and notarized.
- b. The Bid Form No. 96 is to be signed on the lower half of the inside page, by an authorized individual or officer(s) of the company or corporation. If the Bid is signed by someone other than an officer of the company or corporation, a Board Resolution is to be submitted with the Bidding Documents giving said person signature authority.

III. Standard Questionnaire and Financial Statement for Bidders (Form 96a)

- a. Page 8 of the Form 96a is to be signed, dated and notarized.
- b. Page 9 of the Form 96a is to be dated. In no event shall the Financial Statement be dated more than 12 months prior to date of Bid. If the date is more than 90 days prior to the date of Bid, the Bidder shall submit a statement of their financial condition with their Bid as set forth in Section IB1.06(C) of the Instructions to Bidders.
- c. Statement of True Financial Condition section on page 15 of the Form 96a is to be signed and sealed as instructed.
- d. The appropriate Affidavit section on page 15 of the Form 96a is to be signed by an individual or officer of any company or corporation and notarized by a Notary Public.

IV. Combination Bid Bond & Bond for Construction

- a. The penal sum of the Contractor's Combination Bid Bond and Bond for Construction is to be for the maximum amount of the Bid. The maximum amount of the Bid is the total of the base bid plus all add alternates.
- b. The Combination Bid Bond and Bond for Construction as included in the Specifications is to be signed and dated on the second page by an officer of the company or corporation and the Bonding Company's representative. A copy of the power of attorney is to be attached to bond, authorizing said person to execute documents on behalf of the Bonding Company.

CHECK LIST AND ASSEMBLY OF BID

V. Principal Subcontractor Questionnaire

- a. If a Principal Subcontractor Questionnaire is included in the Specifications, it is to be filled out complete with one Subcontractor's name and address for each subcontract requested, and for any subcontract greater than \$150,000 (specifically requested or not) signed by an officer of the company or corporation, and submitted with the Bidding Documents.

VI. Minority Business Enterprise Program Forms

- a. Submit proof of minority business enterprises (MBE) participation in accordance with the requirements of IB1.12 MINORITY CONTRACTORS.

VII. Contractor's Written Drug Testing Program

- a. Submit contractor's written drug testing program in accordance with the requirements of IB1.14 DRUG TESTING OF EMPLOYEES OF PUBLIC WORKS CONTRACTORS. Requirement for the plan is determined by the owner's estimate of the project cost (for applicability, see Advertisement for Bid).

VIII. Compliance with Owner's Safety Requirements

- a. Submit documentation in accordance with the requirements of IB1.17 OWNER SAFETY REQUIREMENTS.

IX. Other Project Specific Documents

- a. If applicable, include any other remaining documentation required to be submitted with the bid.

BID FORM INSERT

Vet Path Research Building Lab B002-B003A Renovation- 2024
Purdue University, West Lafayette, Indiana

Following notices given and having carefully examined the Contract Documents as well as the premises and conditions affecting the work, the undersigned proposes to furnish all labor and materials, necessary tools, expendable equipment, and all utility and transportation services and to perform all work required by and in strict accordance with the above named documents, prepared by DELV Design Studio, LLC, now on file in the office of the Vice President for Physical Facilities, Purdue University, West Lafayette, Indiana, and DELV Design Studio, LLC as stated below.

BID PROPOSALS

Bidder agrees to perform all items of work as shown on the Drawings and/or described in the Specifications or Addenda, for the amounts shown as follows: (Amount for Bids shall be shown in both words and figures. In case of discrepancy, the amount shown in words will govern).

SUBMITTED BY: _____

BASE BID: The complete construction as required by the Contract Documents for the sum of

_____ (\$ _____).

ALTERNATE PROPOSALS

Submit Alternate Bids on the respective Alternates as applicable to the Base Bid submitted. Use the space provided under the respective Alternates accordingly.

ALTERNATE NO. 1: N/A
(Add to/deduct from) the Base Bid the sum of: _____
_____ Dollars (\$ _____)

ALTERNATE NO. 2: N/A
(Add to/deduct from) the Base Bid the sum of: _____
_____ Dollars (\$ _____)

ADDENDA

The Bidder acknowledges receipt of the following Addenda:

ADDENDUM # _____ DATED _____

ADDENDUM # _____ DATED _____

PERSON AUTHORIZED TO SIGN CONTRACT (please print):

Name and Title: _____

Email: _____

PRINCIPAL SUBCONTRACTOR QUESTIONNAIRE

Vet Path Research Building Lab B002-B003A Renovation- 2024

Purdue University, West Lafayette, Indiana

Principal Subcontractor Questionnaire

Submitted by _____

(To be submitted by each Bidder with his Bid)

Bidder to list subcontractors as requested below. **In addition to the requested subcontractors, Bidder to list all subcontractors that will have subcontracts greater than \$150,000.**

If awarded the complete construction contract, I/WE propose to have the following Subcontractors.

	<u>SUBCONTRACTOR - COMPLETE ADDRESS</u> (List the Subcontractor firms only)	Indicate if MBE/WBE/DBE
Laboratory Casework	_____ NAME	_____
	_____ ADDRESS	
Electrical Construction	_____ NAME	_____
	_____ ADDRESS	
	_____ NAME	_____
	_____ ADDRESS	

These Subcontractors have been advised of the applicable labor provisions as set forth in the Contract Documents and these labor provisions will be included in all Subcontracts.

PRINTED NAME & TITLE_____
SIGNATURE_____
DATE

SUBCONTRACTOR AND MATERIAL QUESTIONNAIRE

SUBMITTED BY: _____

Vet Path Research Building Lab B002-B003A Renovation- 2024

Each Bidder shall indicate under appropriate headings in the following form, the material, equipment, and specialties he proposes to incorporate in the work if awarded the Contract.

This form filled out in detail by the Bidder shall be submitted as required under "Instructions to Bidders".

The Bidder whose proposal is accepted will be required to furnish the materials, equipment and specialties he has listed herein unless such items do not, in the opinion of the Architect, comply with the requirements and intent of the Specifications and Plans. In the event that certain materials, equipment or specialties hereinafter listed by the successful Bidder do not, in the opinion of the Architect, comply with said requirements or intent, the successful Bidder will be required (as the Contractor) to furnish and substitute items which are in strict accordance with the Specifications and Plans and as approved by the Architect.

LIST OF SUBCONTRACTORS

If awarded the Construction Contract, I/We propose to employ the following listed Subcontractors:

<u>BRANCH OF WORK</u>	<u>NAME OF SUBCONTRACTOR</u>	Indicate if MBE/WBE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

MATERIALS, EQUIPMENT, & SPECIALTIES

MANUFACTURERS (Not Subcontractors)

ALTERNATE PROPOSALS

The base bid shall be submitted in strict accordance with the plans and specifications.

The deduction from, or addition to, the base bid for each numbered alternate shall include the cost of any changes in, additions to, or omissions from adjacent construction and materials necessary to properly install and complete the work even though such changes, additions to, or omissions are not specifically noted in the description of the alternate. No extra will be allowed for any such changes, additions, or omissions.

Each bidder shall state in their proposal the amount to be deducted from or added to the base bid for each and every alternate hereinafter described. If the base bid is not affected by any particular alternate proposal, bidder shall enter the amount of \$0.00 in the proper place on the Supplemental Bid Form.

BASE BID

State the amount required to complete all work shown on the drawings, herein specified and necessary to design and construct

ALTERNATE NO. 1

Add to (or deduct from) the Base Bid the cost to

UNIT PRICES

SUBMITTED BY: _____

Vet Path Research Building Lab B002-B003A Renovation- 2024

The Bidder is required to complete the following schedule of Unit Prices to be listed on Form No. 96.

The Unit costs herein quoted are to apply to additions or deductions to the contract. The following unit prices are for the cost of the material installed, unless noted otherwise. The Unit Prices shall include all incidental items, such as use of tools, scaffolding, equipment, Contractor's overhead and profit, taxes, insurance, etc. All quantities will be determined by measurements in place.

The right is reserved to reject any and all Unit Prices if the cost is considered excessive.

1.	_____	\$	per	_____
2	_____	\$	per	_____
3	_____	\$	per	_____
4	_____	\$	per	_____
5	_____	\$	per	_____
6	_____	\$	per	_____
7	_____	\$	per	_____
8	_____	\$	per	_____

MINORITY BUSINESS ENTERPRISE PROGRAM FORM

MBE/WBE/VBE SUBCONTRACTOR PLAN

PROJECT TITLE Vet Path Research Building Lab B002-B003A Renovation- 2024

BIDDER _____ BID DATE _____

The following minority/women owned firms will be subcontracting on the project according to the following schedule:

Indicate MBE/WBE/VBE	MBE/WBE/VBE Firm	Trade	Amount	Contact Name	Phone

THIS DOCUMENT MUST BE INCLUDED IN YOUR SEALED BID PACKAGE

MINORITY BUSINESS ENTERPRISE PROGRAM FORM

DOCUMENTATION OF EFFORT TO MEET MBE/WBE/VBE PARTICIPATION GOAL

MBE/WBE Program Documentation is hereby submitted for the project listed below:

PROJECT TITLE Vet Path Research Building Lab B002-B003A Renovation- 2024

BIDDER _____ BID DATE _____

Describe the efforts made to achieve the minority/women’s business enterprises participation goal for this project. Attach a copy of all solicitation efforts, e.g., ads that were published or networking events, etc.

- Unable to locate MBE/WBE/VBE engaged in _____ (Trade)
- Unable to secure competitive price in _____ (Trade)
- Other (See attached description)

LIST BELOW THE MBE/WBE/VBE FIRMS CONTACTED INDIVIDUALLY FOR THIS PROJECT

Indicate MBE/WBE/VBE	MBE/WBE/VBE Firms Contacted (list company and commodity)	Type of Attempt	Date(s) Attempted	Quote Rec'd – Not Low	No Response

THIS DOCUMENT MUST BE INCLUDED IN YOUR SEALED BID PACKAGE

MINORITY BUSINESS ENTERPRISE PROGRAM FORM

Vet Path Research Building Lab B002-B003A Renovation- 2024

(project title)

MBE/WBE/VBE LETTER OF INTENT TO PERFORM

(To be completed by the MBE/WBE/VBE and submitted to pfpmc@purdue.edu by successful bidder prior to contract award.)

The MBE/WBE/VBE status of the undersigned must be confirmed prior to contract award. The undersigned intends to perform work in connection with the above

project as a: contractor subcontractor supplier joint venture

The undersigned has agreed to provide the following work, trades, services or supplies:

at the following price: \$ _____

The following commencement and completion dates for subcontracted work is:

Commencement Date: _____ Completion Date: _____

The undersigned will enter into formal contract or purchase order agreement with _____
_____ for the above work, trades, services or supplies contingent upon
prior execution of a contract between said company and
_____.

Name of Minority/Women/Veteran Contractor (please print)

Address

Phone No.

Company Office Name & Title (please print)

Signature

CONTRACTOR'S COMBINATION BID BOND AND BOND FOR CONSTRUCTION

Having submitted a bid or proposal ("Bid") dated _____ to enter into a binding contract ("Contract") with The Trustees of Purdue University ("Purdue") for the construction or demolition of the project known as Vet Path Research Building Lab B002-B003A Renovation- 2024 ("Project"), in West Lafayette, Indiana the bidder/proposer _____ ("Principal") and _____ ("Surety")

represent, warrant and guarantee to Purdue that:

1. The Principal and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, trustees, successors and assigns to the Owner for the performance of the Contract, which is completely incorporated by reference herein, in the penal sum of _____ Dollars (\$ _____).
2. If Purdue awards the Contract to the Principal and the Principal: a) enters into the Contract; b) performs the work required by the Contract; and c) promptly makes payment of all sums due and owing to persons making claim pursuant to the applicable provisions of I.C. 5-16-5, I.C. 5-16-5.5 or the equivalent provisions of I.C. 5-30, or I.C. 5-32, as the case may be, and defends, indemnifies and holds harmless Purdue from such claims or suits seeking payment for labor, material or equipment furnished for use in the performance of the Contract, then the Principal and Surety shall have no further obligation under this Bond.
3. If Purdue awards the Contract to the Principal pursuant to I.C. 5-16 and the Principal refuses, without substantial equitable justification, to enter into the Contract then the Principal and Surety shall be jointly and severally liable to Purdue in an amount equal to the difference between the Principal's Bid and that of the successful bidder/proposer.
4. If the Principal enters into the Contract and the Principal fails to perform in accordance with the requirements of the Contract, including without limitation the plans and specifications and any other documents identified in the Contract which establish the work to be performed by the Principal, Purdue shall give such notice to the Principal and Surety as may be required by the Contract or applicable statute and may thereafter declare the Principal to be in default and terminate the Contract. The Principal and Surety shall then be jointly and severally liable to Purdue for all costs reasonably and necessarily incurred by Purdue in completing the Project. If the Surety does not proceed to promptly make arrangements satisfactory to Purdue for completion of the Project then the Surety shall be in default of its obligations under this Bond and seven days after receipt of an additional notice from Purdue to this effect Purdue shall be entitled to enforce any remedy available to it under law.

CONTRACTOR’S COMBINATION BID BOND AND BOND FOR CONSTRUCTION

5. The Principal and Surety acknowledge Principal’s obligations under the Contract and applicable statutes to make payment to subcontractors, laborers, material-men and those furnishing or supplying labor or material for and on account of the work called for by the Contract. This Bond shall inure directly to the benefit of all persons or entities entitled to make claim pursuant to I.C. 5-16-5, I.C. 5-16-5.5, or the equivalent provisions of I.C. 5-30 or I.C. 5-32 as the case may be.
6. If the Principal enters into the Contract and claims are made, or suits filed, by persons or entities against Purdue or Purdue’s property seeking payment for labor, material or equipment furnished for use in the performance of the Contract then the Principal and Surety shall, defend, indemnify and hold harmless Purdue from and against any such claims or suits.
7. Purdue shall give Principal and Surety all notices required by the Contract or applicable statute; however, the failure of Purdue to give such notice shall not affect or invalidate the rights of the person, firm, limited liability company, or corporation to whom money may be due on account of having performed labor or service or having furnished material and shall not operate as a defense for the Surety on this Bond.
8. The Surety hereby waives notice of any change, including changes of time, to the Contract, any documents constituting a part of said Contract, or related subcontracts, purchase orders and other obligations of the Principal. No irregularity or defect in the Contract or in the letting, awarding, or execution of it or in any of the proceedings preliminary thereto shall in any way operate to release or discharge the Surety, whether or not the Surety has notice of it.

IN WITNESS THEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____.

SURETY

PRINCIPAL

	Company Name	
	Signature	
	Printed Name, Title	

Bonding Agency: _____
 Agent: _____
 Email Address: _____
 Address: _____
 Phone: _____



AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of _____.

BETWEEN the Owner:

(Name, legal status, address and other information)

The Trustees of Purdue University
2550 Northwestern Ave., Suite 1100
West Lafayette, IN 47906

and the Contractor:

(Name, legal status, address and other information)

for the following Project:

(Name, location and detailed description)

The Architect:

(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

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.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

Init.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

- The date of this Agreement.
- A date set forth in a notice to proceed issued by the Owner.
- Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

- Not later than () calendar days from the date of commencement of the Work.

Init.

/

[] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be (\$), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement. *(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)*

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum: *(Identify each allowance.)*

Item

Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

Init.

/

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month:

Not later than ten (10) days following the end of the period covered by the Application for Payment ninety-five percent (95%) of the portion of the Contract Sum properly allocable to labor, materials and equipment incorporated in the Work and ninety-five percent (95%) of the portion of the Contract Sum properly allocable to materials and equipment suitable stored at the site or at some other location agreed upon in writing, for the period covered by the Application for Payment, less the aggregate of previous payments made by the Owner; and upon Substantial Completion of the entire Work, a sum sufficient to increase the total payments to ninety-five percent (95%) of the Contract Sum, less such amounts as the Owner shall determine for all incomplete Work and unsettled claims as provided in the Contract Documents.

§ 5.1.3 Deleted

§ 5.1.4 Deleted

§ 5.1.5 Deleted

§ 5.1.6 Deleted

(Paragraphs deleted)

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

The Owner shall withhold five percent (5%) of the dollar value of all work satisfactorily completed until the public work is substantially complete.

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

§ 5.1.7.2

(Paragraphs deleted)

Deleted

§ 5.1.7.3

(Paragraphs deleted)

Deleted

§ 5.1.8 Deleted

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of modified AIA Document A201-2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 such final payment shall be made by the Owner as follows:

Init.

Final payment by the Owner to the Contractor shall be made sixty-one (61) days after the established Substantial Completion Date, provided that all field work has been completed and all specified documents have been submitted and approved.

§ 5.2.2 Deleted

§ 5.3 Interest

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

(Insert rate of interest agreed upon, if any.)

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of modified AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of modified AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

- Arbitration pursuant to Section 15.4 of AIA Document A201–2017
- Litigation in a court of competent jurisdiction
- Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of modified AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner’s convenience in accordance with Article 14 of modified AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner’s convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of modified AIA Document A201–2017.

Init.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of modified AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner’s representative:
(Name, address, email address, and other information)

James K. Keefe, P.E.
Senior Director, Capital Asset Management
2550 Northwestern Ave., Suite 1100
West Lafayette, IN 47906

§ 8.3 The Contractor’s representative:
(Name, address, email address, and other information)

§ 8.4 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days’ prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in modified AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in modified AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of modified AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, as modified
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, as modified
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, as modified
- .4

(Paragraphs deleted)

Deleted

- .5 Drawings

Init.

/

Number	Title	Date	
.6	Specifications		
Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

The Sustainability Plan:

Title	Date	Pages
-------	------	-------

Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017, as modified, provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

This Agreement entered into as of the day and year first written above.

The Trustees of Purdue University

OWNER *(Signature)*

Jason S. Wasson
 Vice President for Physical Facilities and
 Chief Public Safety Officer

CONTRACTOR *(Signature)*

(Row deleted)

Init.

/



AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated _____.

for the following **PROJECT**:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

The Trustees of Purdue University
2550 Northwestern Ave., Suite 1100
West Lafayette, IN 47906

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to modified AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a Certificate of Insurance evidencing coverage required under Article A.2.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

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.

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk broad-risk or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project.

§ A.2.3.1.1 **Causes of Loss.** The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm.

(Paragraphs deleted)

(Table deleted)

§ A.2.3.1.2

(Paragraphs deleted)

Deleted

(Table deleted)

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 **Deductibles and Self-Insured Retentions.** Owner shall be responsible for all losses with the Owner's selected retention or deductible, excepting that the Contractor shall be responsible for the first \$25,000 of each and every property loss.

§ A.2.3.2 **Occupancy or Use Prior to Substantial Completion.** The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, broad-risk property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4

(Paragraphs deleted)

Deleted

(Paragraphs deleted)

§ A.2.5 Deleted

(Paragraphs deleted)

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 **Certificates of Insurance.** The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or

Init.

replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.1.4 Owner shall not be liable to any person for the failure of Contractor or any Subcontractor to carry any insurance specified or to furnish proof of such coverage to Owner.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits as determined by Contract Sum:

- Up to \$9,999,999
 - Each Occurrence \$2,000,000 annual aggregate \$2,000,000
- from \$10,000,000 to \$19,999,999
 - Each Occurrence \$3,000,000 annual aggregate \$3,000,000
- from \$20,000,000 to \$40,000,000
 - Each Occurrence \$4,000,000 annual aggregate \$4,000,000
- over \$40,000,000
 - Each Occurrence \$10,000,000 annual aggregate \$10,000,000

for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.

Init.

AIA Document A101® – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 13:17:52 ET on 05/21/2021 under Order No.5027455636 which expires on 07/12/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.

User Notes:

(1782082899)

- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than One Million Dollars (\$1,000,000.00) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than Five Hundred Thousand Dollars (\$500,000.00) each accident, Five Hundred Thousand Dollars (\$500,000.00) each employee, and Five Hundred Thousand Dollars (\$500,000.00) policy limit.

§ A.3.2.7 Deleted

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits as determined by Contract Sum:

Up to \$9,999,999

- Each Occurrence \$2,000,000 annual aggregate \$2,000,000 from \$10,000,000 to \$19,999,999

- Each Occurrence \$3,000,000 annual aggregate \$3,000,000 from \$20,000,000 to \$40,000,000

- Each Occurrence \$4,000,000 annual aggregate \$4,000,000 over \$40,000,000

- Each Occurrence \$10,000,000 annual aggregate \$10,000,000

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than One Million Dollars (\$1,000,000.00) per claim and One Million Dollars (\$1,000,000.00) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than One Million Dollars (\$1,000,000.00) per claim and One Million Dollars (\$1,000,000.00) in the aggregate.

Init.

AIA Document A101® – 2017 Exhibit A. Copyright © 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A101," and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 13:17:52 ET on 05/21/2021 under Order No.5027455636 which expires on 07/12/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.

User Notes:

(1782082899)

§ A.3.2.11 Deleted

§ A.3.2.12 Deleted

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located; having an A.M. Best rating of "A" VII or better; and acceptable to Owner. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

§ A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3.1, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3.1 except to the extent provided below. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall be listed as an additional loss payee on said property insurance policy and shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

§ A.3.3.2.2 **Railroad Protective Liability Insurance**, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.

§ A.3.3.2.3 **Asbestos Abatement Liability Insurance**, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

§ A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on a "broad-risks" form.

§ A.3.3.2.5 Property insurance on a "broad-risks" form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

§ A.3.3.2.6 **Other Insurance**
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

§ A.3.4.1 The laws of the State of Indiana (IC § 5-16-5.5-1 et seq.) contain certain special provisions regarding retainage, bonds and payment of Contractors and Subcontractors. Contracts in excess of \$200,000 are governed by those provisions. For purposes of this Contract, the Owner has determined to withhold as statutory retainage no more than 5 percent of the dollar value of the work satisfactorily completed until the work is substantially completed.

§ A.3.4.2 The amounts retained by the Owner from the Contractor pursuant to retainage provisions shall be placed in an escrow account in accordance with a written escrow agreement with a bank or savings and loan institution as escrow agent, selected by mutual agreement between the Contractor and Owner. This escrow agreement shall have no application to payments withheld by the Owner pursuant to provisions of the Construction Contract intended to protect the Owner from loss on account of: Defective work not remedied; claims filed on reasonable evidence; failure of the Contractor to make payments when due to Subcontractors; or for material or labor; reasonable doubt that the Contract can be completed for the balance then unpaid; damage to another Contractor; failure or refusal of the Contractor to prosecute the work in strict compliance with the Contractor's construction schedule for the work; or similar provisions.

§ A.3.4.3 Contractor shall comply with all applicable provisions of I.C. § 5-16-5-1 with respect to its Subcontractors (as the term "Subcontractor" is defined therein).

(Table deleted)

§ A.3.4.4 Contractor shall furnish Owner with a performance bond and a payment bond in the form, manner and amount required by the Instructions to Bidders.

§ A.3.4.5 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.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

CERTIFICATE OF INSURANCE

ACORDTM CERTIFICATE OF LIABILITY INSURANCE		DATE (MM/DD/YYYY)
PRODUCER	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
INSURED	INSURERS AFFORDING COVERAGE	
	INSURER A: Purdue University Insurance Services Enterprise	NAIC #
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADDL INSR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
		GENERAL LIABILITY <input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER <input type="checkbox"/> POLICY <input type="checkbox"/> OBJECT <input type="checkbox"/> LOC				EACH OCCURRENCE \$ AUTO TO RENTED PREMISES (Ea occurrence) \$ MEDICAL (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMPROP AGG \$
		AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS <input type="checkbox"/> NON-OWNED AUTOS				UNINSURED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
		GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: EAACC \$ AGG \$
		EXCESS/UMBRELLA LIABILITY <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> DEDUCTIBLE RETENTION \$				EACH OCCURRENCE \$ AGGREGATE \$ \$ \$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below				WC STATIL-TORY LIMITS OTH-ER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
		OTHER				

REFERENCE COPY ONLY
 USE CURRENT EDITION

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

CERTIFICATE HOLDER 	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE
-----------------------------------	---

CONTRACT CHANGE ORDER

Purdue University

Physical Facilities Construction Department
401 S. Grant Street
West Lafayette, IN 47907-2024

Phone (765) 494-0580
Fax (765) 494-0918

TITLE: _____ **DATE:** _____
PROJECT: _____ **CONTRACT NO:** _____
TO: _____ **WBSE:** _____
FUND: _____
FUNDS COMMITMENT: _____

You are hereby requested to proceed with the following changes from the contract plans and specifications:

RE:

PP90/PCO #:

REFERENCE COPY ONLY

The Original Contract Sum was

Net Change by Previously Authorized Requests and Changes

The Contract Sum Will be Decreased

The Contract Time Will be Decreased

This document shall become an amendment to the contract and all provisions of the contract shall apply hereto. In consideration of the change order agreed to herein as complete equitable adjustment, the Contractor hereby releases the Owner of and from any and all cost, expenses, damages, or claims attributable in whole or in part to (1) the facts and circumstances giving rise to this change order and (2) the execution of this change order.

Recommended by:
ARCHITECT/ENGINEERING FIRM

Approved by:

Executed by:
THE TRUSTEES of PURDUE UNIVERSITY

Signature _____

Signature _____

Signature - FOR THE TREASURER _____

Printed Name _____

Printed Name _____

Printed Name _____

Date _____

Date _____

Date _____

CONSTRUCTION INVOICE VOUCHER

Business Services Form: CIV		Construction Invoice Voucher			Purdue University	
Vendor Number (Firm)		Vendor Number (Escrow)		PU Order Number		
Vendor (Name and Address)				Date		
Name:				Invoice #		
Remit Address:				Amount to Vendor		
City, State, Zip:				Amount to Bank (for Escrow)		
Project Title:				REFERENCE COPY ONLY ORIGINAL FORMS WILL BE SENT TO SUCCESSFUL BIDDERS		
Payment Request Number:						
Original Contract Sum		Change Orders Through No. _____		Total Installed To Date		
Total Additions		Subtotal		Materials Stored		
Total Deductions		Total Contract Amount		Total Installed and Stored		
				Less _____% Retainage		
				Total Earned Less Retainage		
				Less Previous Payments		
				This Payment		
<p>"This is to certify that in the performance of this Contract, neither the undersigned contractor nor (so far as the undersigned has knowledge) any of his subcontractors has violated the provisions of 'Nondiscrimination Provisions' of General Conditions of the Contract".</p> <p>Signed _____</p>						
For Purdue University Use Only:						
G/L Account	Amount	Cost Center	Order	WBS Element	Fund	Earmarked Funds
Held Chk?	Contact for Held Check			Campus	Phone	Audit
Department Head				Date	Dept/Building	Document #/Date
Recommended				Date	Dept/Building	
APPROVED				Date	Dept/Building	

COMPLIANCE AFFIDAVIT

Physical Facilities Form 25
Rev. Oct 24, 2018

Purdue University

COMPLIANCE AFFIDAVIT

(Submit this affidavit, signed and notarized, with each Construction Invoice Voucher)

Contractor: _____

Project Name: _____

Date: _____

This is to certify that in the performance of this contract, neither the undersigned Contractor nor (so far as the undersigned has knowledge) any of his Subcontractors has violated any of the following:

1. The "Nondiscrimination" (§ 13.9) provisions of the General Conditions of the Contract;
2. The "Occupational Safety and Health Act" (Article 10) provisions of the General Conditions of the contract;
3. The "Hazard Communication" (§ 10.1.2) provisions of the General Conditions of the Contract;
4. The "Drug Testing Program" (§ 13.6) provisions of the General Conditions of the Contract;
5. The "Background Checks and Security Clearance" (§ 13.7) provisions of the General Conditions of the Contract; and
6. The "Subcontractor Spend Data" (§ 13.8) provisions of the General Conditions of the Contract.
7. The "E-Verify Program" (§ 13.14) provisions of the General Conditions of the Contract.
8. The "Contribution by Tier 1 Contractor" (§ 13.13) provisions of the General Conditions of the Contract.
9. The "Contractor Pre-Qualifications" (§ 13.15) provisions of the General Conditions of the Contract.

Given under our hand and seal this
_____ day of _____, 20__.

By: _____

Title: _____

STATE OF _____)
) SS:
COUNTY OF _____)

Subscribed and sworn to before me this _____ day of _____, 20__.

(Notary Public)

COUNTY OF RESIDENCE

MY COMMISSION EXPIRES

BREAKDOWN OF APPLICATION FOR PAYMENT

Physical Facilities
Form 87, Rev. 1-80

BREAKDOWN OF APPLICATION FOR PAYMENT

PROJECT TITLE : _____

CONTRACTOR : _____

DATE OF ESTIMATE : _____ ESTIMATE NO: _____

FOR PERIOD FROM : _____ TO: _____

Application is Made For Payment, As Hereinafter Shown, In Connection With The Subject Project.

Item No.	Description of Work	Contract Amount	Materials Stored at Job Site*	Labor/Material Installed This Estimate	Labor/Material Installed To Date	%
<div style="border: 3px double black; padding: 20px; width: fit-content; margin: auto;"> <p style="font-size: 24px; font-weight: bold; margin: 0;">REFERENCE COPY ONLY</p> </div>						
Subtotal or Total						

*Submit Itemized List In Accordance With Project Specifications

CONTRACTOR'S AFFIDAVIT, WAIVER OF LIEN, CERTIFICATION AND GUARANTEE

Physical Facilities Form 86
July 22, 2014

CONTRACTOR'S AFFIDAVIT, WAIVER OF LIEN, AND GUARANTEE

TO: _____

Job No: _____

Date: _____

TO WHOM IT MAY CONCERN:

We, the undersigned _____
having been employed by _____ to furnish and/or install

REFERENCE COPY ONLY

for the _____,
do hereby affirm that we have paid all charges against us for labor, materials, equipment, rentals and all other items
of expense under this contract, except as follows: (List all items of expense which you have not paid whether you
have received invoice or not.) _____

Also, we, the undersigned, for and in consideration of payments (\$ _____) made to
_____, the receipt whereof is hereby acknowledged, do
hereby waive and release any and every lien, or claim, or right of lien on said above described building and premises
on account of labor, skill, machinery, or materials, or all, furnished to

_____ by the undersigned for said building or premises.

The undersigned further guarantees that all work is executed in strict accordance with the specifications and
contract drawings, including any changes or alterations authorized in writing, and that should any defect appear
within the periods as specified due to faulty materials or workmanship furnished in the performance of the contract,
for which payment is herein acknowledged, that the said undersigned will, in accordance with the Specifications,
repair and remedy said defects without expense to the Owner or _____
_____ when notified to do so.

Given under our hand and seal this
_____ day of _____, 20 _____

BY: _____

TITLE: _____

Subscribed and sworn to before me this _____ day of _____, 20 _____

State of _____ SS:

County of _____

My Commission Expires: _____

(Notary Public)

E-VERIFY PROGRAM AFFIDAVIT

E-VERIFY PROGRAM AFFIDAVIT

(Submit this affidavit, signed and notarized, seven days after the bid)

Contractor: _____

Project Name: _____

Date: _____

We, the undersigned, do hereby affirm that we are compliant with [IC 5-16-13-11 and 22-5-1.7].
The undersigned further affirms that the Contractor:

1. Has enrolled and is participating in the E-Verify program
2. Does not knowingly employ an unauthorized alien.

Given under our hand and seal this

_____ day of _____, 20____.

By: _____

Title: _____

STATE OF _____)

) SS:

COUNTY OF _____)

Subscribed and sworn to before me this _____ day of _____, 20____.

(Notary Public)

COUNTY OF RESIDENCE

MY COMMISSION EXPIRES

CONTRIBUTION BY TIER 1 CONTRACTOR AFFIDAVIT

CONTRIBUTION BY TIER 1 CONTRACTOR AFFIDAVIT

(Submit this affidavit, signed and notarized, with Contractor's Waiver of Lien)

Contractor: _____

Project Name: _____

Date: _____

REFERENCE COPY ONLY

This is to certify that in the performance of this contract, the tier 1 Contractor contributed in work, material, or services at least fifteen percent (15%) of the awarded contract price in accordance with IC 5-16-13-9.

Given under our hand and seal this
_____ day of _____, 20____.

By: _____

Title: _____

STATE OF _____)
COUNTY OF _____) SS:

Subscribed and sworn to before me this _____ day of _____, 20____.

(Notary Public)

COUNTY OF RESIDENCE

MY COMMISSION EXPIRES



AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

The Trustees of Purdue University
2550 Northwestern Ave., Suite 1100
West Lafayette, IN 47906

THE ARCHITECT:
(Name, legal status and address)

TABLE OF ARTICLES

- 1 GENERAL PROVISIONS
- 2 OWNER
- 3 CONTRACTOR
- 4 ARCHITECT
- 5 SUBCONTRACTORS
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

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.

INDEX

(Topics and numbers in bold are Section headings.)

NOTICE: Substantive changes have been made to these A 201 General Conditions which are not reflected in the Index below.

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, 12.3

Access to Work

3.16, 6.2.1, 12.1

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,

10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

Additional Inspections and Testing

9.4.2, 9.8.3, 12.2.1, **13.4**

Additional Time, Claims for

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

Administration of the Contract

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

Allowances

3.8

Applications for Payment

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,

3.12.10.1, 4.2.7, 9.3.2, 13.4.1

Arbitration

8.3.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Definition of

4.1.1

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,

9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,

13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3,

4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2,

9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,

7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,

13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,

3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,

3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,

9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,

15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

Bonds, Performance, and Payment

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

Building Information Models Use and Reliance

1.8

Init.

/

AIA Document A201® – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. **The "American Institute of Architects," "AIA," the AIA Logo, "A201," and "AIA Contract Documents" are registered trademarks and may not be used without permission.** This document was produced by AIA software at 15:51:23 ET on 04/27/2021 under Order No.5027455636 which expires on 07/12/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.
User Notes:

(1783516235)

Building Permit

3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.1, 4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7,

9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

Certificates of Inspection, Testing or Approval

13.4.4

Certificates of Insurance

9.10.2

Change Orders

1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3,

7.1.2, 7.1.3, 7.2, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1,

9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2

Change Orders, Definition of

7.2.1

CHANGES IN THE WORK

2.2.2, 3.11, 4.2.8, 7, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1,
11.5

Claims, Definition of

15.1.1

Claims, Notice of

1.6.2, 15.1.3

CLAIMS AND DISPUTES

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, 15, 15.4

Claims and Timely Assertion of Claims

15.4.1

Claims for Additional Cost

3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, 15.1.5

Claims for Additional Time

3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, 15.1.6

Concealed or Unknown Conditions, Claims for

3.7.4

Claims for Damages

3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3,

11.3.2, 14.2.4, 15.1.7

Claims Subject to Arbitration

15.4.1

Cleaning Up

3.15, 6.3

Commencement of the Work, Conditions Relating to

2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3,

6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, 15.1.5

Commencement of the Work, Definition of

8.1.2

Communications

3.9.1, 4.2.4

Completion, Conditions Relating to

3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1,

9.10, 12.2, 14.1.2, 15.1.2

COMPLETION, PAYMENTS AND

9

Completion, Substantial

3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1,

9.10.3, 12.2, 15.1.2

Compliance with Laws

2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1,

13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8,

15.4.2, 15.4.3

Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract

1.1.1, 6.1.1, 6.1.4

Consent, Written

3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2,

15.4.4.2

Consolidation or Joinder

15.4.4

CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

1.1.4, 6

Construction Change Directive, Definition of

7.3.1

Construction Change Directives

1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, 7.3,
9.3.1.1

Construction Schedules, Contractor's

3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Contingent Assignment of Subcontracts

5.4, 14.2.2.2

Continuing Contract Performance

15.1.4

Contract, Definition of

1.1.2

CONTRACT, TERMINATION OR SUSPENSION OF THE

5.4.1.1, 5.4.2, 11.5, 14

Contract Administration

3.1.3, 4, 9.4, 9.5

Contract Award and Execution, Conditions Relating to

3.7.1, 3.10, 5.2, 6.1

Contract Documents, Copies Furnished and Use of

1.5.2, 2.3.6, 5.3

Contract Documents, Definition of

1.1.1

Contract Sum

2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4,

9.1, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2,

12.3, 14.2.4, 14.3.2, 15.1.4.2, 15.1.5, 15.2.5

Contract Sum, Definition of

9.1

Contract Time

1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5,

7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1,

8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2,

14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5

Contract Time, Definition of

8.1.1

Init.

/

CONTRACTOR

3

Contractor, Definition of

3.1, 6.1.2

Contractor's Construction and Submittal Schedules

3.10, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

Contractor's Employees

2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3, 11.3, 14.1, 14.2.1.1

Contractor's Liability Insurance

11.1

Contractor's Relationship with Separate Contractors and Owner's Forces

3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7, 9.10.2, 11.2, 11.3, 11.4

Contractor's Relationship with the Architect

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.4, 15.1.3, 15.2.1

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

2.2.2, 9.7

Contractor's Right to Terminate the Contract

14.1

Contractor's Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2, 9.8.3, 9.9.1, 9.10.2, 9.10.3

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction

Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4

Coordination and Correlation

1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.3.6, 3.11

Copyrights

1.5, 3.17

Correction of Work

2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, 12.2, 12.3, 15.1.3.1, 15.1.3.2, 15.2.1

Correlation and Intent of the Contract Documents

1.2

Cost, Definition of

7.3.4

Costs

2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2, 12.1.2, 12.2.1, 12.2.4, 13.4, 14

Cutting and Patching

3.14, 6.2.5

Damage to Construction of Owner or Separate Contractors

3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2, 11.3, 14.2.4, 15.1.7

Damages for Delay

6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2

Date of Commencement of the Work, Definition of

8.1.2

Date of Substantial Completion, Definition of

8.1.3

Day, Definition of

8.1.4

Decisions of the Architect

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2, 14.2.2, 14.2.4, 15.1, 15.2

Decisions to Withhold Certification

9.4.1, 9.5, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of

2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1

Definitions

1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1, 6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

Delays and Extensions of Time

3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

Digital Data Use and Transmission

1.7

Disputes

6.3, 7.3.9, 15.1, 15.2

Documents and Samples at the Site

3.11

Drawings, Definition of

1.1.5

Drawings and Specifications, Use and Ownership of

3.11

Effective Date of Insurance

8.2.2

Emergencies

10.4, 14.1.1.2, 15.1.5

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.3, 14.1, 14.2.1.1

Equipment, Labor, or Materials
 1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
 4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3,
 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Execution and Progress of the Work
 1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1,
 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1,
 9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time
 3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2,
 10.4, 14.3, 15.1.6, **15.2.5**

Failure of Payment
 9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work
 (See Defective or Nonconforming Work)

Final Completion and Final Payment
 4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's
 2.2.1, 13.2.2, 14.1.1.4

GENERAL PROVISIONS

1

Governing Law

13.1
 Guarantees (See Warranty)

Hazardous Materials and Substances
 10.2.4, **10.3**
 Identification of Subcontractors and Suppliers
 5.2.1

Indemnification
 3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

Information and Services Required of the Owner
 2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5,
 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2,
 14.1.1.4, 14.1.4, 15.1.4

Initial Decision

15.2

Initial Decision Maker, Definition of
 1.1.8
 Initial Decision Maker, Decisions
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5
 Initial Decision Maker, Extent of Authority
 14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Injury or Damage to Person or Property
10.2.8, 10.4
 Inspections
 3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,
 9.9.2, 9.10.1, 12.2.1, 13.4
 Instructions to Bidders
 1.1.1
 Instructions to the Contractor
 3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

Instruments of Service, Definition of
1.1.7
 Insurance
 6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**
 Insurance, Notice of Cancellation or Expiration
 11.1.4, 11.2.3

Insurance, Contractor's Liability

11.1
 Insurance, Effective Date of
 8.2.2, 14.4.2

Insurance, Owner's Liability

11.2

Insurance, Property
10.2.5, 11.2, 11.4, 11.5
 Insurance, Stored Materials
 9.3.2

INSURANCE AND BONDS

11
 Insurance Companies, Consent to Partial Occupancy
 9.9.1
 Insured loss, Adjustment and Settlement of
 11.5
 Intent of the Contract Documents
 1.2.1, 4.2.7, 4.2.12, 4.2.13

Interest

13.5

Interpretation
 1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1
 Interpretations, Written
 4.2.11, 4.2.12
 Judgment on Final Award
 15.4.2

Labor and Materials, Equipment
 1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1,
 10.2.4, 14.2.1.1, 14.2.1.2
 Labor Disputes
 8.3.1
 Laws and Regulations
 1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4,
 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8,
 15.4
 Liens
 2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8
 Limitations, Statutes of
 12.2.5, 15.1.2, 15.4.1.1
 Limitations of Liability
 3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6,
 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3,
 11.3, 12.2.5, 13.3.1
 Limitations of Time
 2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7,
 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3,
 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15,
 15.1.2, 15.1.3, 15.1.5

Materials, Hazardous
10.2.4, **10.3**
 Materials, Labor, Equipment and
 1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,
 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2,
 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and Procedures of Construction

3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien

2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Mediation

8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1

Minor Changes in the Work

1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

MISCELLANEOUS PROVISIONS

13

Modifications, Definition of

1.1.1

Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

Mutual Responsibility

6.2

Nonconforming Work, Acceptance of

9.6.6, 9.9.3, **12.3**

Nonconforming Work, Rejection and Correction of
2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2

Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1

Notice of Cancellation or Expiration of Insurance

11.1.4, 11.2.3

Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, **15.1.3**, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1

Notice of Testing and Inspections

13.4.1, 13.4.2

Observations, Contractor's

3.2, 3.7.4

Occupancy

2.3.1, 9.6.6, 9.8

Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1

OWNER

2

Owner, Definition of

2.1.1

Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

Owner, Information and Services Required of the

2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1,

7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

Owner's Insurance

11.2

Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

Owner's Right to Carry Out the Work

2.5, 14.2.2

Owner's Right to Clean Up

6.3

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

6.1

Owner's Right to Stop the Work

2.4

Owner's Right to Suspend the Work

14.3

Owner's Right to Terminate the Contract

14.2, 14.4

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

1.1.1, 1.1.6, 1.1.7, **1.5**, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

Partial Occupancy or Use

9.6.6, **9.9**

Patching, Cutting and

3.14, 6.2.5

Patents

3.17

Payment, Applications for

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3

Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4

Payment, Failure of

9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Payment, Final

4.2.1, 4.2.9, **9.10**, 12.3, 14.2.4, 14.4.3

Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Payments, Progress

9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4

PAYMENTS AND COMPLETION

9

Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

PCB

10.3.1

Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**

Permits, Fees, Notices and Compliance with Laws

2.3.1, **3.7**, 3.13, 7.3.4.4, 10.2.2

PERSONS AND PROPERTY, PROTECTION OF

10

Init.

/

AIA Document A201® – 2017. Copyright © 1911, 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1966, 1970, 1976, 1987, 1997, 2007 and 2017 by The American Institute of Architects. All rights reserved. The "American Institute of Architects," "AIA," the AIA Logo, "A201," and "AIA Contract Documents" are registered trademarks and may not be used without permission. This document was produced by AIA software at 15:51:23 ET on 04/27/2021 under Order No. 5027455636 which expires on 07/12/2021, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail copyright@aia.org.

User Notes:

(1783516235)

Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.7
Progress and Completion
4.2.2, **8.2**, 9.8, 9.9.1, 14.1.4, 15.1.4
Progress Payments
9.3, **9.6**, 9.8.5, 9.10.3, 14.2.3, 15.1.4
Project, Definition of
1.1.4
Project Representatives
4.2.10
Property Insurance
10.2.5, **11.2**
Proposal Requirements
1.1.1
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,
10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4
Rejection of Work
4.2.6, 12.2.1
Releases and Waivers of Liens
9.3.1, 9.10.2
Representations
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1
Responsibility for Those Performing the Work
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
Review of Contract Documents and Field
Conditions by Contractor
3.2, 3.12.7, 6.1.3
Review of Contractor's Submittals by Owner and
Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2
Review of Shop Drawings, Product Data and Samples
by Contractor
3.12
Rights and Remedies
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,
6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,
12.2.4, **13.3**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4.1
Safety of Persons and Property
10.2, 10.4
Safety Precautions and Programs
3.3.1, 4.2.2, 4.2.7, 5.3, **10.1**, 10.2, 10.4

Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.7
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2
Separate Contractors, Definition of
6.1.1
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.7
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4
Special Inspections and Testing
4.2.6, 12.2.1, 13.4
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14
Statute of Limitations
15.1.2, 15.4.1.1
Stopping the Work
2.2.2, 2.4, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2,
9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1
Submittals
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8,
9.9.1, 9.10.2, 9.10.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.7
Subrogation, Waivers of
6.1.1, **11.3**
Substances, Hazardous
10.3
Substantial Completion
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, **9.8**, 9.9.1, 9.10.3, 12.2,
15.1.2

Substantial Completion, Definition of

9.8.1

Substitution of Subcontractors

5.2.3, 5.2.4

Substitution of Architect

2.3.3

Substitutions of Materials

3.4.2, 3.5, 7.3.8

Sub-subcontractor, Definition of

5.1.2

Subsurface Conditions

3.7.4

Successors and Assigns

13.2

Superintendent

3.9, 10.2.6

Supervision and Construction Procedures

1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3,

7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers

1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6,

9.10.5, 14.2.1

Surety

5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2,

15.2.7

Surety, Consent of

9.8.5, 9.10.2, 9.10.3

Surveys

1.1.7, 2.3.4

Suspension by the Owner for Convenience

14.3

Suspension of the Work

3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract

5.4.1.1, 14

Taxes

3.6, 3.8.2.1, 7.3.4.4

Termination by the Contractor

14.1, 15.1.7

Termination by the Owner for Cause

5.4.1.1, **14.2**, 15.1.7

Termination by the Owner for Convenience

14.4

Termination of the Architect

2.3.3

Termination of the Contractor Employment

14.2.2

TERMINATION OR SUSPENSION OF THE CONTRACT

14

Tests and Inspections

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3,

9.9.2, 9.10.1, 10.3.2, 12.2.1, **13.4**

TIME

8

Time, Delays and Extensions of

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7,

10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

Time Limits

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2,

5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1,

9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2,

15.1.3, 15.4

Time Limits on Claims

3.7.4, 10.2.8, 15.1.2, 15.1.3

Title to Work

9.3.2, 9.3.3

UNCOVERING AND CORRECTION OF WORK

12

Uncovering of Work

12.1

Unforeseen Conditions, Concealed or Unknown

3.7.4, 8.3.1, 10.3

Unit Prices

7.3.3.2, 9.1.2

Use of Documents

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

Use of Site

3.13, 6.1.1, 6.2.1

Values, Schedule of

9.2, 9.3.1

Waiver of Claims by the Architect

13.3.2

Waiver of Claims by the Contractor

9.10.5, 13.3.2, **15.1.7**

Waiver of Claims by the Owner

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, **15.1.7**

Waiver of Consequential Damages

14.2.4, 15.1.7

Waiver of Liens

9.3, 9.10.2, 9.10.4

Waivers of Subrogation

6.1.1, **11.3**

Warranty

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2,

15.1.2

Weather Delays

8.3, 15.1.6.2

Work, Definition of

1.1.3

Written Consent

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3,

13.2, 13.3.2, 15.4.4.2

Written Interpretations

4.2.11, 4.2.12

Written Orders

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

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.

§ 1.1.9 Written Notice

Written notice shall mean a written instrument and shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

Written Notice to the Owner shall be directed to the Project Manager identified in Division 1 of the Specifications.

Written Notice to the Contractor shall be directed to the Contractor's Project Manager.

Written Notice to the Architect shall be directed to the individual identified at the pre-construction meeting.

§ 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. In the case of an inconsistency between Drawings and Specifications and within either Contract Document not clarified by Addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's/Engineer's interpretation.

§ 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 except as may otherwise be provided in the Agreement between Owner and Architect will retain all common law, statutory, and other reserved rights, 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 Owner's, 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.

Init.

§ 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

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model 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 Deleted

§ 2.2 Deleted

(Paragraphs deleted)

§ 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 Deleted

§ 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 five-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 deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor 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 payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

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, 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. The Owner reserves the right to require the Contractor to remove from the Project any employee of the Contractor (including the General Superintendent), any Subcontractor or employee of any Subcontractor if the Owner deems such person to be unfit or otherwise unsatisfactory.

§ 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.

Init.

§ 3.6.1 The labor and materials furnished under this Contract will be used, when the Project is completed, by the Owner for its tax exempt purposes. Accordingly, the Indiana Gross Retail and Use Tax (sales and use tax) will not apply to the purchase of materials under this Contract by the Owner from the Contractor. The Owner will issue an appropriate exemption certificate to the Contractor to that 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 any permits, fees, licenses, and inspections by government agencies necessary for the means and methods employed by Contractor to complete the Work that are customarily secured after execution of the Contract.

§ 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 regardless of whether they are specifically identified in the Contract Documents. Contractor shall furnish Architect and Owner with copies of all notices given.

§ 3.7.3 If the Contractor performs Work knowing or suspecting it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume full responsibility for such Work and shall bear all 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 Within seven days after Contractor's bid is received and opened the Contractor shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply 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. Once approved, the Contractor's superintendent may not be changed without the written permission of the Owner, which shall not be unreasonably withheld.

§ 3.9.4 Contractor's superintendent shall devote his full attention to the Project and shall not superintend any other projects for the Contractor without the written consent of the Owner, which shall not be unreasonably withheld.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work in accordance with the requirements of Division One of the Specifications. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at monthly intervals or more often as required by the Owner, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, immediately after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be 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. Contractor's failure to submit satisfactory information required by this § 3.10 shall be grounds for delaying or withholding payment to Contractor.

§ 3.10.4 The Contractor shall not interrupt, disrupt or in any way interfere with utility service to the Owner's existing buildings and structures unless required in order to properly perform the Work. Any necessary interruption, disruption or interference shall be specifically identified in Contractor's construction schedule for the Work and shall be closely coordinated with the Owner so as to minimize the impact to Owner's operations.

§ 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.

§ 3.12.5.1 Each Shop Drawing, Product Data, Sample or similar submittal shall bear the following wording typed or stamped thereon: "APPROVED TO BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS EXCEPT AS NOTED."

SIGNED: _____ DATED: _____

Any Shop Drawing, Product Data, Sample, or similar submittal submitted without the above wording shall be returned without review for resubmittal.

§ 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. Any work performed by the Contractor in violation of this section shall be at Contractor's sole risk.

§ 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 cause such services or certifications to be provided by a properly 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, accuracy and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, 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. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified 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. Contractor's use of the site shall be limited to performance of the Work.

§ 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 at all times 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 and leave the Work "broom clean" and ready for use.

§ 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.

§ 3.15.3 The Contractor shall keep all public and Owner-owned drives and streets cleaned of spilled or tracked materials from trucking operations.

§ 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 defend, indemnify and hold harmless the Owner, its related and affiliated foundations and entities, individually or collectively, and their respective consultants, agents and employees from and against any and all 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 the injury to or destruction of tangible property (other than the Work itself), including any loss of use therefrom. Contractor's obligation to defend, indemnify and hold harmless shall apply regardless of whether it is alleged that any person or entity to be indemnified hereunder, or their respective consultants, agents or employees contributed in any way to the alleged wrongdoing or are otherwise liable on account of the alleged breach of a non-delegable duty.

§ 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.

Init.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that materially 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 expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect 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, unless otherwise specifically stated by the Architect, 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.

Init.

§ 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 or the bidding requirements, 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.

§ 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.

§ 5.3.1 Contractor shall comply with all statutory provisions regarding the payment of Subcontractors, including but not limited to I.C. §5-16-5.5-6 or its equivalent.

§ 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.

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.

§ 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. Except as permitted in Section 7.3, a change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealing between the parties, nor express or implied acceptance of alterations or addition to the Work, and no claim that the Owner has been unjustly enriched by any alteration of or addition to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents.

§ 7.1.4 A change in the Contract Sum or the Contract Time may only be accomplished through a Change Order or a Construction Change Directive. No course of dealing, express or implied acceptance of alterations or additions to the Work, or claim that the Owner has been unjustly enriched by an alteration or addition to the Work shall entitle the Contractor to an increase in the Contract Sum or the Contract Time.

§ 7.1.5 If the Contractor claims that any instructions, by drawings or otherwise, involve extra cost under this Contract, Contractor shall provide the Architect and Owner with Written Notice in accordance with the requirements of Article 15 before proceeding to execute the work. The timely giving of such Written Notice shall constitute a condition precedent to the Contractor's entitlement to compensation for such extra costs. Failure of the Contractor to give such Written Notice shall also constitute a waiver of any such claim for extra compensation.

§ 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.

§ 7.2.2 An executed Change Order shall become an amendment to the Contract Documents and all provisions of the Contract Documents shall apply thereto. In consideration of the Change Order as a complete equitable adjustment, the Contractor releases the Owner of and from any and all costs, expenses, damages or claims attributable in whole or in part to:

- .1 The facts and circumstances giving rise to the Change Order; and
- .2 The execution of the Change Order.

Init.

§ 7.2.3 For any adjustments in the Contract Sum, the Contractor overhead and profit shall be calculated as follows:

- .1 Cost of labor payroll, not to exceed the actual wages paid on this project, plus applicable payroll taxes and insurance, plus 10%; Costs of the material, including rentals, plus 10%.
- .2 For work by Subcontractors, or a lower tier Contractor, the Contractor performing the Work shall be permitted to mark up its costs in accordance with Section 7.2.3.1, and each succeeding Contractor, including the Prime Contractor, shall add 10%.

§ 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 Deleted

§ 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 an act or neglect of the Owner or Architect, or of an employee of either, or of a Separate Contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes not caused by wrongful or unlawful acts of Contractor, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control ("Excusable Delay"), then the Contract Time shall be extended by Change Order for a period of time equal to the duration of the Excusable Delay.

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

§ 8.3.3 Except as provided in Sections 3.7.4 and 10.3.3, an extension of time for Excusable Delay, as defined above, shall be the Contractor's exclusive remedy in the event of such a delay, no matter how or by whom caused.

Contractor further specifically acknowledges that it shall have no claim for increase in the Contract Sum or damages of any kind because of any delays whatsoever to all or any part of the Work whether foreseen or unforeseen, and whether caused by any person's hindrance or active interference.

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 in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted. Unit prices include Contractor's overhead and profit.

§ 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 Deleted

§ 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.

§ 9.3.4 The Contractor's final Application for Payment shall contain evidence satisfactory to the Architect and the Owner that all payrolls, material bills, and other indebtedness connected with the Work has been paid. The final Application for Payment shall be accompanied by the Contractor's Compliance Affidavit, Contractor's Affidavit,

Init.

Waiver of Claims and Liens, and Guarantee in the form included in the Specifications properly completed and executed by the Contractor, each of the Contractor's Subcontractors, and by each of Contractor's major material suppliers.

§ 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.

§ 9.4.3 Upon receipt of Architect's Certificate for Payment the Owner will, within 14 days, either issue payment to the Contractor in the amount of the Certification or make such payment as is undisputed and offer explanation of the disputed items. When the reasons for withholding are removed, payment will be made for amounts withheld.

§ 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;
- .7 repeated failure to carry out the Work in accordance with the Contract Documents; or
- .8 failure to defend, indemnify or hold harmless the Owner and other required indemnitees as required by 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 Deleted

§ 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.

§ 9.7 Failure of Payment

§ 9.7.1 A final Certificate for Payment shall not be issued until all labor and materials required in the Contract Documents have been furnished, installed and completed, all claims have been disposed of and all claims for extra work materials and allowances for omissions have been rendered, considered and, if agreed to, made a part of such Certificate of Payment.

§ 9.7.2 If, pursuant to the Contract Documents, the Owner is entitled to any reimbursement or payment from the Contractor, Contractor shall make such payment within 14 days of demand by the Owner. Notwithstanding anything in the Contract Documents to the contrary, if Contractor fails to make any payment due the Owner, or if the Owner incurs any costs and expenses to cure any default of Contractor or to correct defective Work, the Owner shall have the right to either (1) deduct an amount equal to that which the Owner is entitled from any payment then or thereafter due Contractor from the Owner, or (2) issue a written notice to the Contractor reducing the Contract Sum by an amount equal to that which the Owner is entitled.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when:

- .1 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; and
- .2 The Owner has received from any governmental authority having jurisdictional authority thereof all certificates of occupancy and all other permits, approvals, licenses or other documents necessary for the beneficial occupancy of the Project.

§ 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 and Owner will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the 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. 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, 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 or a waiver of any right under 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 and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety to final payment (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, 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, and (6) all "As Built" drawings, complete operating instructions for equipment and accessories, maintenance manuals, documentation of any special warranties, such as manufacturers' warranties or specific subcontractor warranties, and bonds, certificates and guarantees required by the Contract Documents.

§ 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.

§ 10.1.1 The Contractor shall administer and comply with all the rules, standards, and regulations of the Construction Safety Act (40 U.S.C. 333) and the Williams-Stieger Occupational Safety and Health Act (OSHA) of 1970 (29 U.S.C. 650 et seq.) as administered and enforced by the Occupational Safety and Health Administration, Department of Labor. The Contractor shall further administer and comply with all the provisions, standards, rules and regulations of the Indiana Occupational Health and Safety Act (OSHA) of 1971 (I.C. § 22-8-1.1-1, et seq) including, but not limited to, 29 C.F.R. 1926, Subpart P (trench safety systems).

The Contractor shall not require or permit any laborer or mechanic, including apprentices and trainees, employed in the performance of this Contract to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to health as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation (29 CFR Part 1926, 36 FR 7340, April 17, 1971) pursuant to Section 107 of the Contract Work Hours and Safety Standards Act.

Init.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract, neither the undersigned Contractor nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "Occupational Safety and Health Act" provisions of the General Conditions of the Contract.

§ 10.1.2 Contractor shall establish a program to coordinate the exchange of material safety data sheets or other hazard communication required to be made available to or exchanged between or among employers at the site in accordance with applicable laws or regulations. At all times during performance of the work, Contractor shall be responsible for administering the hazard communication program and coordinating the hazard communication. Contractor shall provide Superintendent with copies of all material safety data sheets or other hazard communication exchanged among or made available to employers at the site.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract, neither the undersigned Contractor, nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "Hazard Communication" provision of the General Conditions 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

- .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, except damage or loss 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 3.1.8.

Init.

§ 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 48 hours 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.

§ 10.3.2 Owner shall be responsible for any hazardous materials, including asbestos, polychlorinated biphenyl ("PCBs"), petroleum (for example, oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene and oil mixed with other non-hazardous materials), Hazardous Waste (as defined in Section 1004 of the Solid Waste Disposal Act [42 U.S.C. Section 6903] as amended from time to time) or Radioactive Material (including source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 [52 U.S.C. Section 2011 et seq.] as amended from time to time) which are uncovered or revealed at the site and which were not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the work at the site.

§ 10.3.3 To the extent that Hazardous Materials are shown or indicated in Drawings or Specifications or identified in the Contract Documents, but are not made the subject of supplementary conditions, then Contractor shall be responsible for the Hazardous Materials so shown, identified or indicated. In no event shall Owner be responsible for any Hazardous Materials brought to the site by Contractor, Subcontractors, Suppliers or anyone else for whom Contractor is responsible.

§ 10.3.4 To the extent that Contractor discovers Hazardous Materials (as described above) or that Contractor discovers materials which it either believes, or has reason to believe, may constitute Hazardous Materials, and which were not shown or indicated in the Drawings or Specifications or not identified in the Contract Documents then the Contractor shall:

- .1 immediately report the same to the Owner by the most expedient means available and confirm the report in writing; and
- .2 immediately cease all work in the vicinity of the materials believed to be hazardous.

The Owner shall then take measures, reasonable and appropriate under the circumstances, to ascertain the true character of the materials believed to be hazardous and the measures, if any, necessary to make the job site reasonably safe for the Contractor's completion of the work. Upon receiving notice from the Owner (which shall be confirmed in writing) to complete performance of the Work, Contractor shall immediately resume performance of the Work.

§ 10.3.5 The Owner shall not be responsible under this Section 10.3 for 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 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.

§ 10.3.6 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance 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 sole fault or negligence.

§ 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 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 be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 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 obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub Subcontractors in the Work. 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 Deleted

§ 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 Deleted

(Paragraphs deleted)

§ 11.4 Deleted

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by this Agreement shall be adjusted by the Owner.

§ 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 5 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. 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.

§11.6 Refer to AIA Document A101™ - 2017 Exhibit A, as modified, for insurance requirements.

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. 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.

Init.

§ 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 State of Indiana. Any action by Contractor or Owner to enforce rights or obligations, or to assert Claims arising out of this Agreement (including cross-claims and third-party claims) shall be brought and maintained only in a court of competent jurisdiction in Tippecanoe County, Indiana.

§ 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. Contractor shall not assign, or permit the assignment of, any Claim arising out of this Agreement.

§ 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 retained by the Owner. The Contractor shall give the Architect and the Owner timely notice of when and where tests and inspections are to be made so that the Architect and Owner may be present for such procedures.

§ 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 retained by the Owner, and the Contractor shall give timely notice to the Architect and Owner of when and where tests and inspections are to be made so that the Architect and Owner 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 and Contractor.

§ 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.

§ 13.6 Drug Testing Program

The laws of the State of Indiana (IC 4-13-18 as amended) contain certain special provisions regarding drug testing of employees of public works Contractors and Subcontractors. As determined by the Owner, projects estimated to be in excess of \$150,000.00 will be governed by these provisions. These provisions require, among other things, that the Contractor submit with the bid a written plan for a program to test the Contractor's employees for drugs. In addition, each successful Bidder will be required to comply with all applicable provisions of the statute referred to above with respect to each Bidder's Subcontractors, as the term "Subcontractor" is defined in the statute referred to above.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract, neither the undersigned Contractor, nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "Drug Testing Program" provision of the General Conditions of the Contract.

§ 13.7 Background Checks and Security Clearance

Contractor shall perform security clearance background checks on all of its officers, agents, employees assigned to have access to Purdue's facilities to identify whether any such individual is a registered sex offender pursuant to Zachary's Law, Ind. Code § 11-8-8 et. seq. or the equivalent law of the individual's state of residence. Contractor shall either perform such checks on the officers, agents or employees of subcontractors of any tier or shall require that such subcontractors certify to the Contractor and the Owner that such checks have been performed. Neither Contractor nor any subcontractor (of any tier) shall assign an individual identified as a registered sex offender to perform work or services at Purdue's facilities. Purdue reserves the right to immediately remove any individuals identified as registered sex offenders from Purdue's facilities. Purdue reserves the right to require additional background checks be made on any of Contractor's and its subcontractor(s)'s officers, agents, employees or volunteers assigned to have access to Purdue's premises. Contractor shall indemnify Purdue and hold it harmless from and against all liability, losses,

damages, claims, liens, and expense (including reasonable legal fees) arising out of or connected with Contractor's failure to comply with the requirements of this Article of the General Conditions.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract, neither the undersigned Contractor, nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "Background Checks and Security Clearance" provision of the General Conditions of the Contract.

§ 13.8 Subcontractor Spend Data

Contractor shall monitor its payments to its subcontractors and material suppliers and report, on a monthly basis, its disbursement of each Project payment received from the Owner.

COMPLIANCE AFFIDAVIT

Each pay application for payment shall be accompanied by an affidavit dated and signed by the Contractor, substantially as follows:

This is to certify that the Contractor has received the Owner's payment of its prior application for payment, subject to any disputed items, and has disbursed payment to its subcontractors and material suppliers as set forth below:

Subcontractor	Amount	Date
_____	_____	_____

§ 13.9 Nondiscrimination

§ 13.9.1 The Contractor shall perform, observe and comply with all applicable State, Municipal and Federal laws, rules, regulations and Executive Orders pertaining to nondiscrimination against employees or applicants for employment because of race, color, religion, sex, handicap, disability, national origin or ancestry. During the performance of this Contract, the Contractor agrees to comply with all applicable requirements of the Americans with Disabilities Act of 1990 and the regulations promulgated thereunder. When required by such laws, rules, regulations and Executive Orders, the Contractor shall include nondiscrimination provisions in all contracts and purchase orders.

§ 13.9.2 The Contractor agrees that:

- .1 In the hiring of employees for the performance of work under this Contract or any subcontract hereunder, neither the Contractor, any Subcontractor, nor any person acting on behalf of the Contractor or Subcontractor, shall, by reason of race, religion, color, sex, national origin or ancestry or handicap, discriminate against any citizen of the State of Indiana who is qualified and available to perform the work to which the employment relates;
- .2 Neither the Contractor, Subcontractor, nor any person on their behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Contract on account of race, religion, color, sex, national origin or ancestry, or handicap;
- .3 There may be deducted from the amount payable to the Contractor by the Owner, under this Contract, a penalty of five dollars (\$5.00) for each person for each calendar day during which such person was discriminated against or intimidated in violation of these nondiscrimination provisions; and
- .4 This Contract may be canceled or terminated by the Owner, and all money due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of these nondiscrimination provisions.

§ 13.9.3 By the act of submitting a Bid, each Bidder shall be deemed to have certified to the Owner that it has at all times complied with the nondiscrimination provisions of Senate Enrolled Act No. 484 - Section 4 enacted by the First

Init.

Regular Session 99th General Assembly 1975, unless such Bidder states otherwise in a written statement submitted with the Bid. The Owner will refrain from entering into any contract with any Bidder who states that it has failed to comply with said nondiscrimination provisions of said Senate Enrolled Act. No. 484 - Section 4. The applicable portion of Senate Enrolled Act No. 484 - Section 4 is as follows:

"SECTION 4. IC1971, 22 0-10, as amended by Acts 1971, P.L. 347, SECTION 7, is amended to read as follows: Sec. 10. Every contract to which the state or any of its political or civil subdivisions is a party, including franchises granted to public utilities, shall contain a provision requiring the Contractor and his Subcontractors not to discriminate against any employee or applicant for employment, to be employed in the performance of such contract, with respect to his hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of his race, religion, color, sex, handicap, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

Each application for payment shall be accompanied by a nondiscrimination certificate.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by a certificate, dated and signed by the Contractor, substantially as follows:

"This is to certify that in the performance of this Contract, neither the undersigned Contractor nor (so far as the undersigned has knowledge) any of its Subcontractors has violated the provisions of 'Nondiscrimination Provisions' of these General Conditions".

§ 13.10 American Steel

To the extent that the Contractor's performance of the Work entails the use of purchase of steel products (as defined in I.C. 5-16-8-1, as amended from time to time), then Contractor warrants that only steel products made in the United States shall be used and supplied in the performance of the Contract and in the performance of any subcontracts.

§ 13.11 Open Competition

Where in the Specifications one or more certain materials, trade names, or articles of certain manufacture are mentioned, it is done for the express purpose of establishing a basis of durability and efficiency and not for the purpose of limiting competition. Other names or materials can be used, if in the opinion of the Architect they are equal in durability and efficiency to those mentioned and of a design in harmony within the work as outlined and the Architect gives written approval of a substitution before the articles and material are ordered by the Contractor.

§ 13.12 Parking Regulations

The contractor and its employees are to conform to the University's Motor Vehicle and Traffic Regulations. See Division 1 of the Specifications.

§ 13.13 Contribution by Tier 1 Contractor

The laws of the State of Indiana (IC 5-16-13-9 as amended) contain certain special provisions regarding contribution by the Tier 1 Contractor on public works projects. The Tier 1 Contractor must contribute in work, material, services, or any combination thereof, at least fifteen percent (15%) of the awarded contract price.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract the undersigned Contractor has not violated the "Contribution by Tier 1 Contractor" provision of the General Conditions of the Contract.

§ 13.14 E-Verify Program

The laws of the State of Indiana (I.C. 22-5-1.7-11.1 as amended) contain certain special provisions regarding

enrollment and participation in the E-Verify program by public works Contractors and Subcontractors. These provisions require, among other things, that the Contractor signs an affidavit affirming that the contractor does not knowingly employ an unauthorized alien. In addition, each successful Bidder will be required to comply with all applicable provisions of the statute referred to above with respect to each Bidder's Subcontractors, as the term "Subcontractor" is defined in the statute referred to above. A Contractor is not required to verify the work eligibility status of all newly hired employees of the contractor through the E-verify program if E-verify no longer exists.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract, neither the undersigned Contractor, nor (so far as the undersigned has knowledge) any of its Subcontractors, has violated the "E-Verify Program" provision of the General Conditions of the Contract.

§ 13.15 Contractor Pre-Qualifications

The laws of the State of Indiana (I.C. 5-16-13-10(c) as amended) contain certain special provisions regarding pre-qualification of contractors on public works projects. Contractors must be pre-qualified under I.C. 4-13.6-4 or I.C. 8-23-10.

COMPLIANCE AFFIDAVIT

Each application for payment shall be accompanied by an affidavit, dated and signed by the Contractor, substantially as follows:

This is to certify that in the performance of this Contract the undersigned Contractor and its Subcontractors are in compliance with the "Contractor Pre-Qualifications" requirements set forth in I.C. 5-16-13-10(c).

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

(Paragraph deleted)

§ 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.

§ 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

Init.

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 above reasons described in Section 14.2.1 exist, 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 Contractor shall be entitled to receive payment for Work properly executed and costs actually and reasonably incurred by reason of such termination.

§ 14.4.4 When the Owner terminates the Contractor's services pursuant to this Section, the termination shall not affect the rights or remedies of the Owner against the Contractor then existing or which may thereafter accrue.

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

Any litigation filed by the Contractor or its Subcontractors asserting any right, claim or cause of action against the Owner arising out of or related in any way to the Contract or Contractor's performance of the Work must be commenced within one year of Substantial Completion. The Owner shall be entitled to the immediate dismissal of any such litigation brought more than one year after Substantial Completion. Any such right, claim or cause of action asserted by the Contractor or its Subcontractors against the Owner more than one year after Substantial Completion is waived by the Contractor.

§ 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 the 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 must be initiated within the specific time period required by the Contract Documents and in the absence of a specific time period then no later than 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. The timely giving of Notice shall be a condition precedent to any entitlement to adjustment in the Contract Time or the Contract Sum. The failure to provide timely Notice of a Claim constitutes an irremovable waiver of such Claim.

§ 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. In the case of a continuing delay occurring on consecutive days, only one Claim is necessary; provided, however, that within ten days after the cessation of the cause of the continuing delay, the Contractor shall notify the Owner and Architect in writing that the cause of the delay has ceased. The failure to give timely notice of the cessation of the cause of the continuing delay will constitute an irrevocable waiver of any Claim based on the continuing delay.

Init.

§ 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. Notwithstanding any other provision of the Contract Documents to the contrary, the Contract Time will not be adjusted on account of the impact of any normal adverse weather on any of the Work or on account of the impact of any abnormal adverse weather on non-critical elements of the Work. The support for and evaluation of all adverse weather Claims shall be based upon average weather conditions during the 10 years immediately preceding the dates at issue in the Claim as such weather conditions were recorded at the government controlled weather-recording facility nearest to the project.

(Paragraphs deleted)

§ 15.1.7 Deleted

§ 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.

§ 15.2.6.1 Deleted

§ 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.

Init.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien or verified claim, 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, and 9.10.5, 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. 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.

§ 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 Deleted

(Paragraphs deleted)

AACC Asian American and Asian Resource and Cultural Center **F6**
AAPF Ag Alumni Seed Phenotyping Facility **F8**
ABE Agricultural and Biological Engineering **F9**
ADDL Animal Disease Diagnostic Laboratory **G10**
ADM ADM Agricultural Innovation Center **E11**
■ Admissions, Office of (Stewart Center 102) **H7**
ADPA-C Aspire at Discovery Park **D8**
AERO Aerospace Science Laboratory **C11**
AGAD Agricultural Administration Building **G8**
AHF Animal Holding Facility **G10**
AQUA Burke (Morgan J.) Boilermaker Aquatic Center **D6**
AR Armory **F6**
ARMS Armstrong (Neil) Hall of Engineering **G5**
ASB Airport Service Building (Shop Services) **A11-12**
BALY Bailey (Ralph and Bettye) Hall **H6-7**
BCC Black Cultural Center **F6**
BCHM Biochemistry Building **F8**
BHEE Brown (Max W & Maileen) Family Hall **H6**
BIDC Bechtel Innovation Design Center **F6**
BIND Bindley Bioscience Center **D8**
BOWN Bowen (Robert L. & Terry L.) Laboratory **H12** (Inset)
BREQ Brunner (David and Bonnie) Equine Hospital **G10**
BRES Brees (Drew and Brittany) Student-Athlete Academic Center **F3**
BRFM Brunner (David and Bonnie) Farm Animal Hospital **H10**
BRUN Brunner (David and Bonnie) Small Animal Hospital **G10**
BRK Birk Nanotechnology Center **D8**
BRNG Beering (Steven C.) Hall of Liberal Arts and Education **G7**
BRWN Brown (Herbert C.) Laboratory of Chemistry **H7**
BTV Boiler Television Building **E3**
■ Car/Van Rentals and Charter Bus (MMDC) **F11**
† CHAF Chaffee Hall **A9**
CHAS Chaney-Hale Hall of Science **G6**
CL50 Class of 1950 Lecture Hall **G7**
COMP Composites Laboratory **C11**
CONV Convergence **C8**
CREC Córdova (France A.) Recreational Sports Center **E6**
CRTN Creighton (Hobart and Russell) Hall of Animal Sciences **F9**
† DANL Daniel (William H.) Turfgrass Research Center **B1**
DAUC Dauch (Dick and Sandy) Alumni Center **H9**
DLR Hall for Discovery and Learning Research **E9**
DMNT DeMent (Clayton W.) Fire Station **D6**
DOYL Doyle (Leo Philip) Laboratory **G10**
DRUG Drug Discovery **F9**
DSCB Data Science **G6**
DUDL Dudley Hall **H6**
DYE Pete Dye Clubhouse **C1**
ECEC Purdue University Early Care and Education Center **A7**
EEL Entomology Environmental Laboratory **G8**
EHSA Equine Health Sciences Annex **G10**
EHSB Equine Health Sciences Building **G10**
ELLT Elliott (Edward C.) Hall of Music **G6**
FLEX Flex Laboratories **D9**
FOPN Flight Operations Building **B11**
FORS Forestry Building **G8**
FPRD Forest Products Building **G8**
FRNY Forney Hall of Chemical Engineering **G5**
FWLR Fowler (Harriet O. and James M., Jr.) Memorial House **E7**
GCMB Golf Course Maintenance Barn **C2**
GMF Grounds Maintenance Facility **F11**
GMGF Grounds Maintenance Greenhouse Facilities **E11**
■ The Graduate School (Young Hall - first floor) **H8**
■ Grand Prix Track (see Northwest Athletic Complex Inset)
GRIS Grissom Hall **H7**
GRS Grounds Service Building **E8**
GSMB Golf Storage Maintenance Building **C2**
HAAS Haas (Felix) Hall **G7**
HAGL Hagle (Marc and Sharon) Hall **F6**
HAMP Hampton (Delon and Elizabeth) Hall of Civil Engineering **G5**
HANS Hansen (Arthur G.) Life Sciences Research Building **F9**
HEAV Heavilon Hall **H7**
HERL Herrick Acoustics **E8**
HGR4-7 Hangars, Numbers 4 through 7 **A11,12**
HGRH Horticultural Greenhouse **G9**
HIKS Hicks (John W.) Undergraduate Library **H8**
HLAB Herrick Laboratories **E8**
HMMT Hazardous Materials Management Trailer **H11**
HNLY Hanley (Bill and Sally) Hall **E7**
HOCK Hockmeyer (Wayne T. and Mary T.) Hall of Structural Biology **E9**
HORT Horticulture Building **G9**
HOVD Hoyde (Frederick L.) Hall of Administration **G6**
HULL Hull All-American Marching Band **D6**
JNSN Johnson (Helen R.) Hall of Nursing **G6**
KCTR Krannert Center for Executive Education and Research **H8**
KFPC Kozuch Football Performance Complex **F3**
KNOY Knoy (Maurice G.) Hall of Technology **H6**

KRAN Krannert Building **H8**
KRCH Krach Leadership Center **E6**
LAMB Lambert (Ward L.) Fieldhouse and Gymnasium **G4**
LCCP Latino Cultural Center at Purdue **F6**
LG Lambert Green **G4**
■ Library, Main (see HIKS) **H8**
LILY Lilly Hall of Life Sciences **F8**
LMBS Lambertus Hall **H6**
LMSB Laboratory Materials Storage Building **H11**
LMST Laboratory Materials Storage Trailer **H11**
LOLC Land O'Lakes Center for Experiential Learning and Purina Pavilion **F9**
LSA Life Science Animal Building **F8**
LSPS Life Science Plant and Soils Laboratory **F8**
LSR Life Science Ranges (Greenhouse and Service Building) **F8**
LWSN Lawson (Richard and Patricia) Computer Science Building **F6**
LYLE Lyles-Porter Hall **F9**
LYNN Lynn (Charles J.) Hall of Veterinary Medicine **G10**
MACK Mackey (Guy J.) Arena **F, G4**
MANN Mann (Gerald D. and Edna E.) Hall **D8**
MATH Mathematical Sciences Building **G7**
ME Mechanical Engineering Building **H6**
MJIS Jischke (Martin C.) Hall of Biomedical Engineering **E9**
MMDC Materials Management and Distribution Center **F11**
MMSI Materials Management Storage Building 1 **F12**
MOLL Mollenkopf Athletic Center **F3**
MRGN Morgan (Burton D.) Center for Entrepreneurship **D8**
MRRT Marriott Hall **F7,8**
MSEE Materials and Electrical Engineering Building **H5**
MTHW Matthews Hall **F8**
NACC Native American Educational and Cultural Center **F6**
NISW Niswonger Aviation Technology Building **B11**
NLSN Nelson (Philip E.) Hall of Food Science **G9**
OLMN Olman (Melvin L.) Golfcart Barn **C1**
PAGE Page (Thomas A.) Pavilion **H12** (Inset)
■ Parking Facilities (MMDC) **F11**
PAO Pao (Yue-Kong) Hall of Visual and Performing Arts **H8**
PFEN Pfendler (David C.) Hall of Agriculture **G8**
PFSB Physical Facilities Service Building **F12**
PGSC Purdue Graduate Student Center **H5**
■ Pharmacy (Purdue University Retail Pharmacy - RHPH) **G5**
PHYS Physics Building **G5**
PJEC Jischke (Patty) Early Care and Education Center **C8**
PMRI Purdue Magnetic Resonance Imaging Facility **G9**
PMU Purdue Memorial Union **H7**
PMUC Purdue Memorial Union Club **H7**
POTR Potter (A.A.) Engineering Center **H6**
PRCE Peirce Hall **G7**
PRSV Printing Services Facility **F11**
PSYC Psychological Sciences Building **G6, 7**
PTCA Purdue Technology Center Aerospace **A8** (West Campus inset)
PUSH Purdue University Student Health Center **F, G5**
PVAB Purdue Village Administration Building **D9**
RAIL American Railway Building **H6**
RAWL Rawls (Jerry S.) Hall **H8**
RHPH Heine (Robert E.) Pharmacy Building **G5**
SC Stanley Coulter Hall **G7**
SCHM Helen B. Schleman Hall **G7**
SCHO Global Policy Research Institute (Schowe House) **F1**
SCPA Slayter Center of Performing Arts **E4**
SIML Holleman-Niswonger Simulator Center **A11**
SMLY Smalley (John C.) Center for Housing and Food Services Administration **D6**
SMTH Smith Hall **F8**
SOIL Soil Erosion Laboratory, National **E9**
SPUR Spurgeon (Tom) Golf Training Center **C1**
STDM Ross-Ade Stadium (includes Ross-Ade Pavilion [RAP]) **F3**
STEM See CHAS **G6**
STEW Stewart Center (includes Welcome Center) **H7**
STON Stone (Winthrop E.) Hall **G8**
■ Student Health Center (see PUSH) **G5**
TEL Telecommunications Building **F7**
TERM Terminal Building **B11**
TERY Terry (Oliver P.) House **E8, 9**
TREC Turf Recreation Exercise Center **D6**
TSWF Transportation Service Wash Facility **G12**
UC University Church **17**
UNIV University Hall **G7**
UPOB Utility Plant Office Building **H11**
UPOF Utility Plant Office Facility **H10**
UPSB Utility Plant Storage Building **G11**
VA1 Veterinary Animal Isolation Building 1 **G10**
VA2 Veterinary Animal Isolation Building 2 **G10**
VCPR Veterinary Center for Paralysis Research **G10**

VLAB Veterinary Laboratory Animal Building **G10**
VMIIF Veterinary Medicine Isolation Facility **G10**
VOIN Voinoff (Samuel) Golf Pavilion **C1**
VPRB Veterinary Pathobiology Research Building **F9, 10**
VPTH Veterinary Pathology Building **G9**
WADE Wade (Walter W.) Utility Plant **H11**
WALC Wilmeth (Thomas S. and Harvey D.) Active Learning Center **G6**
WANG Wang (Seng-Liang) Hall **H5**
■ Welcome Center (see STEW) **H7**
WEST Westwood (President's Home) **A5, 6**
WGLR Women's Golf Locker Room **D1**
WSLR Whistler (Roy L.) Hall of Agricultural Research **G8**
WTHR Wetherill (Richard Benbridge) Laboratory of Chemistry **G7**
YONG Young (Ernest C.) Hall **H8**
† ZL1 Combustion Research Laboratory
† ZL2 Gas Dynamics Research Laboratory
† ZL3 High Pressure Research Laboratory
† ZL4 Propulsion Research Laboratory
† ZL5 Turbomachinery Fluid Dynamics Laboratory
† ZL8 High Pressure Combustion Laboratory

Residence & Dining Facilities

CARY Cary (Franklin Levering) Quadrangle **F4**
*** DUHM** Duhme (Ophelia) Residence Hall **E7**
ERHT Earhart (Amelia) Residence Hall **D7**
FORD Ford (Fred and Mary) Dining Court **E4**
FST First Street Towers **D7**
HARR Harrison (Benjamin) Residence Hall **C7**
HAWK Hawkins (George A.) Hall **H8**
HCRN Honors College and Residences North **E7**
HCRS Honors College and Residences South **E7**
HILL Hillenbrand Residence Hall **C7**
HILTP Hilltop Apartments **E3**
MCUT McCutcheon (John T.) Residence Hall **C7**
MRDH Meredith (Virginia C.) Residence Hall **D7**
MRDS Meredith (Virginia C.) Residence Hall South **D7**
OWEN Owen (Richard) Residence Hall **E4**
PKRF Parker (Frieda) Residence Hall (formerly Griffin Residence Halls) **E6**
PKRW Parker (Winifred) Residence Hall (formerly Griffin Residence Halls) **E6**
PVAB Purdue Village Administration Building **D9**
PVCC Purdue Village Community Center **C8**
PVIL Purdue Village **C, D9, 10**
*** SHLY** Shealy (Frances M.) Residence Hall **E7**
SHRV Shreve (Eleanor B.) Residence Hall **D7**
SMLY Smalley (John C.) Center for Housing and Food Services Administration **D6**
TARK Tarkington (Newton Booth) Residence Hall **E5**
*** VAWT** Vawter (Everett B.) Residence Hall **E6**
*** WARN** Warren (Martha E. and Eugene K.) Residence Hall **E7**
WDCT Wiley Dining Court **E6**
WILY Wiley (Harvey W.) Residence Hall **E6**
*** WOOD** Wood (Elizabeth G. and William R.) Residence Hall **E7**

Northwest Athletic Complex (C2-3 inset)

BBCH Purdue Baseball Clubhouse
BBPB Purdue Baseball Press Box
SBCH Purdue Softball Clubhouse
SBPB Purdue Softball Press Box
SCHW Schwartz (Dennis J. and Mary Lou) Tennis Center
SOCC Purdue Women's Soccer Building

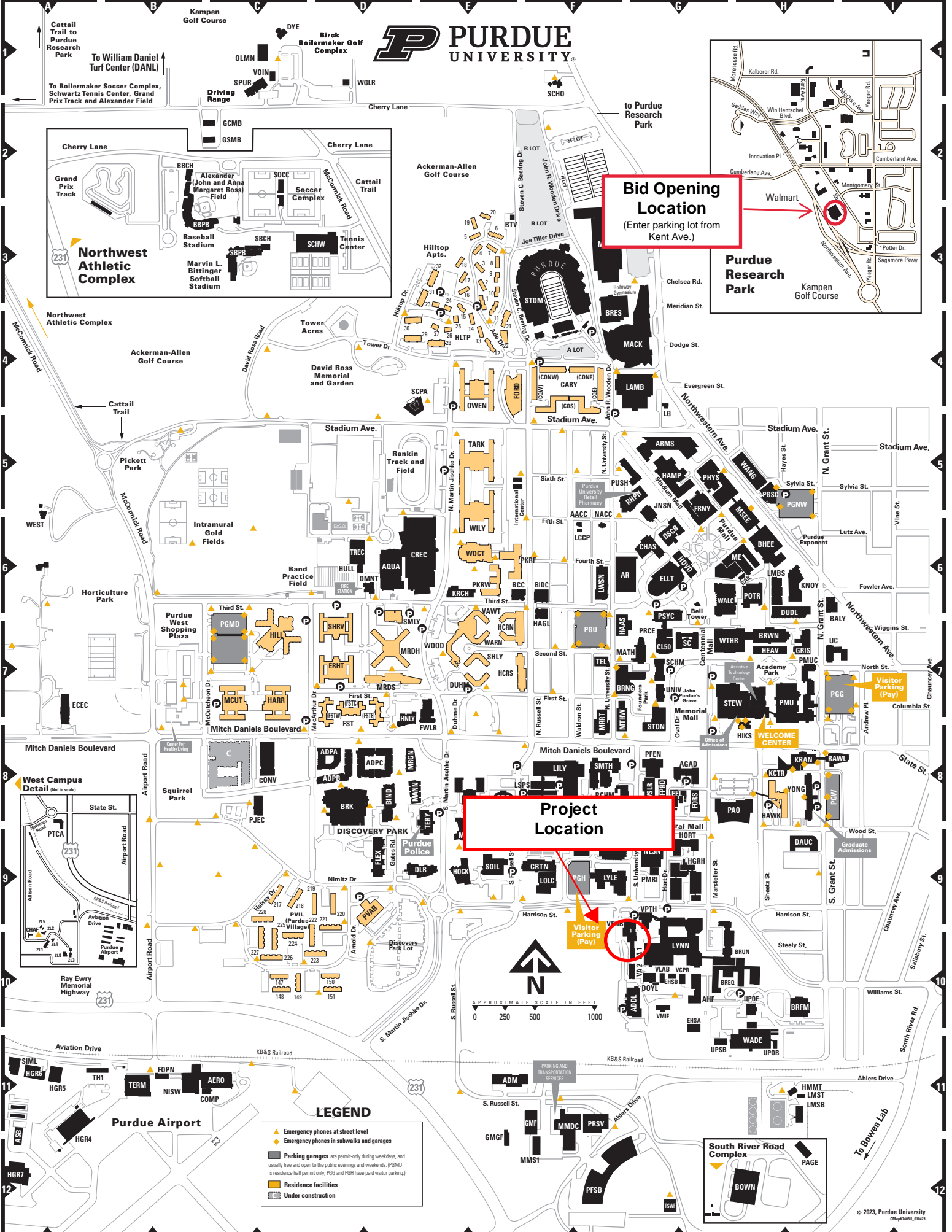
Parking Garages

Parking garages are for permitted parking during weekdays. Parking becomes free and open to the public on most nights and weekends. The Grant Street garage (PGG) has paid visitor parking at all times. **Visitors may purchase day parking passes in advance at purdue.edu/parking. Visitor passes are not valid in the Grant Street garage.**

PGG Parking Garage, Grant Street **17**
PGH Parking Garage, Harrison Street **F9**
PGMD Parking Garage, McCutcheon Drive **C7** (residence hall permit required)
PGNW Parking Garage, Northwestern Avenue **H5**
PGU Parking Garage, University Street **F7**
PGW Parking Garage, Wood Street **H8**

* Windsor Residence Halls

† Part of Maurice J. Zucrow Laboratories



Bid Opening Location
(Enter parking lot from Kent Ave.)

Project Location

- LEGEND**
- ▲ Emergency phones at street level
 - ▲ Emergency phones in subwalks and garages
 - Parking garages are permit-only during weekdays, and usually free and open to the public evenings and weekends. (PGMD is residence hall permit only; PGG and PGH have paid visitor parking.)
 - Residence facilities
 - Under construction

South River Road Complex

BOWN
PAGE

SECTION 01 0100 - PROJECT REQUIREMENTS

SECTION 01 0100 - PROJECT REQUIREMENTS

PART 1: GENERAL

1.01 SCOPE OF PROJECT

- A. Work to include renovation of existing lab spaces including demolition of existing equipment and casework, walk-in cooler, wood doors, interior windows, and lighting. Plumbing and electrical work to include lighting, electrical circuits, and sink. Architectural scope to include installing equipment, doors, and patching CMU. Finish work to include laboratory mobile tables, minor flooring finishes and painting.
- B. Contract: Construction work under unified fixed price contract.

1.02 PROJECT MANAGER

- A. Project Manager for this project is Mike Greene, Physical Facilities, Purdue University, (765) 336-9366

1.03 COMMENCEMENT AND COMPLETION OF THE WORK

- A. Refer to the General Conditions of the Contract, Article 8.
- B. Work on the project shall begin immediately following Award of Contract and must be completed no later than March 21, 2025.
- C. Prior to the Owner's preparation of a Project Punch List, the Contractor shall prepare his own punch list and submit to the Owner.

1.04 JOBSITE VISITS

- A. Any Bidder wishing to make on-site job visits to inspect and verify conditions shall contact Mike Greene, Senior Project Manager, (765) 336-9366, to make arrangements.
- B. All questions about the Contract Documents shall be directed to the Architect of Record.

1.05 PAYMENT

- A. See General Conditions of the Contract, Article 9.

1.06 CONTRACTOR'S USE OF PREMISES

- A. Contractor(s) shall confine his use of premises to the limits of construction shown on the Drawings or as directed by the Owner's Project Manager.

SECTION 01 0100 - PROJECT REQUIREMENTS

1. Use of premises for work and storage shall be limited to allow for Owner's occupancy.
 2. Access to the project area shall be coordinated with the Owner's Project Manager.
- B. Assume full responsibility for protection and safe keeping of products stored on premises.
- C. See Section "Temporary Facilities and Controls" for storage within existing buildings.
- 1.07 CONTRACTOR PARKING
- A. Contractor shall purchase needed contractor parking permits through Purdue University Parking Facilities office. See www.purdue.edu/parking for details.
1. Parking at the Project Site: 2 spaces will be available within the proximity of the Project Site. These parking spaces require green "Contractor Parking" permits and a location to be determined by the Purdue Project Manager. These permits shall be requested by the Contractor through the Purdue Project Manager. Contractor shall submit the approved request form to Parking Facilities to purchase the permit.
 2. Contractor Personnel Parking: Contractor personnel shall park in the Contractor Parking Lot located east of the airport (see map). An orange "Contractor Personnel" parking permit is required for this lot. These permits may be purchased by the Contractor without Purdue Project Manager involvement.
- 1.08 OWNER'S OCCUPANCY
- A. It shall be understood that all occupied buildings in the project area shall operate in a normal manner, without disruption of essential services to the satisfaction of the Owner during construction operations.
- B. Suitable means of ingress and egress shall be maintained to these areas at all times.
- C. Cooperate with Owner in all construction operations to minimize conflict and to facilitate Owner's usage.
- D. If a dispute over time of use or interruption of use of the facilities develop, the Owner's requirements shall take precedence.
- 1.09 PROTECTION
- A. Existing Property:
1. Protect existing property from damage during the work required by these Contract Documents. Any damage done to existing property shall be repaired satisfactorily to the approval of the Owner.

SECTION 01 0100 - PROJECT REQUIREMENTS

2. Existing property includes, but shall not be limited to, buildings, sidewalks, curbs, lawns, grass and shrubs.

B. Work in Progress:

1. In the event of temporary suspension of work for inclement weather or for any other reasons, the Contractor shall protect all work and materials against damage or injury. If damage or injury results from failure to protect, such work and materials shall be removed and replaced at no additional cost to the Owner.

C. Utilities:

1. All existing water and gas pipe, sewers, drains, electrical ducts and other duly authorized structures shall be properly supported and protected by and at the expense of the Contractor during the construction of work under or near them and so as not to interfere with their use. They shall be left in as good condition on completion of the work as when found by the Contractor.

1.10 ASBESTOS AFFIDAVIT

- A. As a part of the project close-out documentation, the Contractor, each of his Subcontractors and each of the material suppliers shall sign an affidavit stating that no materials containing asbestos have been used and/or installed on this project.

1.11 SMOKE-FREE CAMPUS POLICY

- A. As per Purdue University's Smoke-Free Campus Policy effective July 1, 2010, smoking is prohibited on campus except in designated smoking areas. Construction job sites must comply with this policy.
- B. A map of the designated smoking areas on campus may be requested at the pre-construction meeting.
- C. Smoking is only permitted in the designated areas or inside privately owned, closed vehicles.

1.12 UTILITY TUNNELS AND BUILDING LATERALS

- A. The utility tunnels and building laterals are classified as a confined space (not a permit required confined space) under normal operating conditions. Prior to commencing its work, Contractor shall determine whether the area should be reclassified to a permit required confined space due to the Contractor's performance of hot work, painting or any other action. Contractor shall communicate any such determination in writing to the Project Manager and take all action necessary to ensure worker health and safety including compliance with any applicable safety regulation and the Contractor's own safety guidelines.

SECTION 01 0100 - PROJECT REQUIREMENTS

END OF SECTION 01 0100

SECTION 01 2900 – PAYMENT PROCEDURES

SECTION 01 2900 – PAYMENT PROCEDURES

PART 1: GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section
 - 1. Breakdown shall include separate line items for material and labor for Divisions 2 through 48.
 - 2. Round amounts to nearest whole dollar.
 - 3. O&M and As Built Drawings shall be listed as a separate item in the Schedule of Values with a value of 3% of the contract sum but not less than \$1,000 or more than \$250,000.
 - 4. Provide a separate line item in the Schedule of Values for each Allowance, if applicable.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified and paid for by Owner.
- B. Pencil copies of Application for Payment shall be submitted to the Owner's Representative and Purdue Project Manager for approval (5) days prior to formal submission.
- C. Payment Application Forms: use forms provided by Owner for Applications for Payment.
 - 1. Include amounts of Change Orders approved before last day of construction period covered by application.
- D. Transmittal: Submit a signed and notarized original copy of each Application for Payment to Purdue University. Include all required attachments described or prescribed elsewhere in the Contract Documents.
- E. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

SECTION 01 2900 – PAYMENT PROCEDURES

1. Schedule of Subcontractors, Manufacturers and Products.
 2. Schedule of Values
 3. Contractor's Construction Schedule.
 4. Submittal Schedule.
 5. List of Contractor's staff and principal assignments.
 6. Copies of building permits and other authorizations for performance of the Work.
 7. Certificates of insurance and insurance policies.
 8. Certified Schedule of Wages or Certified Payroll, if required.
- F. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- G. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Final statement, accounting for final changes to the Contract Sum.
 4. Contractor's Affidavit, Waiver of Lien, and Guarantee.
 5. Evidence that claims have been settled.
 6. Final, liquidated damages settlement statement.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

PART 1: GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project.

1.03 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. The layout of fire protection, plumbing, mechanical, and electrical systems, equipment, fixtures, piping, ductwork, conduit, specialty items, accessories shown on the drawings and in diagrammatic form, and all variations in alignment, elevation and details required to avoid interferences and satisfy all architectural and structural limitations are not necessarily shown.
 - 2. Actual layout of the Work shall be carried out without affecting the architectural or structural integrity and limitations of the Work and shall be performed in such sequence and manner as to avoid conflicts, provide clear access to all control points, including valves, strainers, control devices and specialty items of every nature related to such systems and equipment, obtain maximum headroom, and provide clearances as required for operation and maintenance.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities.

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

- C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.04 SUBMITTALS

- A. Construction Schedule: Submit a comprehensive, horizontal bar chart or CPM construction schedule within 10 days of the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1.05 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others whose presence is required, of date and time of each meeting. Notify Owner and Architect of dates and times.
 - 2. Minutes: Record and distribute the meeting minutes to everyone concerned within five days of the meeting.
- B. Preconstruction Conference: A/E will schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, at Project site or another convenient location.
 - 1. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing/Critical work sequencing.
 - c. Designation of responsible personnel.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for processing Applications for Payment.
 - f. Submittal procedures.
 - g. Preparation of Record Documents.
 - h. Use of the premises.
 - i. Responsibility for temporary facilities and controls.
 - j. Parking availability.
 - k. Office, work, and storage areas.
 - l. Equipment deliveries and priorities.
 - m. Security.
 - n. Progress cleaning.
 - o. Working hours.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

1. Attendees: 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.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Deliveries.
 - b. Submittals and mockups.
 - c. Possible conflicts, substrate acceptability and compatibility problems.
 - d. Time and weather limitations.
 - e. Manufacturer's written recommendations.
 - f. Warranty requirements.
 - g. Space and access limitations.
 - h. Regulations of authorities having jurisdiction.
 - i. Testing and inspecting requirements and required performance results.
 3. Record significant conference discussions, agreements, and disagreements.
 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Contractor will conduct progress meetings at bi-weekly intervals.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Review the present and future needs of each entity present, including such items as:
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Interface requirements
 - c. Time and sequences
 - d. Access and Site utilization
 - e. RFI's, Submittals, Change Orders
 - f. Off-site fabrication problems
 - g. Housekeeping
 - h. Quality and Work Standards

SECTION 01 3100 – PROJECT MANAGEMENT AND COORDINATION

- i. Documentation of information for payment requests
 - j. Hours of work
 - k. Schedule Updating: Contractor shall revise its Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule at the next meeting. The schedule baseline shall be maintained throughout the life of the project and used to compare against the actual progress of the work.
- E. Contractor Coordination Meetings: Conduct Project coordination meetings at weekly intervals and as needed for the resolution of unanticipated issues. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
- 1. Reporting: Record meeting results and distribute copies to everyone in attendance, Owner and Architect, and others affected by decisions or actions resulting from each meeting.

PART 2: PRODUCTS (Not Used)

PART 3: EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3216 – CONSTRUCTION PROGRESS SCHEDULES

SECTION 01 3216 – CONSTRUCTION PROGRESS SCHEDULES

PART 1: GENERAL

1.01 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.

1.02 SUMMARY

- A. The contractor will create a construction schedule of the Critical Path Method (CPM) type to monitor the project. The contractor will be responsible for providing all information concerning the sequencing and durations of all activities as well as providing the initial CPM logic diagram. Once the initial logic diagram is accepted by Purdue University, the contractor will be responsible for maintaining and providing periodic updates.
- B. If the scope is on multiple levels of a building, each level will be broken out. The electrical, mechanical and general scope will be detailed separately.
- C. This schedule shall be the Contractor's working schedule and used to plan, organize and execute the work, record and report actual performance and progress and outlines how the Contractor plans to complete all remaining work.

1.03 SUBMITTALS

- A. Within ten (10) days after notice of award of contract, the Contractor shall submit for review and approval a framework schedule, along with a work breakdown structure and activity code breakdown structure, and a 60 day detailed schedule. The schedule will be reviewed by Purdue University and returned to the Contractor within fourteen (14) days. Receipt and review of the schedule is a requirement for issuance of the first progress payment.
- B. Within forty-five (45) days after notice of award of the contract, the Contractor shall submit for review and approval the completed schedule, incorporating the 60 day schedule. Progress payments are contingent upon approval of the completed schedule.
- C. Updates of the schedule and the Excel spreadsheet will be sent to Purdue University on the last Friday of every month. Once Red-Zone is reached, updates become required every Friday. Updates are to be delivered in electronic format. Updates are required in electronic schedule software format.

SECTION 01 3216 – CONSTRUCTION PROGRESS SCHEDULES

PART 2: PRODUCTS

2.01 SOFTWARE

- A. The following software packages are acceptable:
 - 1. Primavera Project Planner (P6 XER format)
 - 2. Primavera Suretrack
 - 3. Microsoft Project
- B. Owner supported activities shall be updated in Microsoft Excel format matching the spreadsheet format given to the Contractor.

PART 3: EXECUTION

3.01 NETWORK DETAILS

- A. Detailed Network Diagram: The detailed network diagram shall show all activities required to complete the project and their dependency relationships. Include intermediate milestones as necessary to track important events such as phased completion dates, permanent power, outages, owner furnished equipment delivery, etc., and all items specified in the "Other Conditions" of the contract. Each activity should have an associated activity identification, activity description, duration, early and late start and finish dates, and total float. Logic relationships may include start-to-start, start-to-finish, and finish-to-finish with lags times as required. Finish-to-start lags are not allowed. Start-to-start lags shall be no longer than ten (10) days. Each activity shall have at least one precedent and/or successor activity.
- B. Calendar: List all non-work days to include weekends and holidays. Include other days that university personnel will not be available (refer to current University Academic calendar).
- C. Required Activities: Activities to be included in the network shall be: construction activities; submittal/shop drawing preparation activities; submittal/shop drawing review activities; purchase, manufacture/fabricate, and delivery for major equipment and materials activities; critical inspection activities; utility shutdown activities; and close-out activities.
 - 1. The Contractor will be given a disk with a Microsoft Excel file containing a list of the required milestones. This list of the required milestones is attached in this Specification Section as Attachment "A". The Contractor may add to this list, but may not delete any milestones from it.

SECTION 01 3216 – CONSTRUCTION PROGRESS SCHEDULES

D. Activity Detail: The activities shall meet the following criteria:

1. Unique numbering system to include project number and CSI coding. Include coding for building, phase, area, sub-area, floor, contractor, subcontractor as applicable. Coordinate coding with schedule of values.
2. Whole day units.
3. Construction activities shall have a maximum duration of 15 days.
4. Resource loading in man-hours for each activity. Include proposed resource flow of subcontractors through the building.

3.02 UPDATING

A. The updates will cover the project schedule and the milestones. Update will be compared to the baseline schedule (or accepted revised baseline schedule). Previous months' schedule update will not be used. Update shall include as a minimum the following:

1. Actual start/finish dates
2. Projected remaining durations for activities in progress
3. Logic changes to correct out-of-sequence progress only
4. Narrative to include: reasons for changes and associated impact, progress on the critical path and critical path shifting, total float usage, average number of days activities started early/late, activities which did not start but should have, added/deleted activities.
5. If schedule has slipped, a recovery schedule indicating the logic changes and duration changes required to recover the schedule.

3.03 CHANGE ORDERS

F. If a change in scope influences the project schedule, then a revised project schedule will be submitted with the request for change in contract amount. This revised project schedule will show the change or delay on the current contract schedule completion date. This revised project schedule shall be submitted by the Contractor for review by Purdue University.

END OF SECTION 01 3216

SECTION 01 3523 – OWNER SAFETY REQUIREMENTS

SECTION 01 3523 – OWNER SAFETY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Contractor performing work at the Project site shall demonstrate commitment to workplace safety, safe work practices, and compliance with all applicable safety requirements by one or more of the following methods while working on this project and shall be participating members in one of the following programs:
 - 1. Engaged in an active consultation with IOSHA's INSafe Program for this Project;
 - 2. Establish and maintain a level of "participating" or better in the Coalition for Construction Safety (CCS) Certification Program; or
 - 3. Establish and maintain a "participating" membership status in IDOL/ICI's or IDOL/ABC's Safety Partnership Program.

1.02 SUBMITTALS

- A. Contractor will provide documentation of participation to owner prior to award of contract.
- B. Documentation of participation in a safety program shall be in such form as follows for each program:
 - 1. INSafe Program – employer's INSafe consultation confirmation for the project specifically stated in this contract. Contractor shall provide a copy of the confirmation from INSafe that a consultation has been requested, copies of the confirmation of the visit, and any findings by INSafe.
 - 2. Coalition for Construction Safety (CCS) – participating level will be obtained from the CCS database.
 - 3. IDOL Safety Partnership Programs – letter from the Directors of ICI/ABC attesting to the contractor's participation in the IDOL Safety Partnership Program.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 3523

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

PART 1: GENERAL

1.01 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.

1.02 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities as may be indicated on the Drawings and as specified herein.

1.03 DESCRIPTION

- A. Temporary Electrical Power:
 - 1. Obtain from Owner's existing service.
 - 2. Furnish, install and maintain a temporary wiring system for construction power and light for all trades.
- B. Temporary Heat and Ventilation:
 - 1. Protect work and products against dampness and cold.
 - 2. Provide suitable ambient temperatures for installation and curing of materials.
 - 3. Provide adequate ventilation for safe working environment health regulations.
- C. Temporary Water:
 - 1. Owner's existing service.
 - 2. Coordinate with Owner's Project Manager for point of source.
 - 3. Provide testable, reduced pressure type backflow preventers.
 - a. Owner will test the backflow preventers before they are connected to a potable water source to ensure correct type, lead-free, and correct installation.
 - b. Contractor shall retest backflow preventers after any relocation. Testing reports shall be submitted to Project Manager.
- D. Temporary Telephone:
 - 1. General Contractor provides service of desired.
 - 2. Subcontractors provide service they require.
 - 3. Owner's telephone shall not be available for use, except for emergencies.
- E. Sanitary Facilities:
 - 1. Owner's existing restroom facilities are available for use. If the facilities become abused the contractor will be asked to provide their own portable facilities.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

1.04 COSTS OF TEMPORARY UTILITIES

- A. Temporary Electrical Power:
 - 1. Make all necessary arrangements.
 - 2. Pay for setting, distributing, maintaining, and removing temporary facilities.
 - 3. Owner will furnish and pay cost of power.

- B. Temporary Heat and Ventilation:
 - 1. Pay costs of installation, operation, maintenance, and removal.
 - 2. Pay costs of filter replacement.
 - 3. Contractor shall furnish and pay cost of fuels.

- C. Temporary Water:
 - 1. Pay costs for installing, maintaining, and removing pipe and equipment.
 - 2. Water will be supplied by the Owner.
 - 3. Owner will pay cost of initial testing of backflow preventers.
 - 4. Pay costs for retesting of relocated backflow preventers.

- D. Temporary Telephone:
 - 1. Pay costs of installation, maintaining, and removing temporary service.
 - 2. Pay for local telephone service.
 - 3. Persons making toll calls pay charges.

1.05 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

1.06 GENERAL PROVISIONS

- A. Furnish and maintain during the construction period temporary requirements and facilities and perform temporary Work as required in the performance of this Contract. Upon completion of the Work, all temporary facilities shall be removed and the premises left clean.

- B. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- C. Ingress and Egress:
 - 1. Ingress and egress to the Project construction areas shall be determined by the Owner's Project Manager.
 - 2. Contractors shall not damage any drives, curbs, sidewalks and other site improvements that remain in place.
 - a. Materials and items which are not designated to be removed and are damaged shall be removed and replaced with new materials which match existing.
 - 3. Such means of ingress and egress must take into account that the entrances to existing and adjacent buildings and related access ways must remain open, in operation, unobstructed and available for normal daily operations (and possible emergency exit).
 - 4. Obtain permission from the Owner's Project Manager where necessary to drive a vehicle of any sort over a curb and gutter and onto a sidewalk and on or across a utility tunnel. Such permission will only be granted after an inspection of the areas involved is made. Any damages resulting from passage of vehicles of any sort over curbs, gutters and sidewalks shall be repaired by the contractor at his own expense. Driving of any vehicle over curbs and gutters onto sidewalks without permission will be considered to have been the cause of any flaws found and the contractor shall repair them at his expense.

- D. Access to Existing Adjacent Buildings:
 - 1. The Contractor shall caution all workmen regarding blocking of roadways, illegal parking, blocking of loading docks and blocking of existing facilities from buildings.
 - 2. Throughout the construction period, emergency vehicles routes and access to service entrances of adjacent buildings must be maintained.
 - 3. Coordinate any temporary shutdown of drives or entrances with the Owner.

- E. Maintaining the Use of Existing Adjacent Buildings:
 - 1. It shall be understood that all existing adjacent buildings shall operate in a normal manner, without disruption of essential services to the satisfaction of the Owner during construction operations.

- F. Maintaining Existing Building Security
 - 1. Secure the Project against the entrance of unauthorized persons through construction areas.
 - 2. Maintain proper closures at any openings required in the present exterior walls accommodate construction operations and the sequence of work.

- G. Protecting Existing Materials, Finishes and Mechanical and Electrical
 - 1. All existing materials and finishes designated to remain shall be protected from damage by construction operations and from the elements during the entire period of construction operations. Any existing materials, finishes, mechanical and electrical installations damaged by construction operations or by the elements shall be repaired or replaced as necessary, at no cost to the Owner and to the approval of the Owner's Project Manager.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- H. Storage of Materials:
 - 1. The Contractor shall confine storage of materials within the contract work area as directed by the Owner's Project Manager.
 - 2. Contractor shall be responsible for assigning locations and space for each subcontractor's storage and staging area.
 - 3. Make arrangements for use of all storage areas with Owner's Project Manager.
- I. Signs: The use of signs on the project shall be as approved by the Owner's Project Manager.
- J. Demolition Dust Control: The Contractor shall utilize appropriate dust containment and barriers during demolition activities. The Contractor will provide negative air unit(s) for the Contractor's use during demolition to meet the project requirements.
- K. Chain-Link Fencing: Minimum 2-inch 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts. (Plastic fence is prohibited from being used on campus.)
- L. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- M. Water: Potable

PART 2: PRODUCTS

2.01 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- C. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- D. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- E. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
- F. Roof Harness and Tie-Off Line: Provide harness and tie-off line in accordance with Contractor's sole responsibility for conformance with OSHA requirements for construction.

2.02 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise.
- B. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or if not indicated, enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Set fence posts in compacted mixture of gravel and earth.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
- D. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- E. Fire Protection: Until fire protection is supplied by permanent facilities, the Contractor shall install and maintain temporary fire protection to types needed to protect against predictable and controllable fire losses.
- F. Rodent and Pest Control: Retain an exterminator or pest control company to perform extermination and control procedures so the project will be free of pests at Substantial Completion. Perform operations in a lawful manner using environmentally safe materials.

PART 3: EXECUTION

3.01 INSTALLATION, GENERAL

- A. Install work in neat orderly manner, structurally sound.
- B. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- C. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- D. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations and similar activities. Provide temporary weather tight enclosure for building exterior.
- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
 - 1. Construction dustproof partitions of not less than nominal 4-inch studs, 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure and sealed to floor with tape. Overlap and tape full length of joints.
 - a. Construct a vestibule and airlock at each entrance to temporary enclosure with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
- F. Burning of trash on the site is prohibited.

3.02 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
- B. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 1. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 2. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.
- C. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to municipal or private system designated by Owner as directed by sewer department officials.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

5. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
 6. Provide rubber hoses as necessary to serve Project site.
 7. As soon as water is required at each level, extend service to form a temporary water- and fire-protection standpipe. Comply with Owner's requirements, if any, for spacing and characteristics of standpipes. Provide distribution piping. Space outlets so water can be reached with a 100-foot hose.
 8. Where installations below or adjacent to an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
 9. Provide pumps to supply a minimum of 30-psi static pressure at highest point. Equip pumps with surge and storage tanks and automatic controls to supply water uniformly at reasonable pressures.
- D. Sanitary Facilities: When required by the Contract Documents provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide and maintain toilet tissue, paper towels, paper cups, and similar disposable materials for each facility.
 2. Toilets: Install self-contained toilet units.
 3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 4. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity.
1. Maintain a minimum temperature of 50 deg F in permanently enclosed portions of building for normal construction activities, and 65 deg F for finishing activities and areas where finished Work has been installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- H. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
 - 1. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.
 - 2. Provide metal conduit enclosures or boxes for wiring devices.
 - 3. Provide 4-gang outlets, spaced so 100-foot extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

- I. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

- J. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities.

3.03 SUPPORT FACILITIES INSTALLATION

- A. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.

- B. Street Cleaning: Provide regular street cleaning during course of construction for public streets subject to construction dirt and debris.

- C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
 - 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 - 3. Remove snow and ice as required to minimize accumulations.

- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste.
 - 1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.

- E. Janitorial Services: Provide janitorial services on a daily basis for temporary offices, first-aid stations, toilets, wash facilities, lunchrooms, and similar areas.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- F. Common-Use Field Office: Provide an insulated, weather tight, air-conditioned field office for use as a common facility by all personnel engaged in construction activities; of sufficient size to accommodate required office personnel and meetings of 10 persons at Project site. Keep office clean and orderly.
- G. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site.
- H. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- I. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.
- J. Site Enclosure Fence: Before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or if not indicated, enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Set fence posts in compacted mixture of gravel and earth.
- K. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- L. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 - 2. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.04 OPERATION, TERMINATION, AND REMOVAL

- A. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

SECTION 01 5000 – TEMPORARY FACILITIES AND CONTROLS

- B. Operation: Enforce strict discipline in use of temporary facilities. Limit availability to intended use to minimize abuse. Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and the elements.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion without written consent of Owner.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor except for Project identification signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, clean and renovate permanent facilities used during construction period.

3.05 REPAIR OF DAMAGED AREAS

- A. All landscaping, driveways and parking lot areas, etc., which have been occupied and/or damaged by construction operations or material storage, shall be repaired and restored to their original condition to the approval of the Owner's Project Manager before Substantial Completion will be issued.

END OF SECTION 01 5000

SECTION 01 7700 – CONTRACT CLOSE-OUT

SECTION 01 7700 - CONTRACT CLOSE-OUT

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Inspection procedures for Substantial Completion and Final Completion.
 - 2. Project record document submittal.
 - 3. Operating and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
 - 6. Post Construction Review Meeting.

- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 45.

1.02 SUBSTANTIAL COMPLETION:

- A. Preliminary Procedures: Before requesting an inspection for certification of Substantial Completion (for either entire Work or portions thereof), complete the following. List exceptions in the request.
 - 1. Submit written notice that the project is substantially complete to the Architect and Owner. Provide a list of items not yet in conformance with the contract documents which require attention.
 - 2. Submit one (1) electronic copy of the Operation and Maintenance Manuals to the Architect through Procore.
 - 3. Submit Record Drawings to the Architect through Procore. If only a portion of the work is substantially complete, submit a copy of the Record Drawings covering the completed work.
 - 4. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents to the Architect.
 - 5. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; operating certificates, and similar releases.
 - 6. Deliver tools, spare parts, extra stock, and similar items with appropriate transmittal to the Owner.
 - 7. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tolls, mock-ups, and similar elements.
 - 8. Complete final clean up requirements, including touch-up painting.

SECTION 01 7700 – CONTRACT CLOSE-OUT

- B. Inspection Procedures: Upon receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor on unfilled requirements. Following inspection, the Architect will advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
 - 1. The Architect will repeat inspection when requested and assured that the Work has been substantially completed.
 - 2. Results of the completed inspection will form the basis of requirements for final completion.

- C. Issuance of Certificate:
 - 1. Upon a satisfactory inspection and Contractor completion of the items of substantial completion, the Architect will issue Certificate of Substantial Completion and forward to Contractor.

1.03 FINAL COMPLETION:

- A. Preliminary Procedures: Before requesting final inspection for the certification of final Completion and final billing, complete the following. List exceptions in the request.
 - 1. Submit "Consent of Surety to Final Payment." This consent shall be completed by the Surety and mailed to the University.
 - 2. Submit final billing request with final releases and supporting documentation not previously submitted or accepted to Owner.
 - 3. Submit a signed copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for completion to the Architect.
 - 4. Deliver tools, spare parts, extra stock of materials, and similar physical items to the Owner.
 - 5. Return loaned construction keys to Purdue University Lock Shop, and advise Owner's personnel of change-over in security provisions.
 - 6. Complete start-up testing of systems, and instruction of Owner's Operating/maintenance personnel. Discontinue or change-over and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
 - 7. Complete final cleaning requirements, including touch-up of marred surfaces. Touch-up, repair, and restore marred exposed finishes.

- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect.
 - 1. Upon completion of reinspection, the Architect will prepare a certificate of final completion, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final completion.
 - 2. If necessary, reinspection will be repeated.

SECTION 01 7700 – CONTRACT CLOSE-OUT

1.04 REINSPECTION FEES

- A. Should the Architect be required to perform reinspections due to failure of the work to comply with the status of completion claimed by the Contractor, Owner will:
 - 1. compensate the Architect for such additional or "extra" services; and
 - 2. deduct the amount of such compensation from the final payment to the Contractor.

1.05 RECORD DOCUMENT SUBMITTALS:

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure location; provide access to record documents for the Architect's reference during normal working hours.
- B. The Contractor shall update the Record Documents regularly, and in no event less than once per week. As part of the weekly project meeting, the Contractor shall inform the Project Manager of the status of the updating of Record Documents and, if requested by the Project Manager or Architect, demonstrate that the Record Documents have been recently updated to show current conditions. Failure on the part of the Contractor to update the Record Documents as provided herein shall be cause for withholding a portion of monthly payment until such failure is corrected.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Record Drawings ("As-Builts"): Maintain a clean, undamaged set of blue or black line prints of Contract Drawings, Shop Drawings, and Coordination Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is the most capable of showing conditions fully and accurately; where Shop Drawings or Coordination Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Submit record drawings at Substantial Completion to the Architect.
 - 1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
 - 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings, Shop Drawings, or Coordination Drawings.
 - 3. Note related Request for Information (RFI) numbers and Change Order numbers where applicable.
 - 4. Keep accurate measurements of underground services and utilities referenced to the building or other permanent construction.
 - 5. Note changes of directions and locations, by dimensions and elevations, as utilities are actually installed. Show mechanical dampers, valves, reheat boxes, cleanouts, and other items that require maintenance.
 - 6. Show location of construction-concealed internal utilities and appurtenances referenced to visible and accessible features of the structure.

SECTION 01 7700 – CONTRACT CLOSE-OUT

7. Record accurate locations of piping, valves, traps, dampers, duct work, equipment, and the like.
 8. Indicate field changes of dimension and detail.
 9. "X-out" and appropriately annotate "not constructed" - whichever condition most clearly conveys the actual "as constructed" condition.
 10. Show addenda items.
 11. Organize record drawing sheets into bound manageable sets
 12. Every page needs a red stamp or label on the lower right hand corner near the title block stating "AS-BUILTS"
- E. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, read with continued use and reference. Submit to the Architect.
- 1.06 OPERATING AND MAINTENANCE MANUALS:
- A. Renovations - Provide one (1) electronic copy through Procore. New Buildings – Provide one (1) electronic copy through Procore and two (2) original hard copies of Maintenance Manual(s). Deliver the preliminary manual to the Architect for review prior to Substantial Completion or starting of major equipment, whichever is sooner. The preliminary copy shall comply with all of these requirements except the covers (although the intended layout for same shall be provided). Deliver final manuals and PDF files to Architect for final review. Architect to forward final sets prior to final completion to Owner.
- B. General Construction Work:
1. All materials and equipment will be listed by corresponding specification section.
 2. Final paint and color schedule, manufacturer of paint used, number, location, matching Sherwin Williams paint formula or number; final carpet selection and color, locations; final plastic laminate selections and color, locations; and all other finishes. Recommended maintenance and cleaning procedures for all exposed interior and exterior materials.
 3. Copies of Warranties and Guaranties, with names of servicing agencies.
 - a. All executed certificates, warranties, bonds, and any required service and maintenance contracts from the respective manufacturers, suppliers, and subcontractors.
 - b. Provide complete information for each of the following:
 - i. Product or work item;
 - ii. Firm, with name of principal, address, and telephone number;
 - iii. Scope;
 - iv. Substantial Completion Letter;
 - v. Date of beginning of warranty or service and maintenance contract (unless approved otherwise, the warranty begins on the date of Substantial Completion);

SECTION 01 7700 – CONTRACT CLOSE-OUT

- vi. Duration of warranty or service maintenance contract;
 - vii. Proper procedure in case of failure;
 - viii. Insurances which might affect validity of warranty or bond;
 - ix. Contractor's name or responsible principal, address, and telephone number.
 - 4. Emergency Instructions.
 - 5. Spare parts list.
 - 6. Recommended "turn around" cycles of equipment, maintenance, and surface treatments or finishes.
 - 7. Shop drawings and product data of actual installed items.
 - 8. Original warranties – to be submitted under separate cover.
 - 9. General custodial cleaning instructions for interior finish materials utilized.
- C. Work of Divisions 21, 22, & 23 (Mechanical) and Divisions 25, 26, 27, & 28 (Electrical):
- 1. Copies of approved equipment submittals including equipment manufacturer, make, model number, size, unique equipment ID, serial number, installed location, etc.
 - 2. Supplier's name, address, phone, and reference order numbers.
 - 3. Equipment nameplate and data of major items.
 - 4. Description of system configuration and operation including component identification and interrelations. A master control schematic drawing(s) will normally be required for this purpose.
 - 5. Dimensional and performance data for specific unit provided. Extraneous catalog data must be eliminated.
 - 6. Manufacturers' recommended operation instructions as appropriate.
 - 7. Manufacturers' recommended lubrication and servicing data.
 - 8. Complete parts list including recording information, recommended spares, and anticipated useful life.
 - 9. Fan and pump curves.
 - 10. Fixture lamping schedule.
 - 11. Wiring diagrams.
 - 12. Inspection Procedures.
 - 13. Recommended "tum around" cycles of all equipment and maintenance.
 - 14. Single-Line Diagrams, Flow Diagrams of systems.
 - 15. Final Testing and Balancing Report – to be submitted under separate cover.
 - 16. As-built sequences of operations, control drawings, and original set points.
 - 17. Recommended schedule of calibrating sensors and actuators.
- D. Binders:
- 1. Copies shall be properly indexed and three-hole punched in locking three-ring binders. Provide pocket folders for folded sheet information.
 - 2. Imprint covers with "OPERATING AND MAINTENANCE MANUAL," "PROJECT TITLE," "Purdue University," Prime Architect/Engineer, and Prime General Contractor, and year of completion.

SECTION 01 7700 – CONTRACT CLOSE-OUT

3. Imprint the back edge with "OPERATING AND MAINTENANCE MANUAL," "PROJECT TITLE," and the year of completion.
4. Each copy shall have a type written index and tabbed dividers between categories or sections.
5. Each copy or volume of manual shall not exceed 3-1/2 inch width when three inch binders are used. Label volumes successively by volume # (Ex. Vol. 1 of 3).
6. Each Volume will contain a Table of Contents and Tabs 1-3 noted below.
7. These manuals shall contain all the information needed to operate and maintain all systems and equipment provided in the project. Present and arrange logically for efficient use by the Owner's operating personnel As a minimum the information provided shall include the following:
 - a. Table of Contents
 - b. Tab 1 – Substantial Completion Letter
 - c. Tab 2 – Contact list and corresponding scope of work containing phone, fax, email, and address of the prime contractor, subcontractors, and major manufacturers.
 - d. Tab 3 – Prime contractor's 1 yr. standard warranty on labor and material.
 - e. Remaining tabs contain CSI Divisions 2-45

1.07 CORRECTION OF WORK DURING GUARANTEE PERIOD

- A. Corrections: Where items on the Architect's "Punch List" have not been corrected prior to expiration of the specified guarantee period, it shall nevertheless be the responsibility of the Contractor to permanently correct said items after the specified guarantee period, and the contract corrections are made.
- B. Guarantee Period: All corrective work performed by the Contractor, in remedying defective work during the guarantee period following the Owner's acceptance of the project, shall be subject to the same guarantee requirements of the original work for a period as specified from the date of completion of the corrective work.

PART 2-PRODUCTS - NOT APPLICABLE

PART 3-EXECUTION

3.01 SYSTEMS DEMONSTRATIONS:

- A. Operating and Maintenance Instructions:
 1. After substantial completion and prior to final inspection or full acceptance of the Project, Contractor shall provide qualified personnel for conducting full operation and maintenance training and instructions in the operation, adjustment and maintenance of all operating equipment and systems to Owner's designated personnel; include all general, mechanical and electrical operating systems and equipment.

SECTION 01 7700 – CONTRACT CLOSE-OUT

2. Except as otherwise specified, arrange for each installer of work requiring continuing maintenance or operation to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures.
 3. If installers are not experienced in procedures (in the opinion of the Architect; submit list of experience for each instructor), provide instruction by manufacturer's representatives.
- B. Use operating and maintenance manuals as the basis for instruction. Review contents of Manual with personnel in full detail to explain all aspect of operations and maintenance to include but not limited to:
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.
- C. As part of instruction for operating equipment, demonstrate the following procedures:
1. Start-up.
 2. Shut down.
 3. Emergency operations.
 4. Noise and vibration adjustments.
 5. Safety procedures.
 6. Economy and efficiency adjustments.
 7. Effective energy utilization.
- D. For additional requirements for operations instruction, see respective Specification Sections.
- 3.02 FINAL CLEANING:
- A. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

SECTION 01 7700 – CONTRACT CLOSE-OUT

1. Remove labels that are not permanent labels.
 2. Do not use razor blades to clean any glazing or mirrors.
 3. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
 4. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 5. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
 6. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.
 7. Leave spaces clean enough so that routine "Daily" maintenance will make them ready for occupancy.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems.
1. Remove waste materials from the site and dispose of in a lawful manner.
 2. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.
- 3.03 POST CONSTRUCTION REVIEW MEETING:
- A. This will be a final analysis by the Project Team of the overall Project from Design to Post-Construction. Participants will include but not limited to: Project Manager, Architect/Engineer, General Contractor and prime subcontractors, PM&C Clerical Staff and University Clients.
- B. Items to be discussed include but not limited to the following:
1. Project Communication and Processes
 2. Quality of Meetings
 3. Customer Satisfaction
 4. Product / Service Acceptance

SECTION 01 7700 – CONTRACT CLOSE-OUT

5. Project on Time
6. Project within Budget
7. Architect/ Engineer, Contractor Interactions
8. Management

END OF SECTION 01 7700

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Selective building demolition.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays.
 - 1. Schedule activities in accordance with demolition procedures and sequence of operations submitted to and accepted by Owner and Architect before beginning work.
 - 2. Arrange for and verify termination of utility services encountered.
 - a. Do not shut off or cap utilities without prior notice to Owner and utility companies.
 - b. Notify affected utility companies before starting work, and conform to their requirements.
 - 3. Conduct work so as not to interfere with Owner's use of designated portions of site.

1.3 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Submit in accordance with Division 01.
 - 1. During the work, accurately record location of encountered existing utilities, capped utilities, subsurface conditions and obstructions, and construction remaining within demolition area.

1.4 QUALITY ASSURANCE

- A. Use of Explosives: Not permitted.
- B. Hazardous Materials: Not anticipated. In the event hazardous materials are discovered, immediately notify Architect and Owner. Removal will be under a separate contract.

PART 2 - PRODUCTS

2.1 SALVAGE AND CONSTRUCTION WASTE MANAGEMENT

- A. Items for Owner's use have been removed by Owner from buildings and grounds, except as otherwise specified, shown on Drawings, or directed by Owner or Architect.
- B. Store items indicated for salvage, in a secure, protected location.
- C. Remaining unused demolition from building and site is Contractor's property. Remove from site and dispose of in legal manner.
- D. Remove unused site stored salvaged material prior to Substantial Completion of Project, except where otherwise directed by Owner or Architect.

2.2 REGULATORY REQUIREMENTS

- A. Obtain required permits from governing authorities before proceeding.
- B. Conform to applicable code, health departments, and local and state agencies for demolition of structures, dust control, runoff control, and disposal of debris.
- C. Conform to local governing jurisdiction requirements regarding noise control.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that demolition may safely and appropriately begin.
- B. Verify acquisition of required permits and permission from local governing authorities.
- C. Verify and coordinate with Owner requirements.

3.2 PREPARATION

- A. Provide and maintain temporary barriers and to prevent injury to people and damage to construction and features that to remain.
 - 1. Erect barriers and enclosures to direct heavy equipment and to prevent damage to existing plant materials, surfaces, finishes and other materials to remain.
- B. Cover and protect existing finishes, surfaces, and edges of construction to remain from demolition damage. Cover edges and with layer of clean corrugated cardboard or with one layer of minimum 7/16 inch OSB board or plywood. Tape joints. Do not through-nail into substrate. Include:
 - 1. Floor surfaces, stair treads and risers, and other surfaces susceptible to damage from foot traffic and rolling loads.
 - 2. Plaster, woodwork, and other finishes and surfaces subject to damage from demolition work and equipment.
- C. Take measures to protect and cushion existing construction and finishes at openings where chutes are used.

3.3 SELECTIVE BUILDING DEMOLITION

- A. Conduct demolition operations to prevent damage to finished surfaces, items, and construction at portions of building not designated for demolition.
- B. Minimize cutting and removal of work to remain.
 - 1. Cut finished surfaces, such as concrete, masonry, and plaster, by methods to terminate surfaces in straight line at natural point of division. Do not over-cut.
 - 2. Leave smooth edges at finished surfaces.
- C. Remove items by hand as far as possible. Obtain written approval for use of power-driven equipment.
- D. Remove abandoned items and extraneous material such as abandoned pipe, conduit, clips, fasteners, and fabrications, except where fully concealed. Cap, seal, or plug abandoned work. Remove to the extent required to allow concealment behind finish materials.
- E. Where equipment or fixtures are indicated to be removed, remove related supports, hangers, piping, wiring, ducts, controls, insulation, and other related items that serve no useful purpose, unless noted otherwise.
- F. Reinstall or support mechanical equipment, piping and ductwork, etc., affected by removal or new work that is required to remain in service, as specified for new Work and as accepted by Architect and Owner.
- G. Where existing ductwork, piping, conduits or similar obstructions interfere with the Work, remove, rearrange or relocate items as required, as accepted by Architect and Owner.
- H. See Drawings for specific demolition items.

3.4 SELECTIVE UTILITIES DEMOLITION

- A. Before beginning work, notify utility companies to arrange cut off of services and conform to their requirements.
 - 1. Do not shut off or cap utilities without prior notice to utility companies and to Owner.
 - 2. Do not shut off utilities to Owner occupied on-site facilities.

- B. Disconnect, remove, cap, and identify designated utility lines within demolition area.
- C. Leave active plumbing and electrical conduit in demolition areas, except where designated for removal.
- D. Cap and tag cut lines remaining in place with identifying labels. Show locations on Project Record Documents.
- E. Where unknown utility lines are encountered, arrange with utility companies for identification. Determine whether line is in use or is abandoned. Notify Owner and Architect.
 - 1. Do not cut or otherwise damage unknown utility lines.
 - 2. Where unknown utility lines are cut or damaged without authorization, compensate Owner and utility companies for damage, deducted from Contract Sum.
- F. See Drawings for specific demolition items.

3.5 ADJUSTING

- A. Repair, replace, or reimburse Owner for damage to existing structures and finishes, trees and plant materials, utilities, and other items not indicated to be demolished under this work. Deduct cost from Contract Sum.
- B. Replace finish materials that are a potential food source for molds, fungi, and that have become wet during course of construction.

3.6 CLEANING

- A. Leave demolition areas clean and free from debris and residue resulting from work of this Section.

3.7 REMOVAL AND DISPOSAL

- A. Remove demolished materials, debris, demolition aids, equipment, unused salvage, and stockpiled items such as topsoil from site.
- B. Dispose of demolition material prior to Substantial Completion of Project.
- C. Maintain hauling routes clean and free from demolition work.
- D. Do not store, burn, or bury materials on site.

3.8 MAINTENANCE

- A. Maintain protective fencing, barriers, security measures, and other in-place measures during and following demolition work to prevent damage to existing construction, vegetation, and finishes designated to remain.

END OF SECTION

SECTION 033546 - CONCRETE TOPICAL TREATMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of sealed concrete (SC) that will remain exposed, where no other finish is indicated.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Company certified by or acceptable to manufacturer with minimum 5 years of documented experience installing successful applications of similar scope, type, and complexity.
- B. Field Sample: Before applying densifier and sealer to entire project, apply 100 sq. ft. and request approval from Architect. Accepted densifier and sealer may be incorporated into the Work.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide materials for use within sealed concrete system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2.2 CONCRETE SEALERS

- A. Concrete Substrates, Traffic Surfaces:
 - 1. Acrylic Coating System:
 - a. Products: Provide products indicated on Drawings, or Architect-approved substitution.
 - 1) Scofield, a SIKA Brand; Selectseal Plus.
 - b. Clear Acrylic Floor Coating System:
 - 1) Prime Coat: Primer sealer, interior, low odor/low-VOC.
 - 2) Intermediate Coat: Interior, low odor/low-VOC, matching topcoat.
 - 3) Topcoat: Interior, low odor/low-VOC concrete sealer.
 - c. Gloss: Satin.
 - d. VOC Content: Not greater than 100 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions.
- B. Scarify surfaces and clean substrates of substances that could impair bond of sealer, including dust, dirt, oil, grease, and incompatible materials and encapsulants.
 - 1. Remove incompatible materials or apply compatible tie coat as required to produce sealed concrete system indicated.

3.3 PREPARATION

- A. Examine the substrate and prepare it according to manufacturer's written instructions for system application.

3.4 APPLICATION

- A. Apply system according to manufacturer's written instructions.
- B. Apply to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections.
- C. Protect work of other trades against damage from sealer application. At completion of construction activities of other trades, touch up and restore damaged or defaced sealed surfaces.

END OF SECTION

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:

1.2 STRUCTURALLY REINFORCED CONCRETE UNIT MASONRY.ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with the Work of other Sections.

1.3 QUALITY ASSURANCE

- A. Furnish each type of concrete masonry unit from single source manufacturer.
- B. Manufacturer Qualifications:
1. Company and employees specializing in work of this Section, minimum 10 years documented experience.
 2. Able to document successful fabrication and supply of masonry for projects of similar type and scope with production capacity to sequence into construction schedule without causing construction delay.
- C. Masonry Foreman:
1. Continuously in attendance and conducting supervision for duration of masonry work.
 2. Able to document 5 years' experience supervising and laying out masonry construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Substitutions for Products Specified in this Section: Submit in conformance with provisions specified for substitutions.

2.2 REGULATORY REQUIREMENTS

- A. Special Inspections and Testing for Reinforced Masonry:
1. Test to ASTM C1314 to determine masonry compressive strength.
 - a. Prism Testing: Conform to f_m for design strength of masonry assembly as specified by Structural Notes.
 - b. Where not otherwise indicated assume $f_m = 1500$ psi and verify with Architect before beginning work.
 2. Do not begin work until acceptance of prism and other structural testing.

2.3 CONCRETE MASONRY UNIT MATERIALS

- A. Smooth Face Concrete Unit Masonry: Conform to ASTM C90, Grade N.
- B. Compressive Strength: Minimum 1900 psi as tested to ASTM C140 and as required to meet prism test, as tested to ASTM C1314, for f_m minimum 2,000 psi, and as specified by Structural Notes.
- C. Linear Shrinkage: Maximum 0.065 percent at time of delivery in accordance with ASTM C90 and ASTM C426.
- D. Density: ASTM C90, Normal Weight, 125 pounds per cubic foot density or more unless otherwise indicated.
- E. Minimum Face Shell Thickness: 1-1/4 inch.
- F. Aggregate Types: Normal weight, conforming to ASTM C33.Match existing.

- G. Unit Sizes (W by H by L): 7-5/8 inch by 15-5/8 inch by width shown on Drawings and/or as required to match existing wall thickness.
- 2.4 FURNISH HALF-LENGTH UNITS, RETURN CORNERS, AND OTHER SHAPES TO MAINTAIN RUNNING BOND AND CONSISTENT FINISH.MORTAR
- A. Mortar: As required for construction indicated in drawings.
- 2.5 FINISHES AND COLORS
- A. Smooth Face Concrete Unit Masonry: Painted finish at interior exposed walls under work of Section 099000.
 - B. Mortar Color: As selected by Architect from manufacturer's standard range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section.
- B. Verify masonry units free of cracks, spalling, disfigurements, face chips, or edge chips in excess of 1/4 inch in length or depth. Clean, free of bond breakers and other foreign substances.

3.2 PREPARATION

- A. Obtain exact sizes of openings for ducts, grilles, piping, and similar equipment by other trades.
- B. Cut units requiring cutting with masonry saw.
- C. Do not install poorly cut units or masonry units with chips, cracks, voids, or broken edges.

3.3 INSTALLATION

- A. Conform to manufacturer's instructions, referenced standards, and provisions of Contract Documents.

3.4 CONCRETE MASONRY UNIT INSTALLATION

- A. Install in running bond pattern unless otherwise indicated.
 - 1. Alternate vertical joints in alignment and centered upon alternating masonry units.
 - 2. Maintain coursings straight, plumb, and true.
- B. Tool joints to concave configuration to match existing.
- C. At exposed interior walls and single wythe walls where both faces are exposed, adjust to reduce appearance of irregular block thickness.
- D. Install with square (90 degree) corners, except at angled corners. If infill occurs at rounded corners of existing construction, match profile.
- E. Lay with cells flush and unobstructed by mortar and droppings.
- F. Install bond beams using bond beam units.
- G. Provide precast concrete/masonry lintels were required. Lintels to be scored to match block pattern. Bear at least 8" on each side of opening.
- H. Fill head joints solid. Spread mortar on each course so that small excess is pushed out when masonry unit is laid in position.
- I. Shove masonry unit into position to eliminate voids in mortar bed. Re-lay masonry units that have shifted in fresh mortar.

- J. Build in work specified by related sections.
 - 1. Precast concrete lintels, sills, copings, and trim as part of masonry system. Anchor and dowel as necessary to maintain structural integrity.
 - 2. Ducts, pipes, louvers, structural, and miscellaneous metal work as specified under provisions of other Sections.

3.5 ADJUSTING AND CLEANING

- A. Cut out damaged and defective work, reconstruct with new masonry materials, and repoint with mortar.
- B. Remove excess mortar on masonry and adjacent surfaces.
- C. Cleaning: As specified in Section 040515.

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Elastomeric joint sealants and backer material.
 - 2. Accessories.

1.2 DEFINITIONS

- A. Joint Sealant: Terminology includes "joint sealer," "joint sealant," and "caulking." Regardless of terminology used by Contract Documents, use specified sealant continuously to seal entire area and assembly.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays, and for completeness of weatherproofing system.

1.4 ACTION SUBMITTALS

- A. Product Data: Joint sealant and backer material types, chemical characteristics, performance criteria, and limitations.
- B. Color Samples:
 - 1. Manufacturer's standard selection: Submit on joint sealer material. Reproductions not accepted.
 - 2. Custom color samples: Submit additional custom color samples as directed by Architect.

1.5 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide field-installation of exterior joint sealers specified by this Section under responsibility of a single installer.

1.6 WARRANTIES

- A. Manufacturer:
 - 1. Interior Joint Sealants: Standard 5 year Warranty against failure of materials.
- B. Contractor: 5 year labor Warranty of exterior joint sealants against failure, except at horizontal paving.

PART 2 - PRODUCTS

2.1 SYSTEMS

- A. Interior joint sealant systems installed with pressure gun.
- B. Backer rod as required for hourglass shaped geometry at open joints subject to water penetration. Not required at bedding for thresholds, sheet metal lap seams, paintable interior joints using latex sealants, concealed sealants at gypsum board.
- C. Precompressed foam joint sealant backup sealant at masonry and other rainscreen weather joints.
- D. Sealing of vertical and horizontal construction joints, making air and watertight.

2.2 JOINT SEALANTS

- A. Joint Sealant Manufacturers:
 - 1. BASF Construction Chemicals - Master Builders Solutions (formerly Sonneborn).

2. DOW Inc.
 3. Momentive Performance Materials Inc.; GE Silicones
 4. Pecora Corporation
 5. Sika Corporation
 6. Tremco Inc.; Sealants & Waterproofing Division
- B. Pre-compressed Foam Joint Sealant Manufacturers:
1. BASF Construction Chemicals - Master Builders Solutions (formerly Sonneborn).
 2. Emseal Joint Systems, Ltd.
 3. Tremco Inc.; Sealants & Waterproofing Division
- C. Approved Substitutions: Architect-approved equal products submitted as specified for substitutions Conform to provisions of Section 012500.
- D. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- E. Comply with ASTM C920 and other requirements indicated for each joint sealant specified, including those referencing classifications for type, grade, class, and uses related to exposure and joint substrates.
- 2.3 INTERIOR JOINT SEALANTS
- A. Mildew-Resistant Joint Sealants:
1. ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - a. BASF Sonolastic 150.
 - b. Dow: DOWSIL 786-M White.
 - c. GE Construction Sealants Sanitary SCS1700.
 - d. Pecora 898.
 - e. Sika Corp Bondaflex Sil 100 WF.
 - f. Tremco Tremsil 200.
- B. Other Exposed Joint Sealants, General Use:
1. ASTM C834.
 2. Paintable Siliconized Acrylic Latex Joint Sealant:
 - a. ChemLink TrimCaulk.
 - b. Pecora AC-20 + Silicone Acrylic Latex.
 - c. Tremco Tremflex 834.
 - d. BASF MasterSeal NP 520, acrylic latex.
 - e. GE RCS20 siliconized acrylic latex
- 2.4 BACKER MATERIAL
- A. Backer Rod: Non-adhering, closed cell polyethylene foam or skinned open cell polyethylene foam (soft rod) as instructed by joint sealant manufacturer.
1. Diameter: 1/3 greater than width of joint where it is to be installed.
 2. Polystyrene foam and open cell rods not accepted.
- B. Bond Breaker Tape: Polyethylene tape/plastic tape as recommended by sealant manufacturer, as needed to prevent bonding of joint sealant to substrate where backer rod is not practical.
- 2.5 ACCESSORIES
- A. Joint Cleaner: As recommended by joint sealant manufacturer for joint surfaces.
- B. Joint Primers: Non-corrosive and non-staining type, as recommended by joint sealant manufacturer, for joint surface conditions encountered.

2.6 COLORS AND FINISHES

- A. Colors of Integrally Colored Joint Sealants: As selected by Architect from manufacturer's available colors, including the following:
 - 1. Joints Separating Materials of Same Color.
 - 2. Joints Separating Materials of Different Color.
 - 3. Joint Sealants between Natural / Unfinished Metals.
 - 4. Colors of Joint Sealants to be painted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section, conforming to manufacturer's instructions, before beginning.
- B. Verify surfaces clean and dry before proceeding.
- C. Verify joint size and substrate suitable for joint sealant.
- D. Verify that back-up material and release tapes are compatible with joint sealant.

3.2 PREPARATION

- A. Prepare substrates, conforming to ASTM C1193 and as instructed by manufacturer.
- B. Thoroughly clean joints to remove loose debris, foreign matter, and other bond breaking materials.
- C. Prime joints in accordance with manufacturer's instructions, prior to installation of backer rod, precompressed foam sealant, and bond breaking tapes.
- D. Remove lacquers and protective films from metal surfaces.
- E. Take measures to prevent intrusion of dust, moisture, and other harmful substances into joints during installation.
- F. Apply masking around joints to protect adjacent surfaces from defacement and staining during sealing operations.

3.3 INSTALLATION

- A. Conform to ASTM C1193, manufacturer's instructions, and provisions of Contract Documents.

3.4 BACKER ROD INSTALLATION

- A. Backer Rod Joint Depth Ratio: Force backer rod into joint to proper depth for sealant as instructed by manufacturer. Where not otherwise instructed, conform to following:
 - 1. Where more than 3/4 inch wide install backer to within 1/2 inch of surface.
 - 2. Where less than 1/2 inch wide install backer to within 1/4 inch of surface.
 - 3. Where less than 1/2 inch deep, apply bond breaker tape to bottom of joints to prevent adhesion of sealant to bottom of joint.
- B. Install backing materials in continuous lengths as long as practicable.
 - 1. Use suitable tools for installation that will not damage backing material. Do not insert with sharp objects.
 - 2. Do not puncture backer material.
- C. Bond Breaker Tape: Where backer rod cannot be installed behind joint sealant, install bond breaker tape
 - 1. As necessary to prevent joint sealant from adhering to backing, forming three sided adhesion.
 - 2. As separator over backing materials subject to bleed-through.

3. As separator over asphalt impregnated joint compound and other conditions, where backer rod is not applicable for sealant conditions.

3.5 JOINT SEALANT INSTALLATION

- A. Joint Sealant Width to Depth Ratio - General Sealant: Verify following with manufacturer's instructions.
 1. Joint Sealant Bite: Install between 1/4 inch and 1/2 inch deep, except minimum 1/2 width of joint.
 2. Narrowest Dimension at Joint Sealant Profile: Minimum 1/8 inch thick at center of profile.
- B. Tool joint sealant to make neat, smooth joints.
 1. Provide concave joint profile according to Figure 8A in ASTM C1193 unless otherwise indicated.
 2. Provide flush joint profile according to Figure 8B in ASTM C1193 where indicated.
 3. Provide recessed joint configuration according to Figure 8C in ASTM C1193 of recess depth and at locations indicated.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- C. Take measures to provide positive contact of joint sealants both sides of joint surface. Seal joints before final coat of finish is applied to adjacent surfaces.

3.6 ADJUSTING

- A. Remove and replace joint sealant where determined by Architect to be non-conforming or otherwise defective.
- B. Remove and replace joint sealant from joints where joint sealant is not fully adhered and where joint sealant contains bubbles, foreign matter, and where other defects are evident.

3.7 CLEANING

- A. Remove excess joint sealant material.
- B. Remove and dispose of masking materials.
- C. Leave installations clean and free from residue and debris from work of this Section.

3.8 PROTECTION

- A. Take measures to protect sealed joints during initial set-up and cure, minimum 12 hours.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

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 commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Doors and Frames".
 - 2. Division 28
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.
 - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
 - 3. ANSI/UL 294 - Access Control System Units.
 - 4. UL 305 - Panic Hardware.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 - 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 - 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 - 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
 - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s),

Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Five years for exit hardware.
 - 3. Five years for manual overhead door closer bodies.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
1. Quantity: Provide the following hinge quantity:
 - a. Three Hinges: For doors with heights 61 to 90 inches.
 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - a. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
 4. Hinge Options: Comply with the following:
 - a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
 5. Manufacturers:
 - a. Hager Companies (HA).
 - b. Ives (IV).
 - c. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).
 - d. Stanley Hardware (ST).

2.3 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.
1. Manufacturers:

- a. Sargent Manufacturing (SA) - Interior.
 - b. Schlage Lock Co (SC) - Exterior
 - c. No Substitution.
 - d. Verify and match existing keyway.
- C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Facility Requirements:
- D. Keying System: Each type of lock and cylinders to be factory keyed.
1. Interior Cylinders - Sargent non-removable core restricted keyways: Six Pin – BA, BB, BC, BE.
 2. Exterior Cylinders (Interchangeable Core) –
 - a. Schlage FSIC restricted D125
 - b. Sargent FSIC restricted BF-6
 3. Keyways must be verified / approved by Purdue Lockshop
- E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)
 2. Master Keys (per Master Key Level/Group): Five (5).
 3. Construction Keys (where required): Ten (10).
- F. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.4 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 14 million cycles or greater.
2. Where specified, provide status indicators with highly reflective color and wording for “locked/unlocked” or “vacant/occupied” with custom wording options if required. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status. Indicator window size to be a minimum of 2.1” x 0.6” with a curved design allowing a 180 degree viewing angle with protective covering to prevent tampering.
3. Manufacturers:
 - a. Sargent Manufacturing (SA) - 8200 Series.
 - b. Schlage Lock Co. (SC) – L9000 Series.
 - c. No Substitution.

2.5 AUXILIARY LOCKS

- A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.
 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - 4870 Series.
 - b. Schlage Lock Co. (SC) – L400 Series
 - c. No Substitution.

2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.7 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Large Body Cast Iron): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control.

1. Manufacturers:
 - a. LCN Closers (LC) - 4040XP Series.
 - b. No Substitution.

2.8 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
 - a. Stainless Steel: 300 grade, 050-inch thick.
4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
5. Manufacturers:
 - a. Hager Companies (HA).
 - b. Ives (IV).
 - c. Rockwood (RO).
 - d. Trimco (TC).

2.9 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
 1. Manufacturers:
 - a. Hager Companies (HA).
 - b. Ives (IV).
 - c. Rockwood (RO).
 - d. Trimco (TC).

2.10 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.11 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. The supplier is responsible for handing and sizing all products.
 - 2. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

PART 4 - Hardware Sets

Set: 1.0

Doors: B02A

Description: PoE Access Control Function - Closer w/ Stop

3 Hinge, Full Mortise	TA2714 (size per spec) (NRP as req'd)	US26D	MK
1 Electric Power Transfer - PoE	CEPT-C5E	630	SU
1 PoE Lock w/ Reader	IN220 Series- 82278-BIPS-B-LN-L-26D	US26D	SA
1 Closer w/ Stop	4040XP .SCUSH	.689	LC
1 Sound / Smoke Gasketing	S88		PE
1 Wiring Harness (frame)	PoE-C1300RJ		MK
1 Wiring Harness (door)	PoE-C300RJ		MK
1 Wiring Diagram(s)	Point-to-Point / Elevation		OT

Notes:

Entry by valid credential at lockset reader to release lever or manual key. Free egress at all times.
 Integral RX / DPS functions in lockset to signal opening status.
 Coordinate with electrical & security contractors. ADA Lever.

Set: 2.0

Doors: B02B

Description: Office Function locked from Pull side

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK
1 Office Lock - verify kywy	8205 LW1B (BE BC BB BA)	US26D	SA
1 Wall Stop	406 / 409 (type as applicable)	US32D	RO
3 Silencer	608		RO

Notes:

No free egress from B02 to B03.

Set: 3.0

Doors: B03A

Description: Office Function

1 Office Lock - verify kywy	8205 LW1B (BE BC BB BA)	US26D	SA
-----------------------------	-------------------------	-------	----

1 Wall Stop 406 / 409 (type as applicable) US32D RO

3 Hinge, Full Mortise TA2714 4-1/2" x 4-1/2" US26D MK
3 Silencer 608 RO

Notes: ADA Lever handle

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass for door, and other vision glass glazed assemblies.
 - 2. Setting and glazing materials and accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays, and for completeness of weatherproofing system.

1.3 ACTION SUBMITTALS

- A. Product Data: Glass types and glazing compounds. Include performance charts showing transmittance and shading characteristics.
- B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

1.4 QUALITY ASSURANCE

- A. Provide primary materials which are products of one manufacturer. Provide secondary and accessory materials which are acceptable to manufacturers of primary materials.
- B. Glazer Qualifications: Able to document 3 years experience in cutting and installing glass for similar type and scope of work.
- C. Allowable Tolerances: Thickness of glass specified are nominal. Provide glass manufactured to tolerances listed in GANA - FGMA Manual.
- D. Glass thickness shown and heat treatment specified are minimum requirements. Provide glass thickness and heat treatment as required to meet specified performance criteria, State and local codes and ordinances.
- E. Perform Work in accordance with GANA- FGMA Glazing Manual, GANA Sealant Manual, and GANA Laminated Glass Design Guide for glazing installation methods.
- F. Quality and Dimensional Requirements: ASTM C1036, ASTM C1048, Q3 Glazing, Select Quality, or Better.
- G. Labels: Removable.

1.5 WARRANTY

- A. Coated Glass: Manufacturer 10 year warranty to replace glass coating deterioration not attributed to abuse, misuse, or breakage.
- B. Fire Rated Glazing: Manufacturer 5 year limited Warranty against manufacturing defects resulting in visual and performance defects, such as inclusions.

PART 2 - PRODUCTS

2.1 GLASS MANUFACTURERS AND FABRICATORS

- A. Manufacturers/Fabricators: Provide products from one of the following, or Architect-approved substitution:
 - 1. Guardian Glass, LLC.
 - 2. Pilkington North America/NSG Group.

3. Oldcastle
4. Viracon.
5. Vitro Architectural Glass (Formerly PPG).

B. Approved Substitutions: Architect-approved equal products submitted as specified for substitutions.

2.2 REGULATORY REQUIREMENTS

- A. Safety Glazing: 16 CFR 1201, Category II. Include safety glazing labeling acceptable to authorities having jurisdiction.
1. Comply with safety glazing using tempered glass or laminated glass, unless the type is indicated.

2.3 ANNEALED GLASS (GL-X)

- A. Interior Annealed: ASTM C1036, Type 1 transparent flat, Class 1- clear, Quality q3 - glazing select.

2.4 SETTING AND GLAZING MATERIALS

- A. Setting Blocks: Silicone compatible EPDM or silicone, 80 to 90 Shore A Durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Silicone compatible EPDM or silicone, 50 to 60 Shore A durometer hardness, minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self-adhesive on one face.
- C. Glazing Gaskets: ASTM C864 Option II, resilient Silicone compatible EPDM or silicone, extruded shapes to suit glazing channel retaining slot, 50 to 60 Shore A durometer hardness, one piece with molded corners, black color.
- D. Glazing Tapes:
1. Preformed butyl compound with integral resilient tube spacing device, 10 to 15 Shore A durometer hardness, coiled on release paper, size and thickness as required for conditions of installation, black color. Butyl glazing tape not accepted in fire-rated glass installations.
 2. Expanded Cellular Glazing Tapes: Conform to AAMA 800.
 3. Spacer Tape In Continuous Contact with Silicone: Tested for compatibility and approved for intended purpose by sealant manufacturer.
- E. Temporary Glazing Clips: Manufacturer's standard type.
- F. Silicone Glazing Sealant: Single component, chemical curing, capable of water immersion without loss of properties, non-staining, cured Shore A hardness of 15-25, compatible with insulating unit edge seal, and as specified in Section 079200.

2.5 EXAMINATION

- A. Verify installation conditions as satisfactory to receive work of this Section.
- B. Verify and coordinate glass and related glass and glazing materials with performance requirements of each assembly and installation with recommendations of applicable glass and gasket manufacturers.
- C. Verify and document:
1. Type, size, thickness, and design of glass units.
 2. Include dimensions, tolerances, glazing pockets, jamb and seismic blocking, glass edge clearance, and frame lap.

2.6 PREPARATION

- A. Field Measurements: Measure actual installation before cutting and fabricating.

- B. Clean contact surfaces with solvent and wipe dry.

2.7 GLAZING INSTALLATION

- A. Conform to manufacturer's instructions and provisions of Contract Documents.

2.8 GLASS CUTTING

- A. Cut to accurate sizes and shapes as required; allow edge clearances and tolerances in accordance with GANA recommendations, unless otherwise indicated. Glazing may be factory installed, as practical.
- B. Annealed, and Laminated Glass: Cut for clean, accurate edges. Grind and polish edges indicated to be mitered
- C. Tempered Glass: Provide factory-cutting and factory-formed edges, including drilled holes, notches, and other special fabrication and finishing techniques.

2.9 GLAZING

- A. Glazing Options: Conform to following, except as otherwise specified or where conflicting with manufacturer's instructions.
- B. Interior - Dry Method (Tape and Tape):
 1. Cut glazing tape to length and set against stops, projecting 1/16 inch above sight line.
 2. Place setting blocks at 1/4 points with edge block no more than 6 inch distance from corners.
 3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
 4. Place glazing tape on free perimeter of glazing in same manner described above.
 5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
 6. Knife trim protruding tape.
- C. Interior - Wet/Dry Method (Tape and Sealant):
 1. Cut glazing tape to length and install against stops, projecting 1/16 inch above sight line.
 2. Place setting blocks at 1/4 points with edge block no more than 6 inch distance from corners.
 3. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane of unit.
 4. Install removable stops, with spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
 5. Fill gaps between pane and applied stop with silicone sealant to depth equal to bite on glazing, to uniform and level line.
 6. Trim protruding tape edge.
- D. Interior - Wet Method (Compound and Compound):
 1. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
 2. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

2.10 ADJUSTING, CLEANING, AND PROTECTION

- A. Replace glass damaged during construction period at no additional cost to Contract Sum.
- B. Keep glass in a reasonably clean condition throughout the Work.
- C. Protect glazing from damage during construction period.
- D. When directed, just before Substantial Completion, remove dirt and other foreign material and wash and polish glass included in the work on both sides.

END OF SECTION

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Long roll type rubber/vinyl composite base.
 - 2. Vinyl reducer and transition strips.

1.2 ACTION SUBMITTALS

- A. Product Data: Published product characteristics, performance data, and specifications.
- B. Samples for Verification: Provide samples illustrating selected colors.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Manufacturer's cleaning and maintenance instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Substitutions for Products Specified in this Section: Submit in conformance with provisions specified for substitutions.
- B. Manufacturers: Provide products from one of the following, or approved substitution. Manufacturers of resilient base and accessories include but are not limited to:
 - 1. Armstrong World Industries
 - 2. Roppe Corp.
 - 3. Tarkett Group; Johnsonite

2.2 RESILIENT BASE, GENERAL

- A. Provide either Type TP base specified in this Section.

2.3 RUBBER/VINYL COMPOSITE BASE

- A. Products: As indicated in the drawings. Extruded resilient base conforming to ASTM F1861 Type TP - Rubber, Thermoplastic.
 - 1. Matt finish with solid color throughout material.
 - 2. Type TV - Vinyl, Thermoplastic base not accepted.
- B. Long Roll: Minimum 100 foot continuous base. No short lengths.
- C. Height: as shown on Drawings.
- D. Gauge: 1/8 inch.
- E. Toe Types:
 - 1. Style B - Coved Toe: For both resilient flooring and vinyl, back carpet installations.

2.4 ACCESSORIES

- A. Sealers, Fillers, Primers: Water-resistant type, as instructed by manufacturer.
- B. Adhesives: As instructed by manufacturer.
 - 1. Porous Surfaces: White acrylic cove base adhesive.
 - 2. Non-Porous Surfaces: Contact bond adhesive.

- C. Other Materials: Provide incidental and accessory materials, tools, methods and equipment required for completion of resilient covering installations.

2.5 FINISHES

- A. Resilient Base Color: As indicated on the drawings. Reducer/Transition Strip Color: Match base or as accepted by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section before beginning.
- B. Verify wall substrate installations free of voids and gaps, as necessary to provide solid backing behind resilient base installation.

3.2 PREPARATION

- A. Remove grease, dust, dirt, and other foreign substances. Follow manufacturer's instructions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions and provisions of Contract Documents.

3.4 RESILIENT BASE INSTALLATION

- A. Install resilient base at wall perimeters of rooms and spaces to receive resilient flooring, carpeting, and other floors as indicated.
- B. Provide around entire perimeter of rooms, including kick spaces at fixed casework.
- C. Uncoil wall base 24 hours ahead of installation at room temperature to allow acclimation in the flat condition.
- D. Install from ends toward center. Avoid stretching.
- E. Using approved adhesives, cement directly to solid backing. Bond fully and tightly to wall and floor surfaces.
- F. Fit joints for tight vertical joints. Maintain minimum measurement of 18 inch between joints for resilient base and full length for resilient stringers where possible.
- G. Install with no joints on a single wall less than 25 foot apart.
- H. Corners:
 - 1. Internal Corners: Mark, miter, and fold resilient base at corner.
 - 2. External Corners: Mark and cut V into 2/3 thickness, and wrap resilient base around corner.
 - 3. Make relief cuts as necessary for smooth, even appearance.
 - 4. Adhere with adhesive to hold permanently in place.
 - 5. Pre-molded corner base not accepted.
- I. Scribe and fit to door frames and other interruptions.

3.5 ADJUSTING AND CLEANING

- A. Replace wall base not uniformly adhered to wall, out of alignment, out of plumb, and where showing other installation defects.

- B. After bases and reducer strips have set sufficiently, wash with neutral cleaner as recommended by manufacturer.
- C. Leave surfaces smooth and clean, free of defects.

END OF SECTION

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Vinyl sheet flooring.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's published literature including installation instructions and specifications.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Instructions for cleaning general care.

1.5 MAINTENANCE MATERIALS SUBMITTALS

- A. Maintenance Materials: Supply 10 linear feet sheet of flooring roll for each color at conclusion of Project. Deliver to Owner's Representative and obtain written receipt.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Company specializing in work of this Section with minimum 3 years documented experience installing commercial quality work of this Section.
 - 2. Certified by manufacturer as qualified installer of manufacturer's product prior to Bid.

1.7 WARRANTY

- A. Manufacturer: Standard 5-year warranty.

PART 2 - PRODUCTS

2.1 VINYL MANUFACTURERS

- A. Products: Provide product indicated on Drawings. Manufacturers of sheet vinyl flooring include:
 - 1. Gerflor (Premium Compact)
- B. Approved Substitutions: There will be no approved substitutions.

2.2 MATERIAL

- A. Vinyl Sheet Flooring: Conform to ASTM F1303. Pattern and color extending through the wear layer. Felt composition backing.
 - 1. Gauge: 0.075".
 - 2. Thickness: 82 mils.
 - 3. Weight: 0.55 psf.
 - 4. Width: 6 ft – 6 in.
 - 5. Static Load Limit: 175 psi.
 - 6. Fire Rating:
 - a. Critical Radiant Flux: 0.45 watts per sq cm or greater, tested ASTM E648 and NFPA 253 for Class 1 Rating.

- b. Smoke Developed: Less than 450, tested ASTM E662 and NFPA 258.
 - B. Accessories: Adhesives, strips, and other materials as recommended by manufacturer, for complete installation.
- 2.3 ACCESSORIES
- A. Adhesives: As instructed by manufacturer, formaldehyde free.
 - B. Vinyl Sheet Flooring Chemical Bond Seam Sealer: As instructed by manufacturer.
 - C. Sealers, Fillers, Primers: Water-resistant type, as instructed by manufacturer.
 - D. Cleaner: Neutral type as instructed by manufacturer for conditions of use.
 - E. Other materials: Provide all incidental and accessory materials, tools, methods and equipment required for completion of resilient floor installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify installation conditions as satisfactory to receive work of this Section. Notify Architect of conditions that are not acceptable.
- B. Concrete Surface: Smooth and flat, tolerances as specified in Section 033000.
- C. Adhesion Tests: Verify results, as specified by this Section, conforming to manufacturer's Warranty provisions.
- D. Verify substrate to be free of dirt, dust, or particles that may telegraph through sheet flooring.
- E. Do not begin work of this Section until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Remove grease, dirt, and other foreign substances and particles from concrete slab substrate. Abrade surface if needed or otherwise prepare substrates for proper adhesion. Follow manufacturer's instructions.
- B. Fill cracks less than 1/16 inch wide and depressions less than 1/8 inch deep with crack filler as instructed by manufacturer.
- C. Wider Cracks, Moving Joints, and Slabs Out of Specified Tolerance: refer to manufacturer's recommendations and requirements.

3.3 INSTALLATION

- A. Conform to manufacturer's instructions and provisions of Contract Documents.
- B. Install heat welded using specified adhesive and seam sealer for monolithic flooring surface.
- C. Reducing Strips: Apply at terminations and change of flooring material, as applicable.

3.4 FIELD QUALITY CONTROL

- A. Concrete Slabs Receiving Resilient Flooring Systems: Verify concrete substrate moisture content and pH level as suitable prior to installing resilient flooring system installations, conforming to manufacturer's Warranty provisions.
 - 1. Testing Conditions: Do not conduct field quality control testing until:
 - a. Building envelope is enclosed and weathertight.
 - b. Interior ambient temperature and relative humidity are equivalent to that expected during occupancy by Owner.

3.5 CLEANING

- A. After floor covering have set sufficiently, wash with neutral cleaner. Damp mop surfaces. Do not allow free water on floor covering.
- B. Follow additional manufacturer's instructions for cleaning, protective coatings, and maintenance.

3.6 PROTECTION

- A. Foot Traffic: Restrict to minimal for first 8 hours after installation.
- B. Rolling Loads: Cover traffic areas with plywood or hardboard for first 48 hours after welding seams, and as instructed by manufacture.
- C. Prior to Acceptance by Owner/Architect: Cover flooring with undyed, untreated kraft paper.

END OF SECTION

SECTION 099000 - PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes painting existing and new surfaces unless other finishes are indicated.
 - 1. Pre-Bid Site Visit: Prior to submitting a bid for the work of this Section, make arrangements to tour Project site and examine existing substrates and conditions.
 - 2. Surface preparation.
 - 3. Field-applied primers and sealers.
 - 4. Field applied coatings and painting.
 - 5. Painting and coating schedule.

1.2 ADMINISTRATIVE REQUIRMENTS

- A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays.

1.3 ACTION SUBMITTALS

- A. Product Data: Provide in the same order as scheduled by this Section:
 - 1. Manufacturer's Product Data Sheets for each product.
 - a. Performance features, substrate recommendations, primer recommendations (where required), and product limitations.
 - b. Recommended dry film thickness.
 - c. Solids by weight.
 - d. Solids by volume.
- B. Drawdown Samples: Size not less than 8 inch by 10 inch drawdown for each paint color selected for final acceptance prior to beginning work.
 - 1. Label back of each drawdown with manufacturer, product, color name and number, and gloss level.
 - 2. Furnish additional samples as required for acceptance of colors, finishes, and textures.
 - 3. Retain approved samples for reference.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Product data sheets, manufacturer's application instructions, product color name and number, cleaning instructions, and spot repair and repaint instructions.

1.5 MAINTENCE MATERIAL SUBMITTALS

- A. Include manufacturer instructions and safety datasheet for each product submitted
- B. Turn over to Owner prior to project completion.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Employs full time locally available architectural product representative, technical field representative, testing equipment, and services as necessary to perform inspections and to determine compliance with manufacturer's instructions and provisions of Contract Documents.
- B. Single Source Responsibility: Supply primers, intermediate, and finish coats for each paint and coating system from a single manufacturer, unless otherwise specified.
- C. Applicator Qualifications:
 - 1. Able to document minimum 10 years continuous experience in commercial quality projects of similar type and scope.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide products from one of the following, or Architect-approved substitutions.
- B. Products: Provide products indicated on Drawings, or Architect-approved substitution.
 - 1. Benjamin Moore.
 - 2. McCormick Paints.
 - a. PPG Paints.
 - 3. Sherwin-Williams Co.
- C. Approved Substitutions: Architect-approved equal products submitted as specified for substitutions.
 - 1. Indicate that manufacturer will conform to specified Qualifications, including requirement for manufacturer to employ and maintain full time architectural product representatives, technical field representatives, and testing equipment.
 - 2. Product/Label Analysis: Submit indicating pigments and vehicles in percentages by weight and composition breakdown of pigments and vehicles in percentages by weight.
 - 3. Submit schedule of paints and coatings organized as specified in this Section, showing proposed products and specified products prefaced by "PROPOSED:" and "SPECIFIED:".
 - 4. Products That Are Currently Listed by MPI: Submit the current listings from MPI website, www.paintinfo.com, in PDF form.
 - 5. Products That Are Not Currently Listed by MPI: Proposed products must include current product test reports from an independent testing agency within the past calendar year and certified in writing to be representative of the paint that will be used for this Project, showing performance which meets or exceeds the test results of products in the specified MPI product category, including [VOC content,] [abrasion resistance,] [adhesion,] [corrosion weathering,] [salt fog resistance,] [dry heat resistance,] and other characteristics of paints specified in this Section.
 - a. Submit point-by-point comparisons of product test results, along with test reports from the proposed and specified products, for verification.

2.2 PERFORMANCE CRITERIA

- A. Surface Preparation: Conform to MPI Architectural Painting Specifications Manual, SSPC, manufacturer's instructions, and Contract Documents, for work as needed to prepare substrates to be free of conditions that may impair adhesion and uniformity.
 - 1. Remove bond breakers, dust, foreign matter, and surface irregularities.
 - 2. Prepare to prevent bleed-through of substrate material.
- B. Paint System Application: Conform to MPI Architectural Painting Specifications Manual, manufacturer's instructions, and Contract Documents.
 - 1. Paint Grade: Conform to Premium Grade
 - a. Minimum one primer coat and **two** finish coats.
 - b. Additional coats as necessary to cover with no holidays or other surface imperfections.
 - 2. Dry film thickness (DFT) and wet film thickness (WFT), as instructed by manufacturer.

2.3 MATERIALS

- A. Painting and Coating Schedule: Refer to Schedule at end of this Section for products specified for specific finishes.
- B. Surfaces Not Scheduled for Paints and Coatings: Where unscheduled surfaces are discovered following Bid, assume premium commercial quality paint or coating, meeting or exceeding Approved Product List, and as instructed by manufacturer's technical representative. Submit to Architect for acceptance prior to beginning work.
- C. Coatings: Ready mixed, except catalyzed coatings. Process pigments to consistency for uniform and homogeneous coatings, good flow and brushing qualities, drying or curing free of streaks and sags.

2.4 GLOSS AND SHEEN LEVELS

- A. Conform to Gloss and Sheen Levels as tested in accordance with ASTM D523, regardless of that stated by manufacturer product data and shown on paint containers.
 - 1. Gloss Level 2: Velvet/low-sheen, maximum 10 units at 60 degrees, and 10 to 35 units at 85 degrees.
 - 2. Gloss Level 3: Eggshell, 10 to 25 units at 60 degrees, and 10 to 35 units at 85 degrees.
 - 3. Gloss Level 4: Satin, 20 to 35 units at 60 degrees, and minimum of 35 units at 85 degrees.
 - 4. Gloss Level 5: Semigloss, 35 to 70 units at 60 degrees.
 - 5. Gloss Level 6: Gloss, 70 to 85 units at 60 degrees.

2.5 FINISHES AND COLORS

- A. Product Systems and Gloss Levels: As Scheduled in this Section.
- B. Colors: As indicated.
- C. Paint colors specified are an indication of colors only and do not constitute acceptance of paint manufacturer or products.
- D. Gloss and Sheen Levels: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify conditions ready to receive work of this Section before beginning work.
- B. Arrange for adequate lighting, temporary heat, and ventilation.
- C. Maximum Moisture Content of Substrates: Conform to manufacturer's instructions and guidelines. Perform tests using commercial quality electronic moisture meter. Where exceeding following values, promptly notify Architect and obtain direction before beginning work.
 - 1. Interior Wood: 15 percent, except 12 percent for glue laminated wood.
 - 2. Interior Finish Detail Woodwork, Including Trim, and Casework: 10 percent.
 - 3. Plaster and Gypsum Materials: 17 percent.

3.2 MATERIALS TO BE FINISHED

- A. Prepare and finish surfaces of materials, except as specifically excluded or otherwise specified.
- B. Include Structural, Mechanical, and Electrical Items in rooms and spaces scheduled for painting. Paint out conduit and other such items to match color of adjacent surfaces.
- C. Field paint exposed-to-view surfaces, whether or not indicated to receive coatings, except where specifically excluded by Contract Documents. Include:
 - 1. Pre-finished items such as conduit, ductwork, hangers and seats;
 - 2. Unfinished steel and wood surfaces.
 - 3. Interior utility panels, grilles, and surfaces visible through vents and louvers.

3.3 MATERIALS NOT TO BE FINISHED

- A. Refer to Finish Schedule for rooms or areas not required to be field painted.
- B. Metals: Brass, bronze, copper, stainless steel, pre-finished metal, and plated metals other than galvanized metal, except as specifically indicated.
- C. Plastic laminate, melamine, and other finished plastic surfacing.
- D. Roofing, masonry, stone, and concrete, except as otherwise indicated.
- E. Glass and clear plastic, except as otherwise indicated.

- F. Substrates with specified factory-applied colored finishes and normally unfinished substrates:
 - 1. Includes: Door hardware, electrical switch plates, fabrics, tackboards, porcelain enameled metal fabrications, and lighting fixtures.
 - 2. Exception: Wire mold and other normally prefinished items mounted on surfaces receiving coatings: Paint out to match and blend with field surface.

G. Inaccessible materials permanently enclosed behind building construction and structural components.

3.4 SURFACE PREPARATION UNDER WORK OF OTHER SECTIONS

- A. Field Substrate Preparation Specified Under Work of Related Requirements: Crack free, finished, clean, and as needed to make substrates suitable for primers and finished coats specified for work of this Section, except minimal spot filling, spackling, and other preparation normally performed by work of this Section.
- B. Shop Preparation and Primers for Metal Fabrications: Specified under work of Section 055000, except for spot priming and spot repair of shop primers prior to applying finish coats specified under this Section.

3.5 SURFACE PREPARATION PROCEDURES

- A. Conform to:
 - 1. MPI Architectural Painting Specification Manual, Surface Preparation.
 - 2. SSPC- Surface Preparation Procedures.
 - 3. Manufacturer instructions.
 - 4. Contract Document provisions.
- B. Mildew removal:
 - 1. Do not use bleach to remove mold from carbon-based materials. These include paper, cellulous, wood, sucrose (sugar), gypsum board, and materials that are considered food for mold.
 - 2. Contact Owner and Architect for remediation method for mold contamination of carbon-based materials.
 - 3. Proceed with methods to remove stains as specified by for non-carbon based materials.
- C. Concrete and Concrete Unit Masonry Receiving Opaque Finish:
 - 1. Allow 28 day curing period before beginning work.
 - 2. Remove dirt, loose material, sand particles, loose mortar, scale, laitance, powder, stains, rust, oil, grease, efflorescence, grease, and other bond breakers.
 - 3. Test plaster and masonry surfaces to verify cured and dry.
 - 4. Point, fill, and repair minor cracks, holes, and other surface imperfections.
- D. Steel and Iron: Put in condition to receive paint. Remove grease, rust, scale, dirt, and dust. Use prime paints compatible with finish coats..
 - 1. Field Welded or Abraded Spots: Power tool, clean, and prepare, conforming to SSPC-SP-3. Spot prime by end of same day.
 - 2. Surfaces Shop Primed Conforming to Section 055000: Solvent clean free of oil and grease before coating, conforming to SSPC-SP-1.
 - 3. Surfaces Shop Primed with Alkyd Coatings and Coatings not Conforming to Section 055000:
 - a. Machine clean to SSPC SP-3.
 - b. Hand tool clean to SSPC SP-2 as required for removal of rust and scaling at difficult to reach locations.
 - c. Solvent clean free of oil and grease before coating, conforming to SSPC-SP-1.
 - 4. Surfaces Not Previously Shop Primed:
 - a. Remove Rust and Scale: Power tool clean and prepare, conforming to SSPC-SP-3. Apply primer when thoroughly dry and before forming of visible rust.
 - b. Oil and Grease: Solvent clean, conforming to SSPC-SP-1, before applying finish coat.
- E. Wood Products Receiving Transparent Finishes: Preparation: Sand, seal, and prepare surfaces to receive uniform coatings free of blotches, inconsistent absorption, irregular sheen, and color variations.

1. Remove stains, discolorations, marks, and other surface inconsistencies through sanding, bleaching, and other applicable methods.
 2. Clean as for painted wood surfaces, prior to applying sanding sealer or basecoat.
- F. Wood Products Receiving Opaque Finishes:
1. Clean to remove dirt, bond breakers, and material that is not suitable for paint adhesion to substrate.
 2. Wipe off dust and minor grit prior to applying primer.
 3. Fill nail holes and fine cracks after primer has dried.
 4. Sand smooth and level with surface, ready for finish coat.
 5. Maintain surface condition for subsequent finish coats.
- G. Gypsum Board Surfaces:
1. Repair and remove minor irregularities, contaminations, dust, and dirt.
 2. Where surface defects appear after prime coating, repair defects under work of appropriate Section, and reprime over repaired areas.
 3. Do not begin surface preparation on gypsum board, and other gypsum board materials that have been saturated by water. Notify Owner and Architect.
- H. Mechanical and Electrical Work: Remove dirt, grease, and oil from metal and insulating coverings.
- I. Surfaces Not Specified by MPI, SSPC, or manufacturer's Instructions: Verify with Architect for surface preparation procedures.

3.6 RECOATING SURFACE PREPARATION

- A. Prepare existing coated substrates as needed to make suitable for work of this Section. Proceed as for new work following initial preparation conforming to - Architectural Painting Specification Manual, Surface Preparation, SSPC- Surface Preparation Procedures, manufacturer instructions, and Contract Document provisions.
- B. Concrete and Masonry:
1. Remove old paint, chalking, laitance, and efflorescence down to bare substrate.
 2. Fill holes and cracks with suitable filler.
 3. For substrates not being recoated, match coloration of material being filled.
- C. Metal:
1. Remove deteriorated painted surfaces.
 2. Feather edges to prevent telegraphing of surface blemishes through painted surface.
 3. Prime as necessary to prevent bleed-through of rust.
- D. Wood, Prior to Recoating:
1. Remove and clean existing deteriorated painted surface down to sound substrate, suitable for new coatings.
 2. Sand thick and sharp edges to make feather edge transitions needed to prevent telegraphing through finished paint surface.
 3. Fill and patch checks, blemishes, and deteriorated surfaces.
- E. Wood, Prior to Staining:
1. Proceed as for Recoated Wood, except strip down to bare wood free of coatings and foreign matter.
 2. Spot repair to restore uniformity of color. Bleach stained and watermarked surfaces.
 3. Lightly sand without changing uniform color and character of surface.
- F. Gypsum Board, Veneer Plaster, and Gypsum Based Products:
1. Fill, sand, and spot prime.
 2. Remove unsound coatings and bond breakers.
 3. Apply bonding agent where patching compound overlaps existing painted surfaces.
 4. Sand and feather edge transitions to eliminate telegraphing through finished paint surface.
 5. Remove excessive paint build-up to make sharp corners and edges.

3.7 PROTECTION

- A. Take measures to protect surfaces not receiving work of this Section including protection from overspray, adjacent surfaces and down wind surfaces.
 - 1. Provide drop cloths, shields, and protective equipment.
 - 2. Repair or replace damaged surfaces caused by failure to provide suitable protection.
- B. Remove or mask electrical outlets and switch plates, mechanical diffusers, escutcheons, registers, surface hardware, fittings, fastenings, and other items not receiving coating system.
- C. Correct minor defects and clean substrate surfaces included under work of this Section.
- D. Remove coatings that exhibit surface defects or unsuitable surface adhesion.

3.8 APPLICATION

- A. Conform to manufacturer's instructions, MPI Architectural Painting Specification Manual, and provisions of Contract Documents.
- B. Minimum Number of Coats: The number of coats specified is the minimum number of coats. Apply additional coats as required when substrate, undercoats, or other conditions show through.
- C. Apply painting systems on-site except as otherwise specified.
- D. Conform to manufacturer's instructions for wet film and dry film thickness of coatings.
 - 1. Verify wet film thickness (WFT) by use of wet film gage during application.
 - 2. Test dry film thickness (DFT) using Tooke or other accepted measuring device.
- E. Conform to Premium Grade, including application of minimum of two finish coats over prepared and primed substrates.
- F. Apply as many additional coats for complete coverage and for acceptable finished appearance, free of holidays and color irregularities.
- G. Back-roll, back-brush, and perform other work as necessary to lay down gypsum board fuzz, push spray-applied coatings into surfaces, and to even out and make for smooth, uniform coated surfaces.
- H. Apply primer and each finish coat in slightly different hue as means to verify multiple coat coverage.

3.9 PATCHING

- A. Repair surfaces damaged during construction activities. Spot repair and refinish as necessary for finished appearance prior to Substantial Completion and Owner occupancy.

3.10 REPLACEMENT OF HARDWARE AND MISCELLANEOUS ITEMS

- A. Reinstall items previously removed for painting, including hardware, electrical plates.

3.11 FIELD QUALITY CONTROL

- A. Manufacturers Field Services: Conduct field services by manufacturer's local senior technical field representative.
 - 1. Attend Pre-Construction Conference, view field samples specified in this Section, make intermittent site visits, make final site visit at project completion.
 - 2. Verify conformance to manufacturer's instructions and provisions of Contract Documents for products and procedures.
 - 3. Provide technical assistance to help achieve high quality results.
 - a. Verify mil thickness with wet film gauge, in selected locations.
 - b. Test surfaces with Tooke or approved dry film gauge, for total DFT in selected areas.
 - 4. Promptly notify Architect of suspected non-conforming work and other irregularities.

3.12 ADJUSTING

- A. Take measures as necessary and as directed by Architect to repair, prepare, and recoat systems not conforming to Contract Document provisions.

3.13 CLEANING

- A. As Work proceeds, promptly remove spilled, and splattered paint and coating products so as not to damage surfaces.
- B. Maintain premises free from unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. At conclusion of work, thoroughly clean paint and coatings from surfaces not designated to be painted.
 - 1. Do not scratch or damage surfaces.
 - 2. Verify chemical compatibility of cleaners to materials to be cleaned.
- D. Leave premises neat and clean; free from debris and residue from work of this Section.
- E. Do not dump paint, stains, chemicals and clean/wash painting equipment anywhere in the landscaping around the building, site, or property, including the adjoining property.

3.14 PROTECTION

- A. Protect painting work from damage during remainder of construction period. Remove protection at time of Substantial Completion.

3.15 INTERIOR PAINTING SYSTEMS:

- A. Steel, Non-Galvanized:
 - 1. INT 5.1S-G3: Institutional low odor / low VOC system, eggshell finish.
 - a. System Description:
 - 1) Primer (2 coats): MPI #107 - Rust Inhibitive Primer, W.B.
 - 2) Intermediate Coat and Topcoat: MPI #145 - Latex, Interior, Institutional Low Odor/VOC, (MPI Gloss Level 3).
 - b. Basis of Design: Sherwin-Williams:
 - 1) Primer: Pro Industrial, Pro-Cryl Universal Primer, B66W01310
 - 2) Intermediate Coat and Topcoat: ProIndustrial High Performance Epoxy
- B. Galvanized Metal: (Entirely interior steel doors and frames, railings, misc. steel, pipes, overhead decking, ducts, etc.)
 - 1. INT 5.3N-G5: Institutional low odor / low VOC semi-gloss finish.
 - a. System Description:
 - 1) Primer: MPI #134, Primer - Galvanized, Water Based
 - 2) Intermediate Coat and Topcoat: MPI #147 - Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (MPI Gloss Level 5).
 - b. Basis of Design: Sherwin-Williams:
 - 1) Primer as recommended by manufacturer.
 - 2) Intermediate Coat and Topcoat: ProIndustrial High Performance Epoxy
- C. Concrete Masonry Units:
 - 1. INT 4.2E-G5: Institutional low odor / low VOC system, gloss finish.
 - a. Block Filler: MPI# 4.
 - b. Intermediate Coat and Topcoat: MPI #147, Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss, (MPI Gloss Level 5).Behr Pro, i300 Interior Semi-Gloss Paint, PR370
 - c. Basis of Design: Sherwin-Williams:
 - 1) Block Filler: One of the following, compatible with topcoats:
 - a) PrepRite, Int/Ext Block Filler, B25W00025
 - 2) Intermediate Coat and Topcoat: ProIndustrial High Performance Epoxy

- D. Plaster and Gypsum Board:
 - 1. INT 9.2M-G6: Institutional Low Odor / Low VOC (over low odor, low VOC primer) Gloss Level 6 Gloss finish (gypsum walls and ceilings).
 - a. System Description:
 - 1) Primer: MPI #149 - Primer Sealer, Interior, Institutional Low Odor/VOC.
 - 2) Intermediate Coat and Topcoat: MPI #145 - Epoxy, Interior, Institutional Low Odor/VOC, (MPI Gloss Level 6).
 - b. Basis of Design: Sherwin-Williams:
 - 1) Primer: One of the following, compatible with topcoats:
 - a) ProMar 200 Zero, Interior Latex Primer, B28W02600/B28WQ2600
 - 3) Intermediate Coat and Topcoat: ProIndustrial High Performance Epoxy

3.16 MECHANICAL/ELECTRICAL EQUIPMENT AND RELATED SURFACES:

- A. Unless otherwise specified or noted, paint all unfinished conduits, piping, hangers, ductwork and other mechanical and electrical equipment with color and texture to match adjacent surfaces, in the following areas:
 - 1. Where exposed-to-view in all interior areas.
- B. In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- C. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- D. Do not paint over nameplates.
- E. Paint red or band all fire protection piping and sprinkler lines in accordance with mechanical specification requirements. Keep sprinkler heads free of paint.

END OF SECTION

SECTION 123553 13 – STEEL LABORATORY CASEWORK AND RELATED PRODUCTS

PART 1 — DESCRIPTION OF WORK

1.00 SUMMARY AND SCOPE

A. Section Includes:

1. Information required to furnish all cabinets and casework, modular casework, including tops, ledges, supporting structures, and miscellaneous items of equipment as listed in these specifications, equipment schedules, and drawings. Include delivery to the building, set in place, level, and scribe to walls and floors as required. Furnish and install all filler panels, knee space panels and scribes as shown on drawings.
2. Furnish and deliver all utility service outlet accessory fittings, electrical receptacles and switches as listed in these specifications, equipment schedules, and drawings, as mounted on the laboratory furniture. All plumbing and electrical fittings, not preinstalled in equipment, shall be packaged separately and properly marked for delivery to the appropriate contractor.
3. Furnish and deliver, for installation by the mechanical contractor, all laboratory sinks, cup sinks or drains, drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in these specifications, equipment schedules, and drawings. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.
4. Furnish service strip supports where specified, and set in place, service tunnels, service turrets, supporting structures and reagent racks of the type shown on the drawings.
5. Remove of all debris, dirt and rubbish accumulated as a result of the installation of the laboratory furniture to an onsite container provided by others, leaving the premises broom clean and orderly.

B. Related Divisions:

1. Division 22: Plumbing
2. Division 26: Electrical Fittings and Connections
3. Division 27: Communications

C. Related Publications:

1. SEFA 3 - Scientific Equipment and Furniture Association
2. SEFA 8 - Scientific Equipment and Furniture Association
3. NFPA 30 - National Fire Protection Association
4. NFPA-45 - National Fire Protection Association
5. UL - Underwriters Laboratories
6. ASTM D522 - Bending Test

1.01 BASIS OF WORK

- A. Basis of Design: Use the following product: **Kewaunee Scientific Corporation – RESEARCH COLLECTION (fixed casework – only where indicated) and ALPA SYSTEM (modular benching) Laboratory Furniture** as the standard of construction for laboratory furniture. The

construction standards of this product line shall provide the basis for quality and functional installation.

- B. Acceptable Suppliers: The following suppliers/installers of metal casework and phenolic resin countertops and other miscellaneous materials and supplies for a complete metal laboratory casework installation include (substitutions may be submitted by the contractor w/ approval at the discretion of the architect):
 - 1. Kewaunee Scientific Corporation
 - 2. Lab Crafters, Inc.
 - 3. Mott Manufacturing Ltd.
 - 4. ICI Scientific
 - 5. Air Master Systems
- C. Supply all equipment in accordance with this specification. The offering of a product differing in materials and construction from this specification requires written approval from the owner/architect. This approval must be obtained seven (7) days before the quotation deadline. Procedures for obtaining approval for an alternate manufacturer are defined in section 1.03.B in this specification.
- D. General Contractors should secure a list of approved laboratory furniture manufacturers from the architect as a protection against non-conformance to these specifications.
- E. Participants in the quotation process have the option of clarifying deviations to the specified design, construction, or materials. Without such clarifications, sealed quotations to the owner or owner representative will be construed as being in total conformance to the requirements of the specification.
- F. The owner/owner's representative reserves the right to reject qualified or alternate proposals and to award based on product value where such action assures the owner greater integrity of product.

1.02 QUALITY ASSURANCE

- A. The steel laboratory furniture contractor shall also provide worktops and fume hoods all manufactured or shipped from the same geographic location to assure proper staging, shipment and single source responsibility.
- B. General Performance: Provide certification that furniture shall meet the performance requirements described in SEFA 8.
- C. Finish Performance: Provide independent test lab certification that furniture shall meet the performance requirements described in section 2.05 of these specifications.

1.03 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's data and installation instructions for each type of casework.

- B. Samples:
Samples from non-specified manufacturers will be required and reviewed per specification. Samples shall be delivered, at no cost to the architect or owner, to a destination set forth by the architect or owner. This must be done seven (7) days before quotation deadline as a condition of approval of each bidder. Samples shall be full size, production type samples. Miniature or "Show Room" type samples are not acceptable. Furnish the following:
1. Support structure, suspended cabinet and required hardware.
 2. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests.
 3. Sample of all mechanical service fittings, locks, door pulls, hinges, and interior hardware.
- C. Shop Drawings:
Submit shop drawings for furniture assemblies showing plans, elevations, ends, cross-sections, service run spaces, location and type of service fittings.
1. Coordinate shop drawings with other work involved
 2. Provide roughing-in drawings for mechanical and electrical services when required

PART 2 — PRODUCTS

2.00 MANUFACTURERS

- A. The basis of this specification is steel casework manufactured according to the standards used by **Kewaunee Scientific Corporation**, 2700 Front Street, Statesville, North Carolina. The specified design is Research Collection. All laboratory equipment covered by the specification shall be the product of one manufacturer and be fabricated at one geographic location to assure shipping continuity and single-source responsibility. All quotations from a manufacturer other than Kewaunee Scientific Corporation shall contain a review of the following capabilities:
1. List of a minimum of ten (10) installations over the last five (5) years of comparable scope
 2. Proof of project management and installation capabilities
 3. SEFA member in Good Standing
- B. The selected manufacturer must warrant for a period of one-year starting (date of acceptance or occupancy, whichever comes first) that all products sold under the contract referenced above shall be free from defects in material and workmanship. Purchaser shall notify the manufacturer's representative immediately of any defective product. The manufacturer shall have a reasonable opportunity to inspect the goods. The purchaser shall return no product until receipt by purchaser of written shipping instructions from the manufacturer.

2.01 CABINET MATERIAL:

- A. Steel:
Cabinet bodies, drawer bodies, shelves, drawer heads and door assemblies shall be fabricated from cold rolled steel.

2.02 DRAWER AND DOOR STYLE:

- A. Inset – Square Edge
Drawers and doors, when closed, shall be recessed to create an overall flush face with 1/8" reveals. The outer drawer and door head shall have a channel formation on all four sides to eliminate sharp raw edges of steel. The top front corners of the door shall be welded and ground smooth.

2.03 MATERIALS

- A. General Requirements:
It is the intent of this specification to provide a high-quality steel cabinet specifically designed for the laboratory environment.
- B. Steel:
1. Cold Rolled Steel:
Cold rolled sheet steel shall be prime grade 12-, 14-, 16-, 18- and 20-gauge U.S. Standard; roller leveled, and shall be treated at the mill to be free of scale, ragged edges, deep scratches or other injurious effects.
 2. Stainless Steel:
Stainless Steel shall be Type 304; 12-, 14-, 16-, 18- and 20-gauge U.S. Standard. Stainless steel shall be supplied with a #4 finish free of burrs, weld marks, or other imperfections.
- C. Composition Core Plywood
Composition core plywood shall be 3-ply and shall be compliant with ANSI A208.1-199, and/or ANSI A208.2-1994
- D. Hardware and Trim:
1. Drawer and Door Pulls:
 - a. Aluminum-Recessed – Pull Style 9 (Not available on Overlay – Wood on Steel)
Pull shall be aluminum, with clear lacquer finish, recessed into the face of doors and drawer heads. Use of plastic pulls (molded or extruded), or a design not compatible for usage by the handicapped will not be acceptable.
 - b. Sliding Door Pulls:
Sliding door pulls shall be Aluminum-Recessed – Pull Style 9. Finger holes or slots machined into doors will not be acceptable.
 2. Hinges:
 - a. Inset 5-Knuckle Hinges:
Inset style cabinets shall use 5-Knuckle hinges made of Type 304 stainless steel .089 thick, 2-1/2" high, with brushed satin finish, and shall be the institutional type with a five-knuckle bullet-type barrel. Hinges shall be attached to both door and case with two

screws through each leaf. Welding of hinges to door or case will not be accepted. Doors under 36" in height shall be hung on one pair of hinges, and doors over 36" in height shall be hung on three hinges.

3. Drawer Slide: (Choose One)
 - a. Heavy duty, full extension, soft-close, self-closing, zinc plated, ball bearing slides, rated for 100 pound
4. Catches – For steel casework with 5-knuckle hinges:
 - a. Positive Catch:
A two-piece heavy-duty cam action positive catch Main body of the catch shall be confined within an integral cabinet top or divider rail, while latching post shall be mounted on the hinge side of door. Polyethylene roller type catches are not acceptable.
5. Shelf Adjustment Clips:
Shelf adjustment clips shall be die formed, nickel-plated steel.
6. Leg Shoes:
Leg shoes shall be a pliable, black vinyl material and shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Use of a leg shoe, which does not conceal leveling device, will not be acceptable.
7. Base Molding:
Base molding shall be provided by others.
8. Sink Supports:
Sink supports shall be the hanger type, suspended from end panels of sink cabinet by four 1/4" dia. rods, threaded at bottom end and offset at top to hang from two full-depth reinforcements, welded to the top of end panels. Two 3/4" x 1-1/2" x 12-gauge channels shall be hung on the threaded rods to provide an adjustable sink cradle for supporting sinks.
9. Support Struts:
Support struts shall consist of two 16-gauge channel uprights fastened top and bottom by two adjustable 12 gauge "U" shaped spreaders, each, 1-1/2" x length required, formed from galvanized steel. Struts shall be furnished to support drain troughs, and to support worktop at plumbing space under fume hood superstructures or other heavy loads. Support struts can be furnished with hangers at extra cost when specified, to support mechanical service piping and drain lines.

2.04 CONSTRUCTION

A. Steel Cabinet Construction (Research Collection):

1. General:
 - a. The steel furniture shall be of modern design and shall be constructed in accordance with the best practices of the Scientific Laboratory Equipment Industry. First class quality casework shall be insured by the use of proper machinery, tools, dies, fixtures and skilled workmanship to meet the intended quality and quantity for the project.

- b. All cabinet bodies shall be flush front construction with intersection of vertical and horizontal case members, such as end panels, top rails, bottoms and vertical posts in same plane without overlap. Exterior corners shall be spot welded with heavy back up reinforcements.
 - c. Each cabinet shall be complete so that units can be relocated at any subsequent time without requiring field application of finished ends or other such parts.
 - d. Case openings of Inset style cabinets shall be rabbeted on all four sides for both hinged and sliding doors to provide a dust resistant case.
 - e. All cabinets shall have a cleanable smooth interior. Bottoms shall be formed down on sides and back to create easily cleanable corners with no burrs or sharp edges.
 - f. Cabinets shall be designed using a standardized grid pattern to allow reconfiguration of doors and drawers.
2. Steel Gauges:
Gauges of steel used in construction of cases shall be 18 gauge, except as follows:
- a. Leveling bolt reinforcements 12 gauge.
 - b. Top and intermediate front horizontal rails, apron rails, hinge reinforcements, and reinforcement gussets, 16 gauge.
 - c. Drawer assemblies, door assemblies, bottom, bottom back rail, toe space rail, and adjustable shelves, 20 gauge.
- B. Base Cabinets:
- 1. End uprights shall be formed into not less than an L formation at top, bottom, back and a 3/4" wide front C formation. A pilaster shall be added to the inside front of the upright for cabinet and hinge reinforcement and shall be perforated for the support of drawer channels, intermediate rails, hinge screws, and shelf adjustment holes.
 - 2. A 7/8" high top horizontal rail shall interlock with the flange at top of end panels for strength, but shall be flush at face of unit. Top rails not flush with face of end uprights are not acceptable.
 - 3. Intermediate rails shall be provided between doors and drawers but shall not be provided between drawers unless made necessary by locks in drawers. Intermediate rails shall be recessed behind doors and drawer fronts, and designed so that security panels may be added as required.
 - 4. Intermediate vertical uprights shall be furnished to enclose cupboards when used in a unit in combination with a half width bank of drawers.
 - 5. Cabinet bottom shall be formed of one piece of steel, except in corner units, and shall be formed down on sides and back to create a square edge transition welded to cabinet end

- panels. Front edge shall include a C formation to form a 7/8" high bottom front rail and shall be flush with face of end uprights. Cabinet bottom front rails not flush with face of end uprights are not acceptable.
6. Toe space rail shall extend up and forward to engage bottom panel to form a smooth surfaced fully enclosed toe space, 3" deep x 4" high.
 7. Back construction shall be one piece with integral channel formed for maximum strength and welded to back of top and bottom flanges of end uprights.
 8. Each bottom corner of base cabinets shall have a 3/8"-16 leveling bolt, 2-1/2" long capable of supporting 500 lbs. Access to the leveling bolts shall be through plug buttons in the cabinet bottom. Access to leveling bolts through toe space or leveling bolts requiring special tools to adjust are not acceptable.
 9. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear and formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf. Shelves shall be adjustable on not more than 1" increments.
 10. Steel Door assembly (two-piece) for solid panel swinging doors shall consist of an inner and outer door pan. Outer door pan shall be formed at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material. Door assemblies shall be painted prior to assembly and shall be punched for attaching pulls. Inner pan formation of door shall be indented for in-field installation of locks when required.
 11. Doors shall be readily removable and hinges easily replaceable. Hinges shall be applied to the cabinet and door with screws. Welding of hinges to either cabinet or door will not be acceptable.
 12. Drawer Assemblies:
 - a. Drawer bodies shall be made in one-piece construction including the bottom, two sides, back and front. They shall be fully coved at interior bottom on all four sides for easy cleaning. The top front of the inner drawer body shall be offset to interlock with the channel formation in drawer head providing a 3/4" thick drawer head.
 13. Knee space panels, where shown or specified, shall be 20 gauge, finished same as casework cabinets, and easily removable for access to mechanical service areas.

C. Special Purpose Storage Cabinets:

1. Acid Storage Fume Hood Cabinets:

Acid storage fume hood cabinets shall utilize the same gauges of steel and construction features as other base cabinets except they shall be completely lined with a one-piece polyethylene corrosion resistant liner. The liner shall be 1/4" thick, molded into a seamless

tub, including top, sides and bottom, with a 1" lip at the bottom front to contain spills. Tubs shall include integral cleats at both ends and back to support an optional shelf. Each door shall have a set of louvers at the top and bottom and have a 1/8" sheet polyethylene liner. Where specified, each cabinet shall be vented into the fume hood with a 1-1/2" vent pipe allowing a positive airflow directly into the fume hood exhaust system. When specified or shown on drawings, cabinet shall include a full-depth phenolic resin.

2. Solvent Storage Cabinets:

Solvent storage cabinets shall be specifically designed for the storage of flammable and combustible liquids. Construction shall be based upon the requirements listed by UFC, OSHA and NFPA No. 30 - 1993, and cabinets shall be FM approved and labeled. The bottoms, top, sides and doors shall be fabricated of 18-gauge steel and shall be all double panel construction with a 1-1/2" air space between panels. All joints shall be welded, or screwed, to provide a rigid enclosure. The doors shall swing on full-length stainless steel piano hinges and shall be fully insulated. The doors are self-closing and synchronized so that both doors will always fully close. The right-hand door is equipped with a three-point latching system that automatically engages when the doors close. Each door is equipped with a fusible-link hold-open feature that will ensure the door closes should the temperature outside the cabinet exceed 165 degrees Fahrenheit. Units 24" long have only one door, self-closing, and equipped with a three-point latching system and hold-open feature. A 2" deep liquid tight pan that covers the entire bottom of the cabinet shall be furnished to contain liquid leaks and spills. A second pan shall be provided to serve as a full-depth adjustable shelf. Two, 2" diameter, diametrically opposed vents with spark screens shall be provided in the back of the cabinet as well as a grounding screw. The cabinet shall have interior finish same as exterior. The cabinet shall be labeled: "FLAMMABLE - KEEP FIRE AWAY".

3. Vacuum Pump Cabinets:

Vacuum pump cabinets shall utilize the same gauges of steel and construction features as other base cabinets except they shall be provided without a bottom to allow vacuum pumps and other equipment to be rolled in and out of the cabinet. The interior of the cabinet shall be lined with a 1-inch-thick neoprene foam for sound deadening and easy cleaning. Each cabinet shall be furnished with a 120 VAC, 20-amp, duplex receptacle mounted on the inside cabinet back and a pilot lighted toggle switch mounted in the top front panel. Each cabinet shall be furnished with a 1½" diameter PVC vent pipe in the back for venting or access to the fume hood above. The toe kick shall be attached to the doors and shall allow total access to the front of the cabinet. Internal wiring from the switch and pilot light to the receptacle shall not be furnished unless otherwise specified.

D. Upper Cabinet Construction:

1. Upper cabinets shall have a completely finished interior same as exterior and shall be designed so that no mounting hardware is visible when installed.
2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front edge of end upright shall be 3/4" wide. A pilaster shall be added to the inside front of the upright for cabinet and hinge reinforcement and shall be perforated for hinge screws, and shelf adjustment holes.
3. Cabinet tops shall be formed with a 7/8" high C formation at the front edge and turned down

- at the back to engage a wall hanging rail.
4. Cabinet flush bottoms shall be formed with a 7/8" high C formation at the front edge.
 5. Cabinet false bottoms shall be formed down on all four edges and shall be removable.
 6. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes. Holes shall be enclosed by end uprights.
 7. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear, formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation welded to underside of shelf. Shelves shall be adjustable on not more than 1" increments.
 8. Glazed doors (where indicated) shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. Outer door pan shall be 18-gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18-gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. Glass shall be held in place by a rubber or vinyl gasket around the entire edge of the glass. Doors shall be glazed with:
 - a. 1/8" tempered glass
 9. Solid panel doors shall consist of an inner and outer door pan. Outer door pan shall be formed into a channel or flanged shape at all four sides. The corners on the pull side of the outer door pan shall be welded and ground smooth to prevent exposure of sharp edges of steel at these critical points. Inner door pan shall be flanged at all four sides with hinge reinforcements welded in place. The door assembly shall be 3/4" thick and contains sound deadening material.
 10. Sliding doors shall be suspended from the top in a roll formed steel track fastened to the cabinet top and shall glide on nylon rollers. Track shall be so designed to prevent accidental removal of doors.
 11. Swinging doors under 36" high shall be hung on one pair of hinges, doors over 36" high shall be hung on three hinges.
- E. Steel Full Height Cabinet Construction:
1. Full height storage cabinets shall have a completely finished interior same as exterior.
 2. End uprights shall be formed at front, bottom and back to provide maximum strength and rigidity. Front fascia of upright shall be 1-1/4" wide with inside edge formed in a channel 1/2" x 3/8". A full height box reinforcement shall be fitted to the channel, formed to provide a recessed strike for door and to reinforce the cabinet. The backside of the reinforcement shall be perforated with shelf adjustment holes spaced at not more than 1" centers. Back of upright shall be formed in a 2-1/2" formation. 16-gauge hinge reinforcement shall be welded to inner side of front uprights.

3. Cabinet tops shall be formed into a channel shape at front with flange at rear and sides for electro-welding cabinet top to cabinet back and ends. Front fascia channel shall be strengthened with electro-weld reinforcements.
 4. Cabinet bottoms for storage cabinets shall be formed down on sides and back to create a square edge transition welded to cabinet end panels, and front edge shall be offset to create a seamless door recess rabbet for dust stop. Cabinet bottoms shall be formed to provide a flush 1" face rail with a return flange to give a 9/16" deep x 5" high toe space. All cabinets shall have a cleanable smooth interior.
 5. Toe space rails shall interlock in back of bottom rail and with end panel to provide a welding plate, and shall extend to the floor with a flange turned back and up for support.
 6. Cabinet backs shall be welded to the top, bottom and ends. Backs shall be perforated for shelf adjustment holes on not more than 1" centers. Holes shall be enclosed by a formation in cabinet back and enclosed by end uprights.
 7. Adjustable shelves shall be formed down 3/4", returned back 7/8" and up 1/4" into a channel formation front and rear; formed down 3/4" at each end. Shelves over 42" long shall be further reinforced with a channel formation electro-welded to underside of shelf. Shelves shall be adjustable on not more than 1" increments.
 8. Glazed doors (where indicated) shall be 3/4" thick and consist of an inner and outer door pan welded together to form a single unit. Outer door pan shall be 18-gauge steel, formed into a channel or flanged shape at all four sides. It shall be pierced and formed to create a 3" wide frame with a beveled edge around the glass opening in the center of the door. Inner door pan shall be 18-gauge steel, flanged at all four sides, and pierced for a glass opening in center of the door. Door glazing shall be held in place by a rubber or vinyl gasket around the entire edge of the glass. Doors shall be glazed with: (Choose one)
 - a. 1/4" safety glass
 9. Solid panel doors shall consist of inner and outer pan formations mechanically assembled after painting. All full height solid panel doors shall be further reinforced by a full-height channel formation welded to inner pan. Doors shall be 3/4" thick and contain sound deadening material.
 10. Sliding doors shall be suspended from the top in a roll formed steel track welded to cabinet top and shall glide on nylon rollers. Track shall be so designed to prevent accidental removal of doors.
 11. Swinging doors under 36" high shall be hung on one pair of hinges, doors over 36" high shall be hung on three hinges.
- F. Apron and Leg Assembly Construction:
1. In general, freestanding tables and/or apron and leg assemblies consist of welded leg assemblies connected to aprons by mechanical fasteners.

2. Table apron rails shall be formed of 16-gauge steel. The rails shall be 4" high, formed top and bottom into a channel formation. Where drawers occur, the apron rails shall provide the required opening.
3. Table legs shall be 2" square welded tubing. Securely welded to bottom end shall be a 14-gauge die formed gusset with four flanges. A threaded clinch nut shall accommodate a 3/8" 16 x 2-1/2" long leveling bolt. Leg shoes shall be provided on all table legs, unless otherwise specified, to conceal leveling bolts. Use of leg shoe which does not conceal leveling device will not be acceptable.
4. Stretchers shall be constructed of 18-gauge steel and furnished where indicated on drawings. They shall be formed into a 2-7/64" x 1-1/2" channel formation and secured to table legs by a die-formed clip of 16-gauge steel. Clips shall be welded at ends of channel.

G. Modular Casework Construction (Alpha System):

1. Structural Modules:
The Structural Module is the primary support structure for the Adjustable Worksurface Frames, Shelving, and Suspended Casework. It can also be used as a chase and support structure for electrical and plumbing services.
2. 3" Wall Structural Modules:
 - a. 3" Wall Structural Modules are designed to mount directly to the wall. They accommodate optional moveable access panels and provide support for Adjustable Worksurface Support Frames, Shelving, and Suspended Casework. Vertical adjustment is on 1" increments.
 - b. Module uprights are extruded aluminum with a double slotted steel insert for Shelving and Adjustable Worksurfaces on 1" increments. On 84" high modules, the upright is split at either the 36" or 46" height to allow for future removal or relocation of the upper portion.
 - c. Module frames are manufactured of 16-gauge CRS steel and lock into uprights to form a rigid connection. These frames are designed to accommodate the removable access panels and are provided with electrical cutouts when indicated by model number or shown on the drawings.
 - d. Removable access panels are 18-gauge CRS steel and are removable without the use of tools.
 - e. 3" Wall Structural Modules are available in heights of 36", 48", and 84", and are available in lengths from 24" to 72" in 6" increments.
3. 9" Wall Structural Modules:
 - a. Shall be as described under 3" Wall Structural Modules but be designed with the module upright set 6" off the wall to create pipe space for unrestricted horizontal plumbing and electrical lines, and ledge space for deck mounted fittings and

cupsinks.

4. 12" Island Structural Modules:
 - a. 12" Island Structural Modules areas described under 9" Wall Structural Modules, but with two sets of opposite facing module uprights, 6" apart. The double-sided module is capable of supporting shelving, adjustable worksurface support frames, and suspended casework on each side. Adjustable inner core shelving is supported from the inside of the uprights and all vertical adjustments are on 1" increments.
 5. Corner and Peninsula Modules and Columns:
 - a. Corner and Peninsula Modules are designed using the same components as the 3", 9", and 12" Structural Modules, and are designed to provide spacing and structural support when Structural Modules intersect.
 - b. 9" and 12" Corner and Peninsula Modules can be used as pipe drop umbilical columns when fully enclosed with upper panels.
 6. Upper Carriers:
 - a. Add-on Fixed Furniture Upper Carriers are constructed similar to Support modules but are designed to attach to the working surface of fixed casework installations to provide adjustable overhead shelving support.
- A. Adjustable Worksurface Frames and Tables:
Adjustable Worksurface Frames and Tables provide support for the worksurface, and suspended casework. Cantilevered Worksurface Frames get their support from the Structural Modules and are adjustable in height in 1" increments. Free Standing Table Frames are floor mounted, with the option of being attached to a Structural Module.
1. Adjustable Height Cantilevered Worksurface Frame:
 - a. The frame is a 3-sided welded assembly of 1 5/8" x 1 1/4" x 12-gauge CRS channel. A 12-gauge U channel is welded to the front channel for suspended cabinet support.
 - b. The support leg is an 11-gauge rectangular shaped assembly with an 18-gauge inner support filler. The 11-gauge support legs are part of the final assembly that engage into the outside row of standards for support on 1" increments.
 2. Adjustable Height Free Standing Table Frame:
 - a. The upper frame is the same as 2.02 B.1. above.
 - b. The Lower support leg is an 11-gauge rectangular shaped assembly with an 18-gauge inner support filler and structural modesty panel. The lower leg is welded to an 11-gauge horizontal bottom support member with leveling feet.
 - c. The upper leg is an 11-gauge telescoping member, which marries into the lower leg section, providing height adjustability in 1" increments.
 - d. The Adjustable Height Free Standing Table Frame can be attached (optional) to a Structural Module by use of attachment kit.

3. Adjustable Height Mobile Table Frame:
 - a. This table is the same as 2.02 B.1., above, but includes 4" heavy duty rubber-tired castors mounted to bottom support member.
- B. Work Top and Ledge Materials:

Counter tops and ledges shall be as indicated on the drawings or as indicated by model number, and all clips, screws and parts for fastening top to table frame and/or cabinet shall be included.

 1. Phenolic Resin:

Phenolic Resin tops are available in black, white, silver gray and sand beige. Tops are 1" thick, composed of a cellulose fiber reinforced phenolic resin core with a highly crosslinked polyurethane copolymer surface.
- C. Adjustable Module Shelving:

Adjustable Module Shelving attaches to the structural module upright, with height adjustability on 1' increments.

 1. Upper Carrier Module Core Shelving:
 - a. Upper Carrier Module Core Shelves are 16-gauge steel formed down 1", then returned back and up into a channel formation. Shelves over 48" long shall be further reinforced with a 20-gauge steel hat channel welded to the underside of the shelf.
 - b. Shelves are adjustable in height on 1" increments using a spring style pin mechanism which automatically locks in place to adjustment holes on the rear face of the Support Module uprights. Adjustment is accomplished without the use of tools.
 - c. Shelves are 9" and 12" deep and are available in lengths from 24" to 72" on 6" increments, to match the length of the Structural Module.
 2. Adjustable Module Shelving:
 - a. Adjustable Module Shelves are supported by 11-gauge brackets which mount to the inner slot of the double slotted Support Module Upright. They are adjustable in height on 1" increments.
 - b. Shelves are available in depths of 6", 8", 12", 18", and 24". Shelves are available in lengths from 24" to 72" on 6" increments, to match the Support Module length.
 - c. Steel shelves are 16-gauge steel, formed down 1" then returned back and up into a channel formation. Shelves of 12" depth and greater are further reinforced with a 20-gauge hat channel welded to the underside. Steel shelves are available with a steel front edge seismic lip when specified by model number or indicated on the drawings.

2.05 PERFORMANCE REQUIREMENTS

- A. Steel Casework Construction Performance:

1. Base cabinets shall be constructed to support at least a uniformly distributed load 200 pounds per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.
2. Base cabinet leveling bolts shall support 500 pounds per corner, at 1-1/2" projection of the leveling bolt below the cabinet bottom.
3. Each adjustable and fixed shelf 4 feet or shorter in length shall support an evenly distributed load of 40 pounds per square foot up to a maximum of 200 pounds, with nominal temporary deflection, but without permanent set.
4. Full extension soft-close, self-closing ball bearing zinc plated drawer slide shall be rated for 100 pound loads.
5. Swinging doors on floor-mounted inset style casework shall support 200 pounds suspended at a point 12" from hinged side, with door swung through an arc of 160 degrees. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.

B. Steel Paint System Finish and Performance Specification:

1. Steel Paint System Finish:

After Cold Rolled Steel and Textured Steel component parts have been completely welded together and before finishing, they shall be given a pre-paint treatment to provide excellent adhesion of the finish system to the steel and to aid in the prevention of corrosion. Physical and chemical cleaning of the steel shall be accomplished by washing with an alkaline cleaner, followed by a spray treatment with a complex metallic phosphate solution to provide a uniform fine grained crystalline phosphate surface that shall provide both an excellent bond for the finish and enhance the protection provided by the finish against humidity and corrosive chemicals.

After the phosphate treatment, the steel shall be dried and all steel surfaces shall be coated with a chemical and corrosion-resistant, environmentally friendly, electrostatically applied powder coat finish. All components shall be individually painted, insuring that no area be vulnerable to corrosion due to lack of paint coverage. The coating shall then be cured by baking at elevated temperatures to provide maximum properties of corrosion and wear resistance.

The completed finish system in standard colors shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

2. Performance Test Results (Chemical Spot Tests):

a. Testing Procedure:

Chemical spot tests for non-volatile chemicals shall be made by applying 5 drops of each reagent to the surface to be tested and covering with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile chemicals shall be tested by placing a cotton ball saturated with reagent on the surface to be tested and covering with an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be

conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of $77^{\circ} \pm 3^{\circ}$ F. For both methods, leave the reagents on the panel for a period of one hour. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation, 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

b. Test Evaluation:

Evaluation shall be based on the following rating system.

Level 0 – No detectable change.

Level 1 – Slight change in color or gloss.

Level 2 – Slight surface etching or severe staining.

Level 3 – Pitting, cratering, swelling, or erosion of coating. Obvious and significant deterioration.

After testing, panel shall show no more than three (3) Level 3 conditions.

c. Test Reagents

Test No.	Chemical Reagent	Test Method
1.	Acetate, Amyl	Cotton ball & bottle
2.	Acetate, Ethyl	Cotton ball & bottle
3.	Acetic Acid, 98%	Watch glass
4.	Acetone	Cotton ball & bottle
5.	Acid Dichromate, 5%	Watch glass
6.	Alcohol, Butyl	Cotton ball & bottle
7.	Alcohol, Ethyl	Cotton ball & bottle
8.	Alcohol, Methyl	Cotton ball & bottle
9.	Ammonium Hydroxide, 28%	Watch glass
10.	Benzene	Cotton ball & bottle
11.	Carbon Tetrachloride	Cotton ball & bottle
12.	Chloroform	Cotton ball & bottle
13.	Chromic Acid, 60%	Watch glass
14.	Cresol	Cotton ball & bottle
15.	Dichlor Acetic Acid	Cotton ball & bottle
16.	Dimethylformamide	Cotton ball & bottle
17.	Dioxane	Cotton ball & bottle
18.	Ethyl Ether	Cotton ball & bottle
19.	Formaldehyde, 37%	Cotton ball & bottle
20.	Formic Acid, 90%	Watch glass
21.	Furfural	Cotton ball & bottle
22.	Gasoline	Cotton ball & bottle
23.	Hydrochloric Acid, 37%	Watch glass
24.	Hydrofluoric Acid, 48%	Watch glass
25.	Hydrogen Peroxide, 3%	Watch glass
26.	Iodine, Tincture of	Watch glass

27.	Methyl Ethyl Ketone	Cotton ball & bottle
28.	Methylene Chloride	Cotton ball & bottle
29.	Mono Chlorobenzene	Cotton ball & bottle
30.	Naphthalene	Cotton ball & bottle
31.	Nitric Acid, 20%	Watch glass
32.	Nitric Acid, 30%	Watch glass
33.	Nitric Acid, 70%	Watch glass
34.	Phenol, 90%	Cotton ball & bottle
35.	Phosphoric Acid, 85%	Watch glass
36.	Silver Nitrate, Saturated	Watch glass
37.	Sodium Hydroxide, 10%	Watch glass
38.	Sodium Hydroxide, 20%	Watch glass
39.	Sodium Hydroxide, 40%	Watch glass
40.	Sodium Hydroxide, Flake	Watch glass
41.	Sodium Sulfide, Saturated	Watch glass
42.	Sulfuric Acid, 33%	Watch glass
43.	Sulfuric Acid, 77%	Watch glass
44.	Sulfuric Acid, 96%	Watch glass
45.	Sulfuric Acid, 77% and Nitric Acid, 70%, equal parts	Watch glass
46.	Toluene	Cotton ball & bottle
47.	Trichloroethylene	Cotton ball & bottle
48.	Xylene	Cotton ball & bottle
49.	Zinc Chloride, Saturated	Watch glass

* Where concentrations are indicated, percentages are by weight.

3. Performance Test Results (Heat Resistance):
Hot water (190° F - 205° F) shall be allowed to trickle (with a steady stream at a rate not less than 6 ounces per minute) on the finished surface, which shall be set at an angle of 45° from horizontal, for a period of five minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.
4. Performance Test Results (Impact Resistance):
A one-pound ball (approximately 2" diameter) shall be dropped from a distance of 12 inches onto the finished surface of steel panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close eye-ball examination.
5. Performance Test Results (Bending Test):
An 18 gauge steel strip, finished as specified, when bent 180° over a 1/2" diameter mandrel, shall show no peeling or flaking off of the finish.
6. Performance Test Results (Adhesion):
Ninety or more squares of the test sample shall remain coated after the scratch adhesion test. Two sets of eleven parallel lines 1/16" apart shall be cut with a razor blade to intersect at right angle thus forming a grid of 100 squares. The cuts shall be made just deep enough to go through the coating, but not into the substrate. They shall then be brushed lightly with a soft brush. Examine under 100 foot-candles of illumination. Note: This test is based on ASTM D2197-68, "Standard Method of Test for Adhesion of Organic Coatings".

7. Performance Test Results (Hardness):

The test sample shall have a hardness of 4-H using the pencil hardness test. Pencils, regardless of their brand are valued in this way: 8-H is the hardest, and next in order of diminishing hardness are 7-H, 6-H, 5-H, 4-H, 3-H, 2-H, F, HB, B (soft), 2-B, 3-B, 4-B, 5-B (which is the softest).

The pencils shall be sharpened on emery paper to a wide sharp edge. Pencils of increasing hardness shall be pushed across the paint film in a chisel-like manner until one is found that will cut or scratch the film. The pencil used before that one, that is, the hardest pencil that will not rupture the film, is then used to express or designate the hardness.

2.06 WORKSURFACES

A. Materials:

1. Phenolic Resin Tops (Trespa or Fundermax) – Phenolic Resin tops shall consist of modified resin that has been especially compounded and cured to provide the optimum physical and chemical resistance properties required of a heavy-duty laboratory table top. Tops and curbs shall be a uniform mixture throughout their full thickness, and shall not depend upon a surface coating that is readily removed by chemical and/or physical abuse. Tops shall be 1" thick, exposed edges with a 1/8", 45 degree bevel on top and bottom and drip grooves provided on the underside at all exposed edges. 4" high curbs at the backs and ends of tops shall be 1" thick and bonded to the deck to form a square watertight joint. Sink cutouts shall be smooth and uniform without saw marks with the top edge beveled. The bottom edge of the sink opening shall be finished smooth with the edge broken to prevent sharpness. Corners of sink cutouts shall be radiused not less than 3/4"

B. Performance Requirements:

1. Molded Phenolic Resin (Trespa or Fundermax):

a. Physical Properties:

Flexural Strength (A.S.T.M. Method D790-90) =	15,000 PSI
Compressive Strength (A.S.T.M. Method D695-90) =	30,000 PSI
Hardness, Rockwell E (A.S.T.M. Method D785-89) =	100
Water Absorption (A.S.T.M. Method D570-81)% by weight, 24 Hours =	0.04
% by weight, 7 Days =	0.05
% by weight, 2 Hour Boil =	0.04
Specific Gravity =	1.97
Tensile Strength =	8,500 PSI
Burn Characteristics =	Class 0, A
Thermal Expansion =	34 10-6
Fire Resistance =	Self Extinguishing
Heat Deflection =	Should not be exposed to dry ice or liquid nitrogen

b. Performance Test Results (Heat Resistance):

A high form porcelain crucible, size 0, 15 ml capacity, shall be heated over a Bunsen burner until the crucible bottom attains an incipient red heat. Immediately, the hot crucible

shall be transferred to the top surface and allowed to cool to room temperature. Upon removal of the cooled crucible, there shall be no blisters, cracks or any breakdown of the top surface whatsoever.

- c. Performance Test Results (Chemical Resistance):
Tops shall resist chemical attacks from normally used laboratory reagents. Weight change of top samples submerged in the reagents* listed in the next paragraph for a period of seven (7) days shall be less than one-tenth of one percent, except that the weight change for those reagents marked with ** shall be less than one percent. (Tests shall be performed in accordance with A.S.T.M. Method D543-67 at 77o F.).

*Where concentrations are indicated, percentages are by weight.

Acetic Acid, Glacial	Iso-Octane
Acetic Acid, 5%	Kerosene
Acetone	Methyl Alcohol
Ammonium Hydroxide, 28%	Mineral Oil
Ammonium Hydroxide, 10%	Methyl Ethyl Ketone
Aniline Oil	Nitric Acid, 70%**
Benzene	Nitric Acid, 40%
Carbon Tetrachloride	Nitric Acid, 10%
Chromic Acid, 40%**	Oleic Acid
Citric Acid, 10%	Olive Oil
Cottonseed Oil	Phenol, 5%
Dichromate Cleaning Solution**	Soap Solution, 1%
Diethyl Ether	Sodium Carbonate, 20%
Dimethyl Formamide	Sodium Carbonate, 2%
Distilled Water	Sodium Chloride, 10%
Detergent Solution, 1/4%	Sodium Hydroxide, 50%
Ethyl Acetate	Sodium Hydroxide, 10%
Ethyl Alcohol, 95%	Sodium Hydroxide, 1%
Ethyl Alcohol, 50%	Sodium Hypochlorite, 5%
Ethylene Dichloride	Sulfuric Acid, 85%
Heptane	Sulfuric Acid, 30%
Hydrochloric Acid, 37%	Sulfuric Acid, 3%
Hydrochloric Acid, 10%	Toluene
Hydrogen Peroxide, 28%	Transformer Oil
Hydrogen Peroxide, 3%	Turpentine

NOTE: Dichromate cleaning solution is a formula from Lange's Handbook of Chemistry.

- d. Performance Test Results (Chemical Spot Tests - 24 Hours):
Chemical spot tests shall be made by applying 10 drops (approximately 1/2 cc) of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/2" diameter watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" or larger ball of cotton shall be saturated with the solvent and placed on the surfaces to be tested. The cotton ball shall then be covered by an inverted 2-ounce, wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is

kept wet throughout the entire 24-hour test period and at a temperature of 77 degrees F. + 3 degrees F. At the end of the test period, the reagents shall be flushed from the surfaces with water and the surface scrubbed with a soft bristle brush under running water, rinsed, and dried. Volatile solvent test areas shall be cleaned with a cotton swab soaked in the solvent used on the test area. Spots where dyes have dried shall be cleaned with a cotton swab soaked in alcohol to remove the surface dye. The test panel shall then be evaluated immediately after drying.

Rating Description

- 0 = No Effect: No detectable change in the material surface.
- 1 = Excellent: Slight detectable change in color or gloss but no change in function or life of the surface.
- 2 = Good: A clearly discernible change in color or gloss but no significant impairment of surface life or function.
- 3 = Fair: Objectionable change in appearance due to discoloration or etch, possibly resulting in deterioration of function over an extended period of time.

Chemical Reagent	Rating
Amyl Acetate	1
Ethyl Acetate	0
Acetic Acid, 98%	0
Acetone	1
Acid Dichromate, 5%	2
Butyl Alcohol	0
Ethyl Alcohol	0
Methyl Alcohol	0
Aluminum Hydroxide, 28%	0
Benzene	0
Carbon Tetrachloride	0
Chloroform	1
Chromic Acid, 60%	2
Cresol	1
Dichlor Acetic Acid	1
Dimethylformamide	1
Dioxane	1
Ethyl Ether	1
Formaldehyde, 37%	0
Formic Acid, 90%	1
Furfural	1
Gasoline	0
Hydrochloric Acid, 37%	1
Hydrofluoric Acid, 48%	2

Hydrogen Peroxide, 3%	0
Tincture of Iodine	0
Methyl Ethyl Ketone	1
Methylene Chloride	1
Mono Chlorobenzene	0
Naphthalene	0
Nitric Acid, 20%	0
Nitric Acid, 30%	0
Nitric Acid, 70%	1
Phenol, 90%	1
Phosphoric Acid, 85%	0
Silver Nitrate, Saturated	0
Sodium Hydroxide, 10%	0
Sodium Hydroxide, 20%	0
Sodium Hydroxide, 40%	0
Sodium Hydroxide, Flake	0
Sodium Sulfide, Saturated	0
Sulfuric Acid, 33%	0
Sulfuric Acid, 77%	0
Sulfuric Acid, 96%	0
Sulfuric Acid, 77% & Nitric Acid, 70%, Equal Parts	1
Toluene	0
Trichloroethylene	0
Xylene	0
Zinc Chloride, Saturated	0

2.07 SINKS, CUPSINKS, PEGBOARDS AND DRAINS

A. Sinks (Molded Epoxy Resin):

1. Sinks shall be molded of phenolic resin, carefully compounded with selected materials to provide maximum physical and chemical properties.
2. Sinks shall possess a high resistance to mechanical and thermal shock.
3. All inside corners to be coved and the bottom pitched to the drain outlet.
4. Manufacturer shall supply a full range of phenolic poured, single piece epoxy sinks available in manufacturers' standard colors.
5. Sinks shall be one piece and be available in a drop-in configuration (undermount can be used where drain-board grooves are specified in the countertop).
6. Sink outlets shall be supplied loose and to be installed by respective trades.
7. Sink traps to be furnished and installed under Division 23 trade.

B. Pegboards

1. Manufacturer shall supply epoxy pegboards matching epoxy counter tops.
2. Pegboards to be 1" thick.
3. Exposed edges with 1/8", 45 degree beveled chamfer and finished.
4. Back of pegboard, when exposed, to be finished.
5. Pegboard to be factory machined to accept polypropylene pegs. Pegs shall be supplied with pegboard.
6. Standard line of products shall include an applied drip trough made of epoxy resin or stainless steel.
7. Drip trough shall include a means to attach a drain tube. Drain tube shall be included when a drip trough is purchased.

2.08 FITTINGS

A. Materials:

1. Laboratory Service Fittings:
Service fittings shall be laboratory grade, and water faucets and valve bodies shall be cast red brass alloy or bronze forgings, with a minimum content of 85%. All fittings shall be chromium plated unless specified otherwise.
2. Service Indexes:
Fittings shall be identified with service indexes in the following color coding:

Hot Water	Red
Cold Water	Dark Green
Gas	Dark Blue
Air	Orange
Vacuum	Yellow
Distilled Water	White
Steam	Black
Nitrogen	Brown
Oxygen	Light Green
Hydrogen	Pink
Special Gases	Light Blue

B. Construction:

1. Water Fittings:
Water fittings shall be provided with a renewable unit containing all operating parts which are subject to wear. The renewable unit shall contain an integral volume control device and all faucets shall be capable of being readily converted from compression to self-closing, without disturbing the faucet body proper. Four (4) arm forged brass handles shall contain plastic screw-on type colored service index buttons.
2. Steam Fittings:
Steam fittings shall have a black, heat resistant composition handle, and shall be the heavy pattern design with stainless steel removable seat and flat Teflon seat disc. They shall have Teflon impregnated packing, and shall be so constructed that they can be repacked under

pressure.

3. **Distilled Water Fittings:**
Distilled water fittings shall be chromium plated cast bronze with the interior tin lined, and shall be the self-closing type, or shall be made of aluminum and not be the self-closing type. Handles shall be furnished with tamper-proof and vandal resistant service indexes.
4. **Laboratory Ball Valves:**
Laboratory ball valves shall have a forged brass valve body with a non-removable serrated hose end and a forged brass lever-type handle with a full view color-coded index button. Valves shall have a floating chrome plated brass ball and molded TFE seals. Valves shall be certified by CSA International for use with natural gas under ANSI Z21.15./CGA9.1
5. **Needle Valve Hose Cocks:**
Needle type valves shall have a stainless steel replaceable floating cone, precision finished and self-centering. Cone locates against a stainless steel seat, easily removable and replaced with a socket wrench. Valve shall have "TEFLON" impregnated packing and designed so unit can be repacked while under pressure.
6. **Gooseneck Type Outlets:**
Gooseneck outlets shall have a separate brazed coupling to provide a full thread attachment of anti-splash, serrated tip or filter pump fittings.
7. **Remote Control Valves:**
All valves for remote control use shall be as previously specified, but shall be complete with aluminum extension rods, escutcheon plates, brass forged handles and screw-on type colored service index button.
8. **Tank Nipples:**
Tank nipples shall be provided with locking nut and washer for all fixtures where fittings are anchored to equipment.
9. **Vacuum Breakers:**
Vacuum breakers where required shall be "Nidel" or "Watts" unless otherwise specified or identified to be an integral part of the water fixture assembly.
10. **Aerator Outlets:**
Aerator type outlets shall be furnished for all gooseneck water faucets not furnished with serrated hose connectors.
11. **Waste Lines:**
Waste lines shall be furnished by other trades.
12. **Traps:**
Traps shall be furnished by other trades.
13. **Electrical Fittings:**
Electrical fittings shall contain 20 Amp., 125 Volt AC, 3-wire polarized grounded receptacles, unless otherwise specified. Pedestal and line-type boxes shall be of aluminum, metallic finish

with stainless steel flush plates. Receptacle boxes shall be of plated steel. All electrical or conduit fittings called for or to be furnished under these specifications shall meet the requirements of the National Electrical Code.

C. PERFORMANCE:

1. Maximum Line Pressures:
 - Laboratory Ball Valves (Gas and Air) 75 PSI
 - Needle Point Cocks (Gas and Air)..... 65 PSI
 - Vacuum..... 28.5" Mercury
 - Hot and Cold Water 80 PSI
 - Steam 30 PSI

PART 3 — EXECUTION

3.00 SITE EXAMINATION

- A. The owner and/or his representative shall assure all building conditions conducive to the installation of a finished goods product; all critical dimensions and conditions previously checked have been adhered to by other contractors (general, mechanical, electrical, etc.) to assure a quality installation.

3.01 INSTALLATION

- A. Preparation:

Prior to beginning installation of casework, check and verify that no irregularities exist that would affect quality of execution of work specified.
- B. Coordination:

Coordinate the work of the Section with the schedule and other requirements of other work being prepared in the area at the same time both with regard to mechanical and electrical connections to and in the fume hoods and the general construction work.
- C. Performance:
 1. Casework:
 - a. Set casework components plumb, square, and straight with no distortion and securely anchor to building structure. Shim as required using concealed shims.
 - b. Bolt continuous cabinets together with joints flush, tight and uniform, and with alignment of adjacent units within 1/16" tolerance.
 - c. Secure wall cabinets to solid supporting material, not to plaster, lath or gypsum board.
 - d. Abut top edge surfaces in one true plane. Provide flush joints not to exceed 1/8".
 2. Worksurfaces:
 - a. Where required due to field conditions, scribe to abutting surfaces.
 - b. Only factory prepared field joints, located per approved shop drawings, shall be permitted. Secure the joints in the field, where practical, in the same manner as in the factory.
 - c. Secure worksurfaces to casework and equipment components with materials and

procedures recommended by the manufacturer.

D. Adjust and Clean:

1. Repair or remove and replace defective work, as directed by owner and/or his representative upon completion of installation.
2. Adjust doors, drawers and other moving or operating parts to function smoothly.
3. Clean shop finished casework; touch up as required.
4. Clean worksurfaces and leave them free of all grease and streaks.
5. Casework to be left broom clean and orderly.

E. Protection:

1. Provide reasonable protective measures to prevent casework and equipment from being exposed to other construction activity.
2. Advise owner and/or his representative of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by work of other trades.

END OF SECTION

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Sleeves without waterstop.
 - 2. Sleeves with waterstop.
 - 3. Sleeve-seal systems.
 - 4. Grout.
 - 5. Silicone sealants.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Sustainable Design Submittals:

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES WITHOUT WATERSTOP

- A. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends.
- B. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.
- C. Steel Sheet Sleeves: ASTM A653/A653M, 0.0239-inch minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.
- D. PVC Pipe Sleeves: ASTM D1785, Schedule 40.
- E. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

2.2 SLEEVES WITH WATERSTOP

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advance Products & Systems, LLC.

2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).

B. Description: Manufactured steel, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.

2.3 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, LLC.
2. CALPICO, Inc.
3. GPT; an EnPro Industries company.
4. Metraflex Company (The).
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Designed to form a hydrostatic seal of 20 psig minimum.
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: Stainless steel.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.4 GROUT

A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C1107/C1107M, 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, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. GE Construction Sealants; Momentive Performance Materials Inc.
 - b. Permathane; ITW Polymer Sealants North America.
 - c. Polymeric Systems, Inc.
 - d. Sherwin-Williams Company (The).
 - e. Sika Corporation.

- f. The Dow Chemical Company.
 - g. Tremco Incorporated.
2. Standard: ASTM C920, Type S, Grade NS, Class 25, Use NT.

PART 3 - EXECUTION

3.1 INSTALLATION OF SLEEVES - GENERAL

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
 - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
 - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
 - 2. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
 - 3. Using grout or silicone sealant, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
 - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

3.2 INSTALLATION OF SLEEVES WITH WATERSTOP

- A. Install sleeve with waterstop as new walls and slabs 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 or silicone sealant, seal the space around outside of sleeves.

3.3 INSTALLATION OF SLEEVE-SEAL SYSTEMS

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.4 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
 - 2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

3.5 SLEEVE SCHEDULE

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
 - 1. Concrete Slabs above Grade:
 - a. Sleeves with waterstops or stack-sleeve fittings.
 - 2. Interior Partitions:
 - a. Sleeves without waterstops.

END OF SECTION 220517

SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING

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. Bronze ball valves.

1.3 DEFINITIONS

- A. CWP: Cold working pressure.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of valve.
 - 1. Certification that products comply with NSF 61 Annex G and NSF 372.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
 - 1. ASME B1.20.1 for threads for threaded end valves.
 - 2. ASME B16.1 for flanges on iron valves.
 - 3. ASME B16.5 for flanges on steel valves.
 - 4. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
 - 5. ASME B16.18 for solder-joint connections.
 - 6. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 Annex G and NSF 372 for valve materials for potable-water service.
- D. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
- E. Valve Pressure-Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- F. Valve Sizes: Same as upstream piping unless otherwise indicated.
- G. Valve Actuator Types:
 - 1. Handlever: For quarter-turn valves smaller than NPS 4.
- H. Valves in Insulated Piping:
 - 1. Include 2-inch stem extensions.
 - 2. Extended operating handles of nonthermal-conductive material and protective sleeves that allow operation of valves without breaking vapor seals or disturbing insulation.
 - 3. Memory stops that are fully adjustable after insulation is applied.

2.2 BRONZE BALL VALVES

- A. Bronze Ball Valves, Two-Piece with Full Port and Stainless-Steel Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Apollo Valves; Conbraco Industries, Inc.
 - b. Hammond Valve.
 - c. Milwaukee Valve Company.
 - d. NIBCO INC.
 - e. Watts; a Watts Water Technologies company.
 - 2. Description:
 - a. Standard: MSS SP-110.
 - b. CWP Rating: 600 psig.

- c. Body Design: Two piece.
- d. Body Material: Bronze.
- e. Ends: Threaded or soldered.
- f. Seats: PTFE.
- g. Stem: Stainless steel.
- h. Ball: Stainless steel, vented.
- i. Port: Full.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install valve tags. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valves with specified CWP ratings are unavailable, the same types of valves with higher CWP ratings may be substituted.
- B. Select valves with the following end connections:
 - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 LOW-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 PSIG OR LESS)

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.

3.5 HIGH-PRESSURE, COMPRESSED-AIR VALVE SCHEDULE (150 TO 200 PSIG)

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.

3.6 DOMESTIC HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
2. Bronze ball valves, two-piece with full port and stainless-steel trim.

END OF SECTION 220523.12

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

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 pipe hangers and supports.
2. Trapeze pipe hangers.
3. Fastener systems.
4. Pipe-positioning systems.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:

1. Trapeze pipe hangers.
2. Metal framing systems.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of trapeze hangers.
2. Include design calculations for designing trapeze hangers.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design trapeze pipe hangers and equipment supports.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7].
 - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
 - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

2.2 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Stainless-Steel Pipe Hangers and Supports:
 - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
 - 2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
 - 3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel].
- C. Copper Pipe and Tube Hangers:
 - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.

2.3 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 METAL FRAMING SYSTEMS

A. MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cooper B-line; brand of Eaton, Electrical Sector.
 - b. Flex-Strut Inc.
 - c. G-Strut.
 - d. Unistrut; Atkore International.
2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
4. Channel Width: Selected for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
7. Metallic Coating: Plain Paint Coating: Green epoxy, acrylic, or urethane.

B. Non-MFMA Manufacturer Metal Framing Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
 - b. CADDY; brand of nVent Electrical plc.
 - c. FNW; Ferguson Enterprises, Inc.
 - d. MIRO Industries.
2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.
4. Channel Width: Select for applicable load criteria.
5. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
7. Metallic Coating: [Plain]
8. Paint Coating: [Green epoxy, acrylic, or urethane].

2.5 PIPE-POSITIONING SYSTEMS

- A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.6 MATERIALS

- A. Aluminum: ASTM B 221.
- B. Carbon Steel: ASTM A 1011/A 1011M.

- C. Structural Steel: ASTM A 36/A 36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A 240/A 240M.
- E. Grout: ASTM C 1107/C 1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
 - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.
- B. 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.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Fiberglass Pipe-Hanger Installation: Comply with applicable portions of MSS SP-58. Install hangers and attachments as required to properly support piping from building structure.
- D. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- E. Install lateral bracing with pipe hangers and supports to prevent swaying.
- F. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- H. Insulated Piping:

1. Attach clamps and spacers to piping.
 - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
 - b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
 - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
4. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

3.3 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to [1-1/2 inches].

3.4 PAINTING

- A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those 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 a minimum dry film thickness of 2.0 mils.
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal are specified Section 099123 "Interior Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A 780/A 780M.

3.5 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

- E. Use copper-plated pipe hangers and stainless-steel attachments for copper piping and tubing.
- F. Use padded hangers for piping that is subject to scratching.
- G. Use thermal hanger-shield inserts for insulated piping and tubing.
- H. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
 - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
 - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
 - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
 - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
 - 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
 - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
 - 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
 - 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
 - 12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
 - 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 - 14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
 - 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
 - 16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
 - 17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction occurs.
 - 18. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction occurs but vertical adjustment is unnecessary.
 - 19. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction occurs and vertical adjustment is unnecessary.
 - 20. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation, in addition to expansion and contraction, is required.
- I. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
- J. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. C-Clamps (MSS Type 23): For structural shapes.
 6. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 7. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 8. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 9. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 10. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- K. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
- L. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
 2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 3. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
 - a. Horizontal (MSS Type 54): Mounted horizontally.
 - b. Vertical (MSS Type 55): Mounted vertically.
 - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- M. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- N. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

- O. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.
- P. Use pipe-positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

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. Equipment labels.
 - 2. Warning signs and labels.
 - 3. Pipe labels.
 - 4. Stencils.
 - 5. Valve tags.
 - 6. Warning tags.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Champion America.
 - d. Craftmark Pipe Markers.

- e. Marking Services, Inc.
 - f. Seton Identification Products.
2. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 3. Letter Color: White.
 4. Background Color: Black.
 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 7. Fasteners: Stainless-steel rivets or self-tapping screws.
 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Brimar Industries, Inc.
 - c. Champion America.
 - d. Craftmark Pipe Markers.
 - e. Seton Identification Products.
 2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment hardware.
 3. Letter Color: White.
 4. Background Color: Black.
 5. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
 6. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
 7. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
 8. Fasteners: Stainless-steel rivets or self-tapping screws.
 9. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Brimar Industries, Inc.

3. Champion America.
 4. Craftmark Pipe Markers.
 5. Marking Sevices Inc.
 6. Stranco, Inc.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- C. Letter Color: Red.
- D. Background Color: Yellow.
- E. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- F. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- G. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-quarters the size of principal lettering.
- H. Fasteners: Stainless-steel rivets or self-tapping screws.
- I. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- J. Label Content: Include caution and warning information plus emergency notification instructions.

2.3 PIPE LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Champion America.
 4. Craftmark Pipe Markers.
 5. Marking Sevices Inc.
 6. Seton Identification Products.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- C. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- D. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- E. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: Size letters according to ASME A13.1 for piping.

2.4 VALVE TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Champion America.
 4. Craftmark Pipe Markers.
 5. Marking Sevices Inc.
 6. Seton Identification Products.
- B. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Fasteners: Brass beaded chain or S-hook.
- C. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
 2. Brimar Industries, Inc.
 3. Champion America.
 4. Craftmark Pipe Markers.
 5. Marking Sevices Inc.
 6. Seton Identification Products.
- B. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
1. Size: Approximately 4 by 7 inches.
 2. Fasteners: Brass grommet and wire.
 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
 4. Color: Safety yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.4 PIPE LABEL INSTALLATION

- A. Piping Color Coding: Painting of piping is specified in Section 099123 "Interior Painting."
- B. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- D. Pipe Label Color Schedule:
 - 1. Domestic Water Piping
 - a. Background: Safety green.
 - b. Letter Colors: White.
 - 2. Sanitary Waste Piping:
 - a. Background Color: Safety white.
 - b. Letter Color: Black.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.
 - 2. Valve-Tag Colors:
 - a. Cold Water: Natural.
 - b. Hot Water: Natural.
 - 3. Letter Colors:
 - a. Cold Water: White.
 - b. Hot Water: White.

3.6 WARNING-TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating hot-water piping.
4. Supplies and drains for handicap-accessible lavatories and sinks.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at pipe expansion joints for each type of insulation.
3. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
4. Detail removable insulation at piping specialties, equipment connections, and access panels.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation system materials are to be delivered to the Project site in unopened containers. The packaging is to include name of the manufacturer, fabricator, type, description, and size, as well as ASTM standard designation and maximum use temperature.

1.6 COORDINATION

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation, jacket materials, adhesive, mastic, tapes, and cement material containers with appropriate markings of applicable testing agency.
 - 1. All Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

2.2 INSULATION MATERIALS

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials are applied.
- B. Products do not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel are qualified as acceptable in accordance with ASTM C795.

- E. Flexible Elastomeric: Closed-cell or expanded-rubber materials; suitable for maximum use temperature between minus 70 deg F and 220 deg F. Comply with ASTM C534/C534M, Type I for tubular materials.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA.
 - b. Armacell LLC.
 - c. K-Flex USA.
- F. Glass-Fiber, Preformed Pipe: Glass fibers bonded with a thermosetting resin; suitable for maximum use temperature up to 850 deg F in accordance with ASTM C411. Comply with ASTM C547.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. Knauf Insulation.
 - c. Manson Insulation Inc.
 - d. Owens Corning.
 2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ.
 3. Fabricated shapes in accordance with ASTM C450 and ASTM C585.
 4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.3 INSULATING CEMENTS

- A. Glass-Fiber and Mineral Wool Insulating Cement: Comply with ASTM C195.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ramco Insulation, Inc.
- B. Glass-Fiber and Mineral Wool Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Ramco Insulation, Inc.

2.4 ADHESIVES

- A. Materials are compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Aeroflex USA.
 - b. Armacell LLC.
 - c. Foster Brand; H. B. Fuller Construction Products.

- d. K-Flex USA.
 2. Flame-spread index is 25 or less and smoke-developed index is 50 or less as tested in accordance with ASTM E84.
 3. Wet Flash Point: Below 0 deg F.
 4. Service Temperature Range: 40 to 200 deg F.
 5. Color: Black.
- C. Glass-Fiber and Mineral Wool Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
- D. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. P.I.C. Plastics, Inc.
 - c. Proto Corporation.
 - d. Speedline Corporation.
 - e. The Dow Chemical Company.
- 2.5 MASTICS AND COATINGS
- A. Materials are compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Knauf Insulation.
 - d. Mon-Eco Industries, Inc.
 - e. Vimasco Corporation.
 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.

3. Service Temperature Range: 0 to plus 180 deg F Comply with MIL-PRF-19565C, Type II, for permeance requirements, with supplier listing on DOD QPD - Qualified Products Database.
4. Color: White.

C. Vapor-Retarder Mastic, Solvent Based, Indoor Use: Suitable for indoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: 0 to 180 deg F.
4. Color: White.

D. Vapor-Retarder Mastic, Solvent Based, Outdoor Use: Suitable for outdoor use on below-ambient services.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
3. Service Temperature Range: Minus 50 to plus 220 deg F.
4. Color: White.

2.6 LAGGING ADHESIVES

A. Adhesives comply with MIL-A-3316C, Class I, Grade A, and are compatible with insulation materials, jackets, and substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Vimasco Corporation.
2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
3. Service Temperature Range: 20 to plus 180 deg F.
4. Color: White.

2.7 SEALANTS

A. Materials are as recommended by the insulation manufacturer and are compatible with insulation materials, jackets, and substrates.

B. Joint Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
 - d. Owens Corning.
2. Permanently flexible, elastomeric sealant.
3. Service Temperature Range: Minus 58 to plus 176 deg F.
4. Color: White or gray.

C. FSK and Metal Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Mon-Eco Industries, Inc.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.

D. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Childers Brand; H. B. Fuller Construction Products.
 - b. Foster Brand; H. B. Fuller Construction Products.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: White.

2.8 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.
 3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.
 4. ASJ+: Aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film leaving no paper exposed; complying with ASTM C1136 Types I, II, III, IV, and VII.
 5. PSK Jacket: Aluminum foil fiberglass reinforced scrim with polyethylene backing, complying with ASTM C1136, Type II.

2.9 FIELD-APPLIED JACKETS

- A. Field-applied jackets comply with ASTM C1136, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Airex Manufacturing Inc.
 - b. Johns Manville; a Berkshire Hathaway company.
 - c. P.I.C. Plastics, Inc.
 - d. Proto Corporation.
 - e. Speedline Corporation.
 - 2. Adhesive: As recommended by jacket material manufacturer.
 - 3. Color: White.
 - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- D. Metal Jacket:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. RPR Products, Inc.
 - 2. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
 - a. Sheet and roll stock ready for shop or field sizing.
 - b. Finish and thickness are indicated in field-applied jacket schedules.
 - c. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper 3-mil-thick, heat-bonded polyethylene and kraft paper.
 - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper 3-mil-thick polysurlyn.
 - e. Factory-Fabricated Fitting Covers:
 - 1) Same material, finish, and thickness as jacket.
 - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.
 - 3) Tee covers.
 - 4) Flange and union covers.
 - 5) End caps.
 - 6) Beveled collars.
 - 7) Valve covers.
 - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

- E. Self-Adhesive Indoor/Outdoor Jacket (Non-Asphaltic): Vapor barrier and waterproofing jacket for installation over insulation located aboveground outdoors or indoors. Specialized jacket with five layers of laminated aluminum and polyester film with low-temperature acrylic pressure-sensitive adhesive. Outer aluminum surface is coated with UV-resistant coating for protection from environmental contaminants.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M.
 - b. Foster Brand; H. B. Fuller Construction Products.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 2. Permeance: 0.00 perm as tested in accordance with ASTM F1249.
 3. Flamespread/Smoke Developed: 25/50 as tested in accordance with ASTM E84.
 4. Aluminum Finish: Embossed.

2.10 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 2. Width: 3 inches.
 3. Thickness: 11.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.
 5. Elongation: 2 percent.
 6. Tensile Strength: 40 lbf/inch in width.
 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Ideal Tape Co., Inc., an American Biltrite Company.
 2. Width: 2 inches.
 3. Thickness: 6 mils.
 4. Adhesion: 64 ounces force/inch in width.
 5. Elongation: 500 percent.
 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. 3M Industrial Adhesives and Tapes Division.
 - b. Avery Dennison Corporation, Specialty Tapes Division.
 - c. Ideal Tape Co., Inc., an American Biltrite Company.
 - d. Knauf Insulation.
 2. Width: 2 inches.
 3. Thickness: 3.7 mils.
 4. Adhesion: 100 ounces force/inch in width.
 5. Elongation: 5 percent.
 6. Tensile Strength: 34 lbf/inch in width.

2.11 SECUREMENTS

- A. Bands:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Johns Manville; a Berkshire Hathaway company.
 - b. RPR Products, Inc.
 2. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
 3. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch-wide, stainless steel or Monel.
- C. Wire: 0.080-inch nickel-copper alloy.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. C & F Wire Products.
- b. Johns Manville; a Berkshire Hathaway company.
- c. RPR Products, Inc.

2.12 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Buckaroos, Inc.
 - b. MVG Molded Products.
 - c. McGuire Manufacturing.
 - d. Plumberex Specialty Products, Inc.
 - e. Truebro; IPS Corporation.
 - f. Zurn Industries, LLC.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures, Insert drawing designation:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Truebro; IPS Corporation.
 - b. Zurn Industries, LLC.
2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
 1. Verify that systems to be insulated have been tested and are free of defects.
 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, compress, or otherwise damage insulation or jacket.
- D. Install insulation with longitudinal seams at top and bottom (12 o'clock and 6 o'clock positions) of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. finishing. Replace insulation materials that get wet during storage or in the installation process before being properly covered and sealed in accordance with Contract Documents, unless otherwise approved by the engineer-of-record.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
 - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
 - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
 - 1. Draw jacket tight and smooth, but not to the extent of creating wrinkles or areas of compression in the insulation.
 - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
 - 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.

5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
1. Vibration-control devices.
 2. Testing agency labels and stamps.
 3. Nameplates and data plates.
 4. Cleanouts.

3.4 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- C. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles below.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
 2. Insulate pipe elbows using preformed fitting insulation or mitered or routed fittings made from same material and density as that of adjacent pipe insulation. Each piece is butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
 3. Insulate tee fittings with sectional pipe insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
 6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
 8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation conforms to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
 3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
 4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
 5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install sections of pipe insulation and miter if required in accordance with manufacturer's written instructions.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated valve covers manufactured of same material as that of pipe insulation when available.
2. When prefabricated valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 INSTALLATION OF GLASS-FIBER AND MINERAL WOOL INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install prefabricated pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with glass-fiber or mineral-wool blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install prefabricated sections of same material as that of straight segments of pipe insulation when available.
2. When prefabricated sections are not available, install fabricated sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 INSTALLATION OF FIELD-APPLIED JACKETS

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.9 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
 - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless steel jackets.

3.10 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections.
- B. Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection is limited to three] locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- E. All insulation applications will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.

3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
 1. Drainage piping located in crawl spaces.
 2. Underground piping.
 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Domestic Cold Water:
 1. NPS 1 and Smaller: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.

- b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - 2. NPS 1-1/4 and Larger: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:
- 1. NPS 1-1/4 and Smaller: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
 - 2. NPS 1-1/2 and Larger: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
- 1. All Pipe Sizes: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- D. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:
- 1. All Pipe Sizes: Insulation is one of the following:
 - a. Flexible Elastomeric: 1 inch thick.
 - b. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- E. Hot Service Drains:
- 1. All Pipe Sizes: Insulation is one of the following:
 - a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- F. Hot Service Vents:
- 1. All Pipe Sizes: Insulation is one of the following:
 - a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- G. Hot Service Drains:
- 1. All Pipe Sizes: Insulation is the following:
 - a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- H. Hot Service Vents:
- 1. All Pipe Sizes: Insulation is the following:
 - a. Glass-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
 - 1. None.
- D. Piping, Exposed:
 - 1. None.
 - 2. PVC: 20 mils thick.
 - 3. Aluminum, Smooth: 0.016 inch thick.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

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 tube and fittings.
 - 2. Piping joining materials.
 - 3. Transition fittings.
 - 4. Dielectric fittings.

1.3 ACTION SUBMITTALS

- A. Product Data: For transition fittings and dielectric fittings.

1.4 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than two] days in advance of proposed interruption of water service.
 - 2. Do not interrupt water service without Owner's] written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."
- C. Comply with NSF 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Soft Copper Tube: ASTM B 88, Type L water tube, annealed temper.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- E. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials:
 - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
 - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

2.5 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. HART Industrial Unions, LLC.
 - b. Jomar Valve.
 - c. Matco-Norca.
 - d. Watts; a Watts Water Technologies company.
 - e. Wilkins.
 2. Standard: ASSE 1079.
 3. Pressure Rating: 125 psig minimum at 180 deg F.
 4. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Matco-Norca.
 - b. Watts; a Watts Water Technologies company.
 - c. Wilkins.
 2. Standard: ASSE 1079.
 3. Factory-fabricated, bolted, companion-flange assembly.
 4. Pressure Rating: 175 psig.
 5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Pipeline Seal and Insulator, Inc.
 2. Nonconducting materials for field assembly of companion flanges.
 3. Pressure Rating: 150 psig.
 4. Gasket: Neoprene or phenolic.
 5. Bolt Sleeves: Phenolic or polyethylene.
 6. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Elster Perfection Corporation.

- b. Grinnell Mechanical Products.
 - c. Matco-Norca.
 - d. Precision Plumbing Products.
 - e. Victaulic Company.
- 2. Standard: IAPMO PS 66.
 - 3. Electroplated steel nipple complying with ASTM F 1545.
 - 4. Pressure Rating and Temperature: 300 psig at 225 deg F.
 - 5. End Connections: Male threaded or grooved.
 - 6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."
- D. Install shutoff valve immediately upstream of each dielectric fitting.
- E. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- F. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- J. Install piping to permit valve servicing.
- K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- O. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 221123 "Domestic Water Pumps."
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.

3.5 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric couplings, nipples and unions.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.
 - 2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
 - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
 - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
 - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
 - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1-1/4 and Smaller: 84 inches with 3/8-inch rod.
 - 2. NPS 1-1/2: 108 inches with 3/8-inch rod.
 - 3. NPS 2: 10 feet with 3/8-inch rod.
- G. Support piping and tubing not listed in this article according to MSS SP-58 and manufacturer's written instructions.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
 - 1. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
 - 2. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.8 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Piping Inspections:
 - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
 - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
 - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
 - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
 - 2. Piping Tests:
 - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
 - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
 - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
 - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.10 ADJUSTING

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
 5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
 6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
 8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Clean non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
 2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.

- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:
 - 1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and soldered joints.

3.13 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
 - 1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
 - 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
 - 3. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.
 - 4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 221116

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Hub-and-spigot, cast-iron soil pipe and fittings.
 2. Hubless, cast-iron soil pipe and fittings.
 3. Specialty pipe fittings.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For hubless, single-stack drainage system. Include plans, elevations, sections, and details.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans and elevations, or Building Information Model (BIM) drawn to scale, showing items described in this Section and coordinated with all building trades.
- B. Field quality-control reports.

1.4 FIELD CONDITIONS

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:
1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
 2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

1.5 WARRANTY

- A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:
 - 1. Soil, Waste, and Vent Piping: 10 ft. head of water.

2.2 PIPING MATERIALS

- A. Piping materials to bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AB & I Foundry; a part of the McWane family of companies.
 - 2. Charlotte Pipe and Foundry Company.
 - 3. Tyler Pipe; a part of McWane family of companies.
- B. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark.
 - 2. ASTM A74, service cast iron.
- C. Gaskets: ASTM C564, rubber.
- D. Caulking Materials: ASTM B29, pure lead and oakum or hemp fiber.

2.4 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. AB & I Foundry; a part of the McWane family of companies.
 - 2. Charlotte Pipe and Foundry Company.
 - 3. Tyler Pipe; a part of McWane family of companies.
- B. Pipe and Fittings:
 - 1. Marked with CISPI collective trademark.
 - 2. ASTM A888 or CISPI 301.
- C. CISPI, Hubless-Piping Couplings:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. ANACO-Husky.
 - b. Charlotte Pipe and Foundry Company.
 - c. Mission Rubber Company, LLC; a division of MCP Industries.
 - d. Tyler Pipe; a subsidiary of McWane Inc.
2. Standards: ASTM C1277 and CISPI 310.
 3. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.
 - 4.

2.5 COPPER TUBE AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cambridge-Lee Industries, LLC.
 2. Cerro Flow Products, LLC.
 3. Wieland Copper Products, LLC.
- B. Copper Type DWV Tube: ASTM B306, drainage tube, drawn temper.
- C. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- D. Hard Copper Tube: ASTM B88, Type L), water tube, drawn temper.
- E. Soft Copper Tube: ASTM B88, Type L, water tube, annealed temper.
- F. Copper Pressure Fittings:
1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- G. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
1. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- H. Solder: ASTM B32, lead free with ASTM B813, water-flushable flux.

2.6 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

3. Shielded, Nonpressure Transition Couplings:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cascade Waterworks Mfg. Co.
 - 2) Mission Rubber Company, LLC; a division of MCP Industries.
 - b. Standard: ASTM C1460.
 - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
 - d. End Connections: Same size as and compatible with pipes to be joined.
4. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
5. Dielectric Unions:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) GF Piping Systems: Georg Fischer LLC.
 - 2) HART Industrial Unions, LLC.
 - 3) Jomar Valve.
 - 4) Matco-Norca.
 - 5) Watts Water Technologies; a Watts company.
 - 6) Wilkins.
 - 7) Zurn Industries, LLC.
 - b. Description:
 - 1) Standard: ASSE 1079.
 - 2) Pressure Rating: 125 psig minimum at 180 deg F.
 - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
6. Dielectric Flanges:
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Matco-Norca.
 - 2) Watts Water Technologies; a Watts company.
 - 3) Zurn Industries, LLC.
 - b. Description:
 - 1) Standard: ASSE 1079.
 - 2) Factory-fabricated, bolted, companion-flange assembly.
 - 3) Pressure Rating: 125 psig minimum at 180 deg F].
 - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
7. Dielectric Nipples:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1) Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
 - 2) Elster Perfection; Honeywell.
 - 3) Matco-Norca.
 - 4) Precision Plumbing Products.
 - 5) Victaulic Company.
- b. Description:
- 1) Standard: IAPMO PS 66.
 - 2) Electroplated steel nipple.
 - 3) Pressure Rating: 300 psig at 225 deg F.
 - 4) End Connections: Male threaded or grooved.
 - 5) Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 EARTH MOVING

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.

- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
 2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
 - a. Straight tees, elbows, and crosses may be used on vent lines.
 3. Do not change direction of flow more than 90 degrees.
 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
 - a. Reducing size of waste piping in direction of flow is prohibited.
- K. Lay buried building waste piping beginning at low point of each system.
1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
 3. Maintain swab in piping and pull past each joint as completed.
- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
 2. Horizontal Sanitary Waste Piping: 1 percent downward in direction of flow.
 3. Vent Piping: One] percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Install encasement on underground piping in accordance with ASTM A674 or AWWA C105/A 21.5.
- N. Install aboveground copper tubing in accordance with CDA's "Copper Tube Handbook."
- O. Plumbing Specialties:
- a. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
 2. Install drains in sanitary waste gravity-flow piping.
 - a. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."
- P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors.
1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

- R. Install sleeve seals for piping penetrations of concrete walls and slabs.
 - 1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors.
 - 1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

- A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Hub-and-Spigot, Cast-Iron Soil Piping Caulked Joints: Join in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.
- C. Hubless, Cast-Iron Soil Piping Coupled Joints:
 - 1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- D. Threaded Joints: Thread pipe with tapered pipe threads in accordance with ASME B1.20.1.
 - 1. Cut threads full and clean using sharp dies.
 - 2. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - a. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - b. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
 - c. Do not use pipe sections that have cracked or open welds.

3.4 SPECIALTY PIPE FITTING INSTALLATION

- A. Dielectric Fittings:
 - 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
 - 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.
 - 3. Dielectric Fittings for NPS 2-1/2 to NPS 4]: Use dielectric flanges.

3.5 VALVE INSTALLATION

- A. General valve installation requirements for general-duty valve installation are specified in the following Sections:
 - 1. Section 220523.12 "Ball Valves for Plumbing Piping."
 - 2. Section 220523.13 "Butterfly Valves for Plumbing Piping."
 - 3. Section 220523.14 "Check Valves for Plumbing Piping."

4. Section 220523.15 "Gate Valves for Plumbing Piping."
- B. Shutoff Valves:
1. Install full-port ball valve for piping NPS 2 and smaller.
 2. Install gate valve for piping NPS 2-1/2 and larger.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment".
1. Vertical Piping: MSS Type 8 or Type 42 clamps.
 2. Install individual, straight, horizontal piping runs:
 - a. 100 Ft. and Less: MSS Type 1, adjustable, steel clevis hangers.
 - b. Longer Than 100 Ft.: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Ft. if Indicated: MSS Type 49, spring cushion rolls.
 3. Multiple, Straight, Horizontal Piping Runs 100 Ft. or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.
 4. Base of Vertical Piping: MSS Type 52 spring hangers.
- B. Install hangers for cast-iron soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install hangers for PVC piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- E. Support vertical runs of cast-iron soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support vertical runs of PVC piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.7 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect waste and vent piping to the following:
1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.

4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
- C. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- D. Make connections in accordance with the following unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
- 3.8 IDENTIFICATION
- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."
- 3.9 FIELD QUALITY CONTROL
- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
 - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
 - a. Expose work that was covered or concealed before it was tested.
 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
 - a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.

- b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
 - c. Inspect joints for leaks.
4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
- a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
 - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
 - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
 - d. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTION

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Repair damage to adjacent materials caused by waste and vent piping installation.

3.11 PIPING SCHEDULE

- A. Aboveground, soil and waste piping NPS 4 and smaller are to be any of the following:
 1. Service cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
- B. Aboveground, soil and waste piping NPS 5 and larger are to be any of the following:
 1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI heavy-duty hubless-piping couplings; and coupled joints.
 3. .
- C. Aboveground, vent piping NPS 4 and smaller is to be any of the following:
 1. Service cast iron, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
 3. Copper Type DWV tube, copper drainage fittings, and soldered joints.
 - a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2: Hard copper tube, Type M; copper pressure fittings; and soldered joints.
 4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

- D. Underground, soil, waste, and vent piping NPS 4 and smaller are to be any of the following:
1. Service cast-iron soil piping; gaskets; and gasketed joints.
 2. Hubless, cast-iron soil pipe and fittings; CISPI heavy-duty hubless-piping couplings; and coupled joints.

END OF SECTION 221316

SECTION 260126 - ELECTRICAL TESTING

PART 1 - GENERAL

- 1.1 Tests described below are not all inclusive but are intended to indicate a general test outline for acceptance. Designer should consult with Purdue Engineering for a full discussion of testing of each system, based on experience.
- 1.2 Test reports should include test methods, test equipment information (Manufacturer, Model number, calibration information, etc.) and equipment tested. Report shall indicate Pass, Fail, or Concerns.

PART 2 - PRODUCTS

- 2.1 NOT USED

PART 3 - EXECUTION

3.1 SHORT AND GROUND TESTING

- A. After wires, cables and bus ducts are in place, and before being connected to equipment, the system(s) shall be tested for shorts and grounds, including grounded neutrals, by means of an approved type of constant potential "megger", All hot wires, if shorted or grounded shall be removed and replaced. A Voltage test shall be made at the last outlet on each circuit. If drop in potential is excessive, this contractor shall correct the condition by repairing high resistance splice, etc.

3.2 ISOLATED GROUND SYSTEMS TESTING

- A. Isolated ground system to be test prior to use by lifting the ground at source and without any loads connected to the associated circuits measuring for continuity to the building bonding system. The results should be to have infinite resistance. The isolated ground should only be joined to the building bonding system at one point.

3.3 Power Busway Testing Procedure

- A. Visually inspect each joint stack of the busway run for proper alignment. Verify that the joints meet the manufacturer's requirement for alignment.
- B. Establish the busway method of grounding.
 1. A separate ground bus bar is preferred in all new busways. There may be instances where the bus may use the case for the ground.
 2. Existing systems that are being repaired or extended may have a ground bus bar or case ground to match existing.
 3. If the busway has a case ground perform the check listed below for the ground bus bar

- C. Isolate each bus bar at both ends of the busway run including ground and neutral
 - 1. Verify that there is complete separation of each phase, neutral and ground bus bar
- D. Perform a continuity check for each phase, neutral and ground bus bar as follows:
 - 1. Route an insulated wire from one end of the bus run to the other
 - 2. Test each phase, neutral and ground bus bar one at a time and using the wire to complete the circuit
- E. Check for continuity of each phase, neutral and ground bus bar
 - 1. Verify no continuity to each of the following:
 - a. The remaining phase bus bars
 - b. The neutral bus bar
 - c. The ground bus bar
 - 2. Example:
 - a. Secure the insulated test wire to Phase “A” at the end of the busway (opposite the test end)
 - b. Check for continuity on Phase “A” between the end of the same insulated wire and Phase “A” bus bar at the test end of the bus
 - c. Then verify no continuity between the end of the insulated wire and Phase “B”, Phase “C”, Neutral, and Ground bus bar
 - 3. Note for busway with a ground busbar:
 - a. Note: Ground bus continuity may be difficult to verify if the ground bus is effectively bonded to the case at each end or each joint and cannot be truly isolated.
 - 1) After continuity has been verified for each phase, neutral and ground bus bar, terminate the ground bus at each end of the busway run. Make sure the ground bus bar is bonded to the equipment ground bus in the appropriate switchgear.
 - 2) Verify continuity between the busway ground bus bar and the building system ground.
 - 3) Verify continuity between the busway ground bus bar and the equipment ground bus in the appropriate switchgear.
 - 4) Verify continuity between the busway ground bus bar if there is one and the busway case.
 - 5) Perform a Megger test (insulation resistance test)
 - a) Between each phase and neutral bus bar to the ground bus terminal
 - b) Between each opposite phase
 - c) Perform Test at 1,000 VDC and record the readings
 - 6) Example of Megger test:
 - a) “A” Phase to – Ground
 - b) “A” Phase to – Neutral
 - c) “A” Phase to – Phase “B”
 - d) “A” Phase to – Phase “C”
 - e) Repeat for “B” and “C” phases
 - 7) Reconnect each bus bar at both ends of the busway run including neutral.

- 8) Install all covers
- 9) Level
 - a) Verify that the busway is level to within the requirements of the manufacturer. Submit report indicating compliant installation

4. Thermographic Survey (Infrared Scan)

- a. At project substantial completion perform an infrared scan of electrical connections on equipment rated 100A or more:
- b. Perform the scan no sooner than 24 hours after the equipment is in operation.
 - 1) Mechanical equipment shall be operating at a typical occupied building loading.
- c. Testing Schedule
 - 1) Complete initial testing at substantial completion.
 - 2) Perform follow up test for all previously tested components no longer than 10 months after substantial complete. Provide a side by side (first test and second test) report and identify concerns.
- d. Remove panels so joints and connections are accessible.
- e. Prepare test and inspection report. Include notation of deficiencies and remedial actions taken.
- f. A second infrared scan should be provided 8-9 months after substantial completion. It should also have a report as described above.

3.4 600V CONDUCTORS AND CABLES

- A. Perform visual and mechanical inspections.
- B. Test insulation resistance of conductors of each circuit with overcurrent protection 60A or greater. Test conductors in each conduit after all conductors are pulled in the circuit. Minimum resistance shall be 50M Ω . Where a failed conductor is found, all conductors in a conduit shall be removed. Replacement conductors shall be retested after insertion. Test the following:
 - 1. Phase to Phase.
 - 2. Phase to Neutral.
 - 3. Phase to Ground.
 - 4. Neutral to Ground.
- C. Where conductors fail the visual or electrical test, replace all conductors in the same raceway.

3.5 ELECTRICAL METERING

- A. Visual and Mechanical
 - 1. Verify CT's and PT's are per spec.
 - 2. Verify shorting switch is open after installation.

3.6 ENGINE GENERATOR

- A. A factory authorized representative shall be onsite to perform and support engine generator startup.
- B. Startup shall be in accordance with manufacturer warranty and shall be performed in accordance with NFPA 110 Level 1 EPSS.
 - 1. Visual and Mechanical
 - a. Visually inspect generator, clearances, and anchorage, air baffles, etc.
 - b. Take sound readings to verify compliance with noise attenuation requirements.
 - 2. Electrical and Mechanical Tests
 - a. Perform insulation resistance test on windings with respect to ground in accordance with ANSI/IEEE Standard 43. Calculate polarization index.
 - b. Test relay protective devices.
 - c. Perform Phase rotation test to determine compatibility with load requirements.

3.7 AUTOMATIC TRANSFER SWITCHES

- A. A factory authorized representative shall be onsite to perform and support Automatic Transfer Switch startup. Startup shall be in accordance with manufacturer warranty and shall be performed in accordance with NFPA 110 Level 1 EPSS.
- B. Visual and Mechanical
 - 1. Verify Nameplate information
 - 2. Perform thermographic survey of bolted connections.
- C. Electrical Tests
 - 1. Verify setting and operation of control devices.
 - 2. Calibrate and set relays and timers.
 - 3. Verify phase rotation, phasing and synchronized operation
 - 4. Perform automatic transfer tests:
 - a. Simulate loss of normal power by shutting off normal power.
 - b. Return to normal power.
 - c. Simulate loss of emergency power.
 - d. Simulate all forms of single-phase conditions.
 - e. Verify correct operation and timing of:
 - 1) Normal Source Voltage-Sensing.
 - 2) Engine Start Sequence
 - 3) Time delay upon transfer
 - 4) Alternate source voltage-sensing relays.
 - 5) Automatic transfer operation
 - 6) Interlocks and limit switch function
 - 7) Time delay and retransfer
 - 8) Engine Cooldown

3.8 GENERATOR/LOAD BANK DOCKING STATION

- A. A factory authorized representative shall be onsite to perform and support startup. Startup shall be in accordance with manufacturer warranty and shall be performed in accordance with NFPA 110 NFPA 110 Level 1 EPSS .
- B. Visual and Mechanical Inspection
 - 1. Verify connections and tightness
 - 2. Perform thermographic survey
 - 3. Verify start signal will start generator
 - 4. Verify dump signal will disconnect load bank.

3.9 DRY TYPE TRANSFORMERS

- A. Compare nameplate with drawings and specifications.
- B. Verify tightness of bolted electrical connections per manufacturer's requirements.
- C. Perform thermographic inspection.
- D. Verify as-built taps are as specified.

3.10 SWITCHBOARDS

- A. Perform visual and mechanical inspections.
 - 1. Verify nameplate information and all labeling
 - 2. Verify electrical interlocks.
 - 3. Verify correct function of drawout circuit breakers, disconnecting and grounding contacts and interlocks.
 - 4. Verify all bolted connections.
 - 5. Confirm barriers are in place and intact:
 - a. Section-to-Section Barriers
 - b. Wireway barriers to bus-bars
 - c. Incoming conductors to main circuit breaker: Barrier conductors from main section.
 - 6. Electrical Tests
 - a. Perform visual and mechanical inspection of instrument transformers, in accordance with paragraph "Instrument Transformers."
 - b. After building power has been connected and is stable, perform Thermographic survey.
 - c. Perform phasing checks on double-ended switchboards/switchgear.

3.11 LOW-VOLTAGE INSULATED CASE/MOLDED-CASE CIRCUIT BREAKERS, 225A AND LARGER

- A. Confirm that field/factory tests have been completed and submitted to the Commissioning Agent, Engineer of Record, and Owner for record.
 - 1. Test data should be reviewed by the Commissioning Agent, Engineer of Record and the Owner prior to application of permanent power.

- B. Visual and mechanical inspection.
 - 1. Verify correct application of all circuit breakers (setting, trip plugs, frame size, wire size, etc.) and connected load.
- C. Verify all circuit breaker settings are made in accordance with the arc flash study and all equipment is correctly arc flash labeled.

3.12 LOW VOLTAGE DISCONNECT SWITCHES

- A. Verify application of equipment, size of disconnect, fusing, blade alignment and mechanical operation.
- B. Verify tightness of lugs, blade engagement.
- C. Verify all electrical barriers and insulators have been properly installed.
- D. Perform thermographic survey on disconnects 100A and larger.
- E. Verify interlocks are operating.

3.13 INSTRUMENT TRANSFORMERS

- A. Perform visual and Mechanical Inspections.
 - 1. Verify application
 - 2. Verify primary and secondary fuses.
 - 3. Verify grounding and shorting.
- B. Perform electrical tests –Current Transformers
 - 1. Insulation test.
 - 2. Polarity test
 - 3. Ratio-verification test
 - 4. Excitation test for transformers used in relaying applications.
 - 5. Insulation resistance tests winding-to- winding and each winding-to-ground.
 - 6. Polarity test

3.14 UNINTERRUPTABLE POWER SYSTEM

- A. Visual and Mechanical
 - 1. Verify nameplate information with design documents.
 - 2. Verify connections.
 - 3. Perform thermographic survey of accessible bolted electrical connections.
- B. Electrical Tests
- C. Provide startup by manufacturer authorized representatives in compliance with warranty requirements. Purdue representative shall be invited to observe.
 - 1. Manufacturer representative shall provide startup report.

3.15 GROUNDING SYSTEMS

A. Visual and Mechanical

1. Verify ground system is in compliance with construction documents and NFPA 70.
2. Verify Supplemental Grounding, Instrumentation Grounding, and ITaP Grounding Systems are isolated, except for connection to the Main Building Ground Bar.

B. Electrical Tests

1. Perform fall of potential test in accordance with ANSI/IEEE 81 on the main grounding electrode system.
2. Perform electrical tests voltage transformers

END

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 1. Definitions.
 2. General electrical requirements.
 3. Electrical coordination and installation.
 4. Temporary electricity.
 5. Submittals.
 6. Delivery, storage, and handling.
 7. Cutting, patching, damage, and mutilation.
 8. System startup.
 9. Warranty.

1.3 DEFINITIONS

- A. Furnish: Supply but do not install the specific item, component, equipment, system, etc.
- B. Install: Place in position, make connections and adjust for use of the specific item, component, equipment, system, etc.
- C. Provide: Furnish and install the specific item, component, equipment, system, etc.
- D. Equipment: A general term, including material, fittings, devices, appliances, luminaires, apparatus, machinery, etc. used as part of or in the connection with an electrical installation, per NEC.
- E. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces, immediately below roof, space above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- F. Concealed, Inaccessible, Interior Installations: Concealed from view and protected from physical contact by building occupants. Rendered inaccessible by the structure of finish of the building, per NEC. Examples include above hard ceilings and in chases not behind an access panel.
- G. Concealed, Accessible, Interior Installations: Concealed from view and protected from physical contact by building occupants. Accessible via the structure of the finish of the building, per NEC. Examples include above lay-in ceilings and behind access panels in chases.
- H. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and from physical contact by building occupants but subject to outdoor ambient temperatures. Examples include duct banks and equipment within an underground vault or manhole.

- I. Exposed, Interior Installations: Exposed to view indoors, and accessible Examples include mechanical equipment rooms.
- J. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- K. Rough-In: Suitable raceway terminated at each end in a suitable box or with a bushing and containing a pull string.
- L. Work: Labor, installation, materials, equipment, systems, etc. required to complete a portion of the project scope.
- M. NFPA 70 (National Electrical Code - NEC): Currently adopted NFPA 70 code with all amendments as adopted by the state or local authority having jurisdiction.
- N. Superintendent: Owner's representative as assigned by Purdue Construction Department.

1.4 GENERAL ELECTRICAL REQUIREMENTS

- A. Provide all required labor, material, equipment, and Contractor's services necessary to complete the electrical installation required in full conformity with the Contract Documents and as required to meet all current codes and ordinances including all requirements of the Occupational Safety and Health Act latest edition.
- B. This Contractor shall review the complete set of drawings and specifications and include work from other divisions that affect his work.
- C. Perform all work to conform to or exceed the minimum requirements of the current edition of the National Electrical Code, NECA and all federal, state, local and municipal codes and ordinances. Work shown on the drawings or in the specifications that exceed the minimum requirements of the NFPA 70 or other regulations shall be installed as indicated. Comply with the directions of all properly appointed authorities having jurisdiction.
- D. OSHA: Contractor, Sub-Contractor, and all those working at the job site shall adhere to all requirements of the Occupational Safety and Health Act latest edition.
- E. Drawings are diagrammatical in nature and do not show every required miscellaneous detail, support, fitting, etc. Drawings shall not be scaled for purposes of equipment installation. All measurements shall be verified to ensure equipment, raceways, devices, luminaires, etc. are installed in a neat and workmanlike manner. Furnish and install all materials required for a complete and operational electrical system.
- F. Obtain all permits, licenses, certificates and pay for all fees necessary to complete the electrical installation unless otherwise noted in the front-end specifications or Division 01.
- G. Field verify all conditions and dimensions as they pertain to the intent of the drawings and specifications. Contractor shall bring to the attention of the Engineer any discrepancies discovered prior to the commencement of any work affected by or related to such discrepancy. Contractor shall be responsible for all costs associated with or caused by that contractor's failure to comply with this requirement.
- H. Provide all disconnects, starters, outlets, receptacles, wiring, raceway, pathways, etc. required to properly connect all equipment indicated in the Construction Documents to be furnished and installed by other Trades and/or by the Owner or furnished by other Trades and/or the Owner for installation by this Contractor. Verify all requirements with approved submittals prior to rough-in and installation.

- I. Rough-in requirements for all equipment to be connected may not be shown on the drawings. Contractor shall verify all electrical requirements with the other Trades and/or the Owner furnishing the equipment, and with the manufacturer of the equipment.
 - J. The Engineer reserves the right to make changes of the locations of all receptacles, switches, equipment, etc. up to the time of rough-in or setting of equipment without additional cost to the project.
 - K. Field verifies exact location of electrical equipment including lighting fixtures, fire alarm devices, security system devices, receptacles, etc. in rooms containing exposed ductwork, piping, etc. and rearrange as required by the Engineer.
 - L. All materials shall be new and shall be Underwriters Laboratories (UL) labeled conforming to NEMA Standards and all applicable codes unless otherwise noted.
 - M. Manufacturer Qualifications: Company specializing in manufacturing products with not less than three years of documented experience.
 - N. Workmanship: As a minimum requirement, NECA "Good Workmanship in Electrical Construction" shall be followed along with any additional requirements as described in the specifications and on the drawings.
 - O. To help prevent sound transmission from one space to another, do not install recessed equipment and devices back-to-back in the same wall.
 - P. Provide all cutting, patching, and replacement of materials for electrical work in accordance with all appropriate Divisions of Specifications.
 - Q. Paint surface mounted or otherwise exposed conduit, raceway, boxes, and other unfinished electrical materials in finished spaces. Paint to match surfaces to which they are attached to, or color as selected by Architect.
 - R. All finish painting shall be in accordance with and provided under Division 09 and paid for by this Contractor.
 - S. Provide access panels and doors for electrical items that are required to remain accessible that are installed in non-accessible spaces. Access doors and panels are specified in Division 08."
 - T. Contractor shall examine architectural drawings to verify wall thickness for proper recessing depth for all flush installed equipment, devices, etc. Any instance of inadequate depth shall be brought to the attention of the architect and engineer prior to Bids or provided for by this contractor.
 - U. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements (drawings, specifications, submittals, addendums, etc.).
- 1.5 VERIFICATION
- A. Contractor shall visit the project site to verify existing conditions relative to the project scope.
 - B. Work shown on the drawings as "existing" is assumed to be in place and suitable for modifications and additions as indicated on the drawings. This contractor shall field verify these items prior to installation and shall make all necessary provisions required for proper installation as required by the drawings and specifications. Contractor shall submit questions about existing conditions in writing to the architect/engineer.

1.6 COORDINATION

- A. Contractor shall coordinate with all other Trades to assure proper timing and installation of materials and equipment to meet the sequence of construction. Contractor shall also coordinate with other trades to ensure installation is within intended space requirements, meets code requirements, and does not result in any conflicts. Minor field installation deviations from the drawings are acceptable to ensure proper installation and that all code requirements are met.
- B. Before performing any work, review the drawings and confirm that the electrical work does not interfere with clearance required for beams, foundations, columns, pilasters, partitions, ductwork, plumbing, fire protection, etc. Where interferences develop after installation of equipment, this contractor shall make changes requested by the Engineer as required to provide proper clearances at the expense of this Contractor.
- C. All interruptions of a system or a service shut-down of any duration shall be approved by the Owner and Engineer in writing not less than seven (7) days in advance of the interruption or shut-down. Submit duration and nature of an interruption or shut-down at time of request.
- D. Coordinate arrangement, mounting, and support of electrical 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 installed at required slope.
 - 4. To allow raceways, cables, wireways, cable trays, busways, etc. to be clear of obstructions and of the working and access space of other equipment.
 - 5. To maintain mechanical access, especially the 24"x24" space required in front of VAV/CAV box control locations
- E. Coordinate location of access panels and doors for electrical items that are behind finished surfaces concealed in locations that will remain inaccessible in the future.
- F. For equipment requiring connections by other trades, provide approved submittals to the appropriate trade. Approved submittals are to include all information required by the other trade.
- G. Coordinate all training sessions with the Owner and Engineer. All training sessions shall be performed and scheduled at the Owner's convenience. Quantity of training sessions and length of each session shall be as specified in the technical specification sections.

1.7 TEMPORARY ELECTRICITY

- A. Provide temporary power and lighting for the progression of work by all Trades as required by Division 01.

1.8 SERVICE CONTINUITY

- A. Continuity:
 - 1. Service continuity to existing equipment shall be addressed in the following manner:

- a. Maintain service continuity to all existing loads that are to remain by modifying and/or extending conduit and wiring as required. Field verification of existing conduit runs, and circuitry is to be done as required. This is applicable to receptacles, overhead power drops, disconnects, lighting, and wiring to fume hoods and mechanical equipment.

B. Inconvenience to Occupants:

1. Power interruptions must be properly pursued to reduce inconvenience to the normal building activity to a minimum.

C. Interruption Arrangements:

1. Arrangements for interruption of electrical service to Project areas must be made in writing with the Owner representative\Project Manager at least two weeks before the proposed interruptions.

D. Interruption Hours:

1. Interruptions of service in areas where Owner's personnel are working will be made between the hours of 11:00 P.M. and 6:00 A.M. unless approved by Owner's representative.

1.9 SUBMITTALS

- A. Refer to Division 01 Shop Drawings, for submittal procedures.

- B. Provide submittals for products in Division 26, 27, and 28.

- C. Shop drawing submittals shall comply with the following:

1. Organize each submittal by specification section and it shall include all manufactured items.
2. Include wiring diagrams, riser diagrams, etc. showing the quantity and types of cables, raceway required for systems such as Lighting Control, Sound Systems, Access Control, etc. Drawings will be returned for completion if the locations and routing of the devices and cables are not shown. Delays in the construction schedules due to incomplete drawings shall be the responsibility of this Contractor.

- D. Submit record drawings in accordance with Division 01

- E. Where new electrical equipment, devices, cabling, etc. specified or noted on the drawings are obsolete, provide replacements that meet or exceed all options and accessories necessary for its function. Submit replacement for approval.

- F. Contractor shall verify recessed depths for luminaires against catalog reference material prior to providing submittals for review.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle all material and equipment in accordance with the manufacturer's recommendation unless specifically otherwise noted.

- B. Store all materials and equipment off-site unless approved by the Engineer. Materials and equipment stored on-site shall be stored in a climate controlled indoor space and so as not to interfere with construction or facilities in use by Owner.

- C. Damaged material and equipment shall not be furnished or installed.

1.11 CUTTING, PATCHING, DAMAGE, AND MUTILATION

- A. The General Contractor is responsible for all cutting and patching indicated on the Architectural Drawings related to installation or removal of work by the Electrical Contractor. All required cutting and patching may not be shown. Any additional cutting and patching required for electrical work, which is not indicated on the Architectural Drawings, is the responsibility of the Electrical Contractor.
- B. Properly patch and repair cuts made into, or penetration made through fire rated walls, floors, and ceilings to maintain their proper fire rating.
- C. Roof openings required by this Contractor that are not shown on the Architectural or Structural Drawings shall be provided by the Division 07 Contractor and paid for by this Contractor.
- D. All undue or untimely damage or mutilation of masonry, plaster and other finished surfaces around conduit, equipment, etc., created by this Contractor shall be repaired by the proper Contractor and paid for by this Contractor.
- E. This Contractor shall be responsible for damage to or mutilation of the work of the other Contractors or to the building and its contents caused by equipment installed or work performed by this Contractor.
- F. The finish of any item that has been marred, scratched or damaged in any way by this Contractor shall be repaired and repainted at the expense of this Contractor, and to the satisfaction of the Engineer.

1.12 BASIC ELECTRICAL REQUIREMENTS

- A. All electrical systems shall be designed and specified as “fully-rated” systems. “Series-rated” systems are not acceptable.

1.13 DATA GATHERING BY ELECTRICAL CONTRACTOR

- A. The following scope of work shall be performed by the E.C.
 - 1. E.C. shall provide documentation showing exact feeder lengths for all new feeders. Include conductor type and size as well as insulation type.
 - 2. E.C. shall provide documentation showing the exact overcurrent protection devices installed and the settings and ratings.
 - 3. E.C. shall provide and Install the Arc Flash labels.
 - a. As determined by the Arc Flash study; label information and format will be given to the E.C.
 - b. As required by NEC if an Arc Flash study is not available.

1.14 SYSTEM START-UP

- A. Perform tests on all systems and each piece of equipment as required by applicable codes and/or as specified.
- B. Clean all equipment of construction debris and dust prior to demonstration to Owner.

- C. All work shall include start-up of all systems, demonstrating each system to the Owner, and training the Owner in the proper operation of each system. Furnish operational and maintenance instructions.

1.15 WARRANTY

- A. In addition to the warranty required under the provisions of front end, Division 0 and 1 specification, provide additional warranty for work and materials for the time periods indicated under individual Sections of the Specifications or for a duration of one (1) year from the date of final acceptance by the owner or substantial completion, whichever is longer. Manufacturer product Warranties and Guaranties that exceed the minimum requirements of the Contract Documents shall be adhered to.
- B. Contractor shall correct, repair, and/or replace any deficiencies of any part of the installation to the satisfaction of the Owner and Engineer for the duration of the warranty/guarantee period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to top of unit for wall-mounted 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 the project documents.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

3.2 FIRESTOPPING

- A. Provide firestopping to raceway and cable penetrations of fire-rated floor, ceilings, partitions and wall assemblies for electrical installations to maintain fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07.
- B. Provide firestopping to raceway and cable penetrations of fire-rated floor, ceilings, partitions and wall assemblies for electrical installations to maintain fire-resistance rating of assembly. Fire stopping material will be as follow:
 - 1. Use only firestop products that have been UL 1479 or ASTM E 814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.
 - 2. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:

- a. Hilti Cast-In Place Firestop Device (CP 680-P) or equal for use with combustible penetrants.
 - b. Hilti Cast-In Place Firestop Device (CP 680-M) or equal for use with noncombustible penetrants.
 - c. Hilti Firestop Speed Sleeve (CP 653) or equal for use with cable penetrations.
 - d. Hilti Firestop Drop-In Device (CFS-DID) or equal for use with noncombustible and combustible penetrants.
3. Sealants, foams or caulking materials for use with non-combustible items including rigid steel conduit (GRC, IMC) and electrical metallic tubing (EMT), the following products are acceptable:
- a. Hilti Intumescent Firestop Sealant (FS-ONE) or equal.
 - b. Hilti Fire Foam (CP 620) or equal.
 - c. Hilti Flexible Firestop Sealant (CP 606) or equal.
4. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including PVC jacketed, flexible cable or cable bundles, and plastic pipe, the following products are acceptable:
- a. Hilti Intumescent Firestop Sealant (FS-ONE) or equal.
5. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
- a. Hilti Intumescent Firestop Sealant (FS-ONE) or equal.
 - b. Hilti Fire Foam (CP 620) or equal.
 - c. Hilti Flexible Firestop Sealant (CP 606) or equal.
6. Non curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
- a. Hilti Firestop Putty Stick (CP 618) or equal.
 - b. Hilti Firestop Plug (CFS-PL) or equal.
7. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
- a. Hilti Firestop Putty Pad (CP 617) or equal.
 - b. Hilti Firestop Box Insert or equal.

END OF SECTION 260500

SECTION 260510 - ELECTRICAL DEMOLITION

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.
- B. Division 02, "Demolition".

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation, historical documents, and/or information from the owner. Contractor shall verify all information.
- D. Report discrepancies to Engineer before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.
- F. The electrical contractor shall visit the job site prior to bidding and establish the condition of the existing conduit and cable support system(s).

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with the Owner.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits use personnel experienced in such operations.

- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 14 calendar days before partially or completely disabling system.
- E. Existing Fire Alarm System: Maintain existing system in service.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. The Owner has first right of refusal of all equipment removed, including lighting fixtures, motors, starters, etc.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. When removing electrical devices and connections, remove conductors, boxes, conduit, etc to source of supply, panel of origin, or to the nearest junction box containing circuits and conductors that are to remain.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and below finished floor, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and other distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires.
- I. Remove brackets, stems, hangers, other accessories, etc from removed devices, equipment, luminaires, etc that are no longer used.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations and junction boxes that become inaccessible for any reason, which are to remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods to match existing installation unless otherwise specified.
- M. Service continuity shall be maintained to all existing loads that are to remain by modifying and/or extending conduit and wiring as required. Field verification of existing conduit runs and circuitry shall be done as required. This is applicable to receptacles, overhead power drops, disconnects, lighting, wiring to mechanical equipment, wiring to lab equipment, wiring to overhead doors, wiring to plumbing water coolers, etc.
- N. Through the Floor Conduit Removal:
 - 1. When removing existing conduit cut off conduits below finished floor and patch opening.

- O. During demolition if, after a ceiling has been removed or below an open floor deck, it is discovered that all or some of the existing conduit and open cabling was supported by the ceiling, from the ceiling support system, from other conduits, or other non-NEC approved methods (and not independently from the structure as required by the current NEC) the conduit and cabling in question shall be re-supported as required. The Electrical Contractor shall visit the job site prior to bidding and establish the condition of the existing conduit and cable support system(s).

3.4 REUSE OF EXISTING CONDUITS

- A. This contractor may re-use existing conduit for installing new conductors when practical or directed to do so by the Project Manager, as follows:
 - 1. For home runs, remove all conductors in the existing conduit between a designated existing device and its panel of origin.
 - 2. For conductors installed in conduits that branch off the home run conduit, the conductors shall be removed only to the first existing termination. Termination is defined as a conductor splice or termination to existing device.
 - 3. Removed conductor shall be replaced with new conductors. Where conductors are laced in existing bundles within equipment, bundles shall be replaced after existing conductors have been removed, and new conductors installed.
 - 4. Provide a new equipment grounding conductor with all new conductor runs. Pull the equipment grounding conductor all the way to the original receptacle outlet box. The new equipment grounding conductors shall be used in conjunction with the original circuits and their replacement devices as well as any new circuits.
- B. Supporting of reused conduit:
 - 1. When existing conduit is reused, it is the responsibility of the Electrical Contractor to re-support that conduit as required per the NEC and project specifications. Existing conduit or cabling relying on the present ceiling support system must be re-supported per the NEC.
- C. Ceiling Demolition:
 - 1. Any existing conduit or cabling that is to remain in service and is relying on the present ceiling support system must be re-supported per the new NEC and project specifications.

3.5 REPLACEMENT OF EXISTING DEVICES

- A. It may be necessary to replace other devices (receptacles, switches, etc.) on the same circuit. The first device is called the 'device in question' below.
 - 1. Replace other existing devices when one of these conditions is met:
 - a. The device is located in the conduit run between the device in question and its panel of origin.
 - b. The device is located in a conduit run that branches off from the home run conduit between the panel and the device in question and is located in the same outlet box as the device described in paragraph 3.5.A.
 - 2. Do not replace existing devices when either of the following conditions is met:

- a. The device is served from the original home run circuit in question and located beyond the device in question.
- b. The device is located in a conduit run that branches off from the home run conduit between the panel and the device in question and is located beyond the outlet box as the device described in paragraph 3.5.A.

3.6 REMOVAL OF COMMUNICATIONS SYSTEMS:

- A. Abandoned communications, voice, data, fire alarm, closed circuit television, access control, etc. cables within the project area shall be removed back to source.
- B. There are different types of communication cable on campus, and each type must be removed in a unique way. When removing existing voice (telephone) and data systems the first step is to identify the different systems. After identifying the systems, consult with Purdue IT for the steps that are the proper procedure for the Project Scope of Work.
 1. For removal and demolition of system components and the cables, see specification Division 27 Communications.
 2. For the removal or relocation of PICs, see specifications Division 27, Copper Horizontal Cabling, Subsection Relocation and Removal of Existing Telecommunication Outlets.

3.7 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION 260510

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Copper building wire.
 2. Metal-clad cable, Type MC.
 3. Fire-alarm wire and cable.
 4. Connectors and splices.
- B. Wire and cable shall be color coded, with a separate color used for each phase and neutral used consistently through the system as specified in Identification section Green shall be used for all grounding conductors.
- C. No material shall be used in the conductor system that cannot be identified under an approved material specification.
- D. No material shall be installed that is corrosive, breeds or sustains mold growth, is moisture absorbing or whose properties exceed the following:
1. Flame spread 25 Max
 2. Smoke developed 50 Max
 3. Fuel contributed 50 Max
- E. All wires and cables shall be delivered to the work site in complete coils with an approved tag containing manufacturer's name, wire size and type of insulation.

1.2 SUBMITTALS

- A. Product Data:
1. Copper building wire.
 2. Metal-clad cable, Type MC.
 3. Connectors and splices.
- B. Product Schedule: Indicate type, use, location, and termination locations.
- C. Field quality-control reports.

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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. Alpha Wire; brand of Belden, Inc.
 2. Cerro Wire LLC.
 3. Encore Wire Corporation.
 4. General Cable; Prysmian Group North America.
 5. Okonite Company (The).
 6. Service Wire Co.
 7. Southwire Company, LLC.
- C. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. 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 B3 for bare annealed copper and with ASTM B8 and for compact stranding & TC-ER ASTM B496 for stranded conductors.
- E. Conductor Insulation:
1. Type THHN and Type THWN-2. Comply with UL 83.
 2. Type THW and Type THW-2. Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
 3. Type UF. Comply with UL 83 and UL 493.
 4. Type XHHW-2. Comply with UL 44.

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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. AFC Cable Systems; Atkore International.
 2. Alpha Wire; brand of Belden, Inc.
 3. Encore Wire Corporation.
 4. General Cable; Prysmian Group North America.
 5. Okonite Company (The).
 6. Southwire Company, LLC.
- 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 B3 for bare annealed copper and with ASTM B8 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 STEEL ARMORED CABLE, TYPE HFC-90

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath. Comply with UL 4, 83, 1479, 1581, 2556, NEC 250.118(B), 300.22(C), 517.

B. 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:

1. AFC Cable Systems; Atkore International hcf-90.
2. Encore Wire Corporation.
3. General Cable; Prysmian Group North America.
4. Southwire Company, LLC.
5. WESCO.

2.4 MINIMUM CONDUCTOR SIZE

A. Branch Circuits: No. 12 AWG, up size the conductor for following:

1. 20A, 120V circuits longer than 75 feet: No. 10 AWG.
2. 20A, 120V circuits longer than 150 feet: No. 8 AWG.
3. 20A, 277V circuits longer than 150 feet: No. 10 AWG.

B. Motor Control Circuits: No. 14 AWG.

C. Flexible connections and pendants for lighting fixtures: No. 14 AWG stranded.

- D. Annunciator Wiring: No. 16 AWG TFF, TFFN, THHN, stranded.

2.5 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs 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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. 3M Electrical Products.
 2. ABB, Electrification Business.
 3. Hubbell Utility Solutions; Hubbell Incorporated.
 4. ILSCO.
 5. Ideal Industries, Inc.
 6. NSi Industries LLC.
 7. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 8. TE Connectivity Ltd.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, steel with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: One and Two hole with standard and long barrels.
 3. Termination: Compression and Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Branch Circuits:
1. Copper. Solid for No. 14 AWG and smaller; stranded for No. 12 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- B. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- C. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.
- D. MC Cable: MC Cable may only be used in two cases.

1. In lieu of flex and wire for light fixture whips with a maximum length of 6'. MC cable shall not be daisy-chained between fixtures.

3.3 INSTALLATION, GENERAL

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points in accordance with Section 260533.13 "Conduits 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 Section 260529 "Hangers and Supports for Electrical Systems."

3.4 INSTALLATION OF FIRE-ALARM WIRE AND CABLE

- A. Comply with NFPA 72.
- B. Wiring Method: Install wiring in metal pathway according to Section 270528.29 "Hangers and Supports for Communications Systems."
 1. Install plenum cable in environmental airspaces, including plenum ceilings.
 2. Fire-alarm circuits and equipment control wiring associated with fire-alarm system must be installed in a dedicated pathway system.
 - a. Cables and pathways used for fire-alarm circuits, and equipment control wiring associated with fire-alarm system, may not contain any other wire or cable.
 3. Fire-Rated Cables: Use of two-hour, fire-rated fire-alarm cables, NFPA 70, Types MI and CI, is not permitted.
 4. Signaling Line Circuits: Power-limited fire-alarm cables may be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with fire-alarm system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes; cabinets; or equipment enclosures where circuit connections are made.

- E. Color-Coding: Color-code fire-alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire-alarm system junction boxes and covers red.

3.5 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.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch (150 mm) of slack.

3.6 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "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.

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.8 FIELD QUALITY CONTROL

- A. 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 for compliance with requirements:
 - 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.
- B. Cables will be considered defective if they do not pass tests and inspections.
- C. 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 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.2 SUBMITTALS

- A. Product data for specified product

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. Burndy; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 2. ERICO; brand of nVent Electrical plc.
 3. ILSCO.
 4. O-Z/Gedney; brand of Emerson Electric Co., Automation Solutions, Appleton Group.
 5. Thomas & Betts Corporation: A member of ABB Group.insert manufacturer's name.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

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. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

- C. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- H. Straps: Solid copper, cast-bronze clamp or copper lugs. Rated for 600 A.
- I. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal **[one]** **[two]**-piece clamp.
- J. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Grounding Conductors: Green-colored insulation with continuous.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.

3.3 INSTALLATION

- I. All panelboards and switchboards shall contain a grounding bus.
- J. Equipment Grounding:
 - 1. All new equipment shall be equipped with grounding provisions per current NEC requirements.
- K. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.4 LABELING

- A. Comply with requirements in Division 26 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
 - 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

- A. 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.
- B. Grounding system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 260526

SECTION 260528 - MOUNTING HEIGHTS

PART 1 - GENERAL

1.1 MOUNTING HEIGHT SCHEDULE

Device	Reference	Height
Switches	floor - top	+ 4'-0"
Outlets	floor - bottom	+ 1'-6"
Plugstrip	floor - top	+ 4'-0"
Dimmer	floor - top	+ 4'-0"
Wall Speaker	ceiling - top	+/- 1'-0" (verify)
Telephone Outlet	floor - bottom	+ 1'-6"
Wall Phone	floor - top	+ 4'-0"
Wall Phones - Handicapped	floor - bottom	+ 3'-4"
Fire Alarm Station	floor - top	+ 4'-0"
Fire Alarm Signal	strobe location	ADA - 0'-6" below ceiling or 6'-8" above floor whichever is lower
Safety Switch	floor - top	+ 6'-0"
Motor Starter	floor - top	+ 6'-0"
Relay Panel	floor - top	+ 6'-0"
Branch Circuit Panel	floor - top	+ 6'-0"
Push Button	floor - top	+ 4'-0"
Control Station	floor - top	+ 4'-0"
Microphone Outlet	floor - bottom	+ 1'-6"
Clock	ceiling - top	+/- 1'-0" (verify)
Bells	ceiling - top	+/- 1'-0" (verify)
Control Station for Electric Operated Doors	floor - center	+ 3'-0"
Switches	floor - top	+ 4'-0"

Note: All references are from finished floor or ceiling to the device box.
Verify mounting heights with Architect's Representative where not noted or where in conflict.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION 260528

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Support, anchorage, and attachment components.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the the product use on the project.
 - 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.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.
- C. Comply with NECA 1 and NFPA 70; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. Products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch (10 mm) diameter holes at a maximum of 8 inch (200 mm) on center in at least one surface.
 - 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. ABB, Electrification Business.
 - b. Allied Tube & Conduit; Atkore International.
 - c. CADDY; brand of nVent Electrical plc.
 - d. Cooper B-line; brand of Eaton, Electrical Sector.
 - e. Flex-Strut Inc.
 - f. G-Strut.
 - g. Gripple Inc.
 - h. Haydon Corporation.
 - i. MIRO Industries.
 - j. Metal Ties Innovation.
 - k. Rocket Rack; Robroy Industries.
 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; minimum 1-5/8 inch (41.25 mm).
 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 6. Channel Width: Selected for applicable load criteria; minimum 1-5/8 inch (41.25 mm).
 7. Fittings and Accessories: Products provided by channel and angle manufacturer and designed for use with those items.
 8. Fitting and Accessory Materials: Same as those for channels and angles, except metal items may be stainless steel.
 9. Rated Strength: Selected to suit applicable load criteria.
 10. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. 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 must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. 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, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1) Cooper B-line; brand of Eaton, Electrical Sector.
 - 2) Empire Industries, Inc.
 - 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
 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. Powder actuated fasteners are not permitted.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
6. Toggle Bolts: Stainless steel springhead type.
7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA NEIS 101
 2. NECA NEIS 105.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for boxes specified in Section 260533.16 "Boxes and Covers for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERMC as required by NFPA 70. Minimum rod size must be 1/4 inch (6 mm) in diameter. Support 3/4" and smaller conduit, maximum spacing will be 8'-0".
- 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 or single-bolt conduit clamps using spring friction action for retention in support channel.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1 inch and smaller EMT raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT] IMC and ERMC may be supported by openings through structure members, in accordance with 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 must be weight of supported components plus 200 lb (90 kg).

- 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 Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 3. Expansion bolts shall be prohibited from being used in concrete for overhead applications as well as for equipment bases.
 4. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts and/or Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
 5. To Light Steel: Sheet metal screws.
 6. 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[**by means that comply with seismic-restraint strength and anchorage requirements**].
- 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 Section 055000 "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. Submit welding certificates.

3.4 PAINTING

- A. Touchup:
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Boxes, enclosures, and cabinets.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
2. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.2 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. EMT: Electrical Metallic Tubing.
- C. GRC: Galvanized rigid steel conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight Flexible Metal Conduit.
- F. RNC: Rigid Nonmetallic Conduit (Rigid Polyvinyl Chloride Conduit: Type PVC).

1.3 ACTION SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
1. Structural members in paths of conduit groups with common supports.
 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- B. Seismic Qualification Data: Certificates, for enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.

C. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. EMT: Comply with ANSI C80.3 and UL 797.

B. Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
5. Fittings for EMT:
 - a. Material: Steel.
 - b. Comply with NEMA FB 2.10, Type: Setscrew, insulated throat, concrete tight type couplings and connectors similar to Appleton #TWXX-SI Series, OZ/Gedney #4000-ST/5000-ST Series, and meeting Federal Spec #WF408F. Other fittings shall not be acceptable.
6. Fitting for GRC and IMC: Comply with NEMA FB 2.10, all threaded fittings (use of set screw or compression type not acceptable).
7. Liquid tight fittings: Comply with NEMA FB 2.20, shall be UL listed for grounding, ferrule and sleeve type with insulated throat as O-Z Gedney "4Q" series, Appleton "ST" Carlon "Carflex" or approved equal.
8. Conduit Hubs shall have insulated throat and recessed O-Ring seal.
9. Conduit Bodies:
 - a. "LB" and Mogul size for 1" and larger conduits.
 - b. Cast ferrous material for exterior, watertight, and vapor tight locations with gaskets at covers.
10. 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.
11. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

2.2 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A; galvanized steel.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover and threaded hubs.
- D. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
 - 1. Through wall and Handy boxes are not permitted.
 - 2. Four inch octagon or square boxes for fixture outlets.
- I. Gangable boxes are allowed.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Indoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT
 - 2. Concealed Branch Circuit in Ceilings and Interior Walls and Partitions: EMT.
 - 3. Boxes and Enclosures: NEMA 250, Type 1.
- B. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
 - 1. See communications specifications for telecom raceway sizes.
 - 2. Exceptions, unless otherwise noted:
 - a. 1/2-inch (16-mm) for runs in 4-inch masonry walls.
 - b. 1/2-inch (16mm) for motor control circuits.
 - c. 1/2-inch (16mm) for motor power circuits.
 - d. 1/2-inch (16mm) for switch legs to single switches.
 - e. 1/2-inch (16mm) for end run (dead end) devices (one conduit only).
- C. 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 setscrew, 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.
- D. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Separate raceway systems shall be provided for:
1. Each lighting system.
 2. Convenience outlets.
 3. Each power system.
 4. Each special or different system as further specified whether it is battery lighting, high or low voltage or any nature, such as telephone, fire alarm, emergency system, sound, control systems, Building Automation Control Systems, etc.
 5. Except by special permission, separate conduits are required for each feeder, each equipment branch circuit, and for all special systems.
- D. Common conduits will be acceptable for:
1. Motor branch circuits, or for a motor circuit and its associated control wiring.
 2. Power or lighting and lighting control wiring can be in the same conduit provided the insulation on the control wiring is greater than the highest voltage in the raceway.
- E. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- F. Do not fasten conduits onto the bottom side of a metal deck roof.
- G. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- H. Complete raceway installation before starting conductor installation.
- I. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- J. 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 (300 mm) of changes in direction.

- K. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- L. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines. Conduits located in mechanical and electrical spaces may be exposed.
- M. Install conduit parallel and perpendicular to walls and building lines. Conduit under slab may be routed from point-to-point.
- N. Arrange raceway to maintain headroom and present neat appearance. Install 1" or less below deck to avoid future conflicts when ceilings are installed or when additional work is added.
- O. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
- P. Do not attach conduit to ceiling support wires.
- Q. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch size.
- R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- S. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- T. Route conduit through same roof openings as piping and ductwork wherever possible
- U. Support conduit within 12 inches (300 mm) of enclosures to which attached.
- V. Raceway embedded in slab and under floor slab are not permitted unless otherwise indicated on the contract documents.
- W. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or GRC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- X. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- Y. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- Z. 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.
- AA. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. De-burr cut ends.
- BB. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

- CC. Contractor may re-use existing conduit runs for installing new conductors, when directed to do so by the project manager and superintendent, within the following guidelines:
1. For home runs remove all the conductors in the existing conduits between a designated existing device and its panel of origin.
 2. For conductors installed in conduits that branch off the home run conduit the conductors need to be removed only to the first existing terminations. (Termination is defined as a conductor splice or terminations to existing device.)
 3. Removed conductors must be replaced with all new conductors.
 4. All new conductor runs must include a new equipment-grounding conductor. Pull the equipment-grounding conductor all the way to original receptacles outlet box. The new equipment-grounding conductor shall be used in conjunction with the original circuits and their replacement devices as well as any new circuits.
- DD. If conduit is re-used, the conduit shall be re-supported, by this contractor, to the latest version of the NEC and these specifications. Any existing conduit relying on ceiling support systems shall be re-supported per the current NEC. This becomes especially important when suspended ceilings are removed during construction only to discover that the entire existing conduit was supported from the ceiling support iron (black iron) itself. The conduit in question must then be re-installed and re-supported as required even if it is not related to the ongoing project. If this is not possible, a new conduit system shall be provided.
- EE. 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.
- FF. 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. Conduit extending from interior to exterior of building.
 4. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- GG. Expansion-Joint Fittings:
1. Install in each run of aboveground GRC, IMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet (30 m).
 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) 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 (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 4. 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.

- HH. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) 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 not subject to physical damage.
- II. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements.
1. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.
 2. Align wall mounted outlet boxes for switches, thermostats, and similar devices.
- JJ. Install boxes in locations as shown on the drawings, as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
1. Electrical boxes shown on drawings are approximate locations unless otherwise indicated. Adjust box locations up to 10 feet if required to accommodate intended purpose.
 2. Locate boxes to allow luminaries positioned as shown on reflected ceiling plan.
 3. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel; provide a minimum 6" separation. Provide a minimum 24" separation in acoustic rated walls.
 4. Coordinate installation of outlet boxes for equipment connected under Section "Wiring Devices".
- KK. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- LL. Locate boxes so that cover or plate will not span different building finishes.
- MM. 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. Secure flush mounting box to interior wall partition studs. Accurately position to allow for surface finish thickness.
1. Use stamped steel bridges to fasten flush mounting outlet box between studs.
 2. Adjust flush installed outlets to make front flush with finished wall material.
- NN. Install boxes, enclosures, and cabinets plumb. Anchor securely to structural supports.
- OO. Orient boxes vertically to accommodate wiring devices unless otherwise noted.
- PP. Use flush mounting outlet box in finished areas.
- QQ. Install knockout closures in unused box openings.
- RR. Install pull boxes and junction boxes above accessible ceiling and in unfinished areas only.
- SS. Inaccessible Ceiling Areas: Install outlet and junction boxes not more than 6 inches from ceiling access panel or from removable recessed luminaires.
- TT. Use cast outlet boxes in exterior locations exposed to weather and wet locations.
- UU. Clean interior of boxes and remove dust, debris and other material prior to wire or device installation. Clean exposed surfaces and restore finish. Touch up damage.

- VV. Contractor shall maintain J-Box accessibility. When an outlet, junction box, or pull box becomes inaccessible for any reason (i.e. new lab benches or cabinets) the outlet, junction box, or pull box shall be relocated and all associated conduit and wiring modified and re-routed as required maintaining accessibility.
- WW. Route conduit away from any equipment requiring maintenance access, minimum 24-inches clearance.
- XX. Comply with requirements in Division 26 "Identification for Electrical Systems" for raceway and Boxes identifications.
- YY. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits and /or ceiling support wire.
- ZZ. Set metal floor boxes level and flush with finished floor surface. Provide junction box beneath for conduit routing as required.
- AAA. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."
 - 1. Firestop cables in conduit penetrating rated wall/floor within the building.

3.4 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 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Labels.
 - 2. Bands and tubes.
 - 3. Tapes and stencils.
 - 4. Tags.
 - 5. Miscellaneous identification products.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

1.3 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:
 - 1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.

- C. Signs, labels, and tags required for personnel safety must comply with the following standards:
 - 1. Safety Colors: NEMA Z535.1.
 - 2. Facility Safety Signs: NEMA Z535.2.
 - 3. Safety Symbols: NEMA Z535.3.
 - 4. Product Safety Signs and Labels: NEMA Z535.4.
 - 5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.
- D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Fire Alarm Conduit and Rough-ins Box
 - 1. Junction boxes painted red. Device address will be red letters on white field on junction box cover.
 - 2. Legend: FA System, and Device address.
- B. Metal-Clad cable
 - 1. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each cable size.
 - 2. Black letters on white field for Utility Power, Red letters on White field for Standby Power.
 - 3. Legend: Indicate voltage and system or service type.
- C. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - 1. Color must be factory applied for all sizes. Field-applied color tape may not be used as an identification means on any conductor.
 - 2. Where two or more neutrals are included in same conduit, at each panel, junction box, etc. the proper neutral wire shall be permanently and effectively identified with its branch circuit conductor(s) taped together and labeled with circuit number(s). The neutrals shall have a colored strip that corresponds to the phase color of the non-grounded conductor.
 - 3. All neutrals shall be identified with a color stripe.
 - 4. For branch circuit conductors, wiring shall be identified with wrap-on wire vinyl cloth wire markers. Number shall indicate associated terminal in motor controller, panel board, etc.
 - 5. Phase sequence shall be N-A-B-C, proceeding in direction of left to right, front to back, top to bottom. All phases and neutral shall be identified.
 - 6. For renovation project color coding shall match to existing in the building.
- D. Equipment Identification Labels:
 - 1. Black letters on white field for Utility Power, Red letters on White field for Standby Power.

2.3 LABELS

- A. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3 mil (0.08 mm) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
 - 1. Minimum Nominal Size:
 - a. 1-1/2 by 6 inch (37 by 150 mm) for raceway and conductors.
 - b. 3-1/2 by 5 inch (76 by 127 mm) 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 inch (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.
- 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 maximum of 200 deg F (93 deg C). Comply with UL 224.

2.5 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil (0.08 mm) thick by 1 to 2 inch (25 to 50 mm) wide; compounded for outdoor use.
- B. Tape and Stencil: 4 inch (100 mm) wide black stripes on 10 inch (250 mm) centers placed diagonally over orange background and are 12 inch (300 mm) wide. Stop stripes at legends.

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 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. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- H. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- I. Accessible Fittings for Raceways: Identify cover of junction and pull box of the following systems with wiring system legend and system voltage. System legends must be as follows:
 - 1. "EMERGENCY POWER AND CIRCUIT ."
 - 2. "UTILITY POWER AND CIRCUIT."
- J. Self-Adhesive Labels:
 - 1. Install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 - 2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high label; where two lines of text are required, use labels 2 inch (50 mm) high.
- K. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.
- L. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- M. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
- N. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.
- O. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- P. Nonmetallic Preprinted Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using UV-stabilized or plenum-rated cable ties.
- Q. Write-on Tags:
 - 1. Place in location with high visibility and accessibility.
 - 2. Secure using UV-stabilized or plenum-rated cable ties.
- R. 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

- 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 Fittings for Raceways and Cables within Buildings: Identify cover of junction and pull box of the following systems with self-adhesive labels containing wiring system legend and system voltage. System legends must be as follows:
 - 1. "EMERGENCY POWER."
 - 2. "UTILITY POWER."
 - 3. "FIRE ALARM SYSTEM"
- D. Conductors to Be Extended in Future: Attach write-on tags to conductors and list source.
- E. 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.
- F. Equipment Identification Labels:
 - 1. Indoor Equipment: Self-adhesive label.
 - 2. Equipment to Be Labeled:
 - a. Panelboards:
 - 1) Typewritten directory of circuits in the location provided by panelboard manufacturer.
 - a) 5"x8" minimum size protected by plastic sleeve or guard, Example: "Room 204 – outlets – North wall".
 - 2) Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
 - a) 1/2" high letters on outside of panel doors identifying panel, voltage, phase, wire, and source of feed. Label Interior of panel using marker, Example: "LNP1, 208Y/120V, 3-Phase, 4W, LDP-1, Circuit #4".
 - 3) Arc-flash label comply with NFPA 70 E and /or specified.
 - b. Access doors and panels for concealed electrical items.
 - c. Emergency system boxes and enclosures.
 - d. Remote-controlled switches, dimmer modules, control devices, and wiring devices:
 - a) Utility (Normal) power device covers shall be marked with a clear label with black lettering indicating panel and circuit, Example: "Panel PR2-B4, Cir. # 3"
 - b) Emergency power device covers shall be marked with a clear label with red lettering indicating panel and circuit, Example: "Panel ER2-B4, Cir. # 3"

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

1.1 SUMMARY

- A. Section Includes:
 - 1. Indoor occupancy and vacancy sensors.
 - 2. Emergency shunt relay.
 - 3. Conductors and cables.
- B. Related Requirements:
 - 1. Section 262726 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 SUBMITTALS

- A. Product Data:
 - 1. For each type of product.
- B. Shop Drawings:
 - 1. Show installation details for the following:
 - a. Occupancy sensors.
 - 2. Interconnection diagrams showing field-installed wiring.
 - 3. Include diagrams for power, signal, and control wiring.
- C. Field quality-control reports.
- D. Sample Warranty: For manufacturer's warranties.

1.3 WARRANTY

PART 2 - PRODUCTS

2.1 ELECTRONIC TIME SWITCHES

- A. 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:
 - 1. Eaton.
 - 2. Intermatic, Inc.
 - 3. Leviton Manufacturing Co., Inc.
 - 4. NSi Industries LLC.
 - 5. Schneider Electric USA, Inc.
 - 6. TE Connectivity Ltd.

2.2 INDOOR OCCUPANCY AND VACANCY SENSORS

A. 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:

1. Douglas Lighting Controls.
2. Eaton.
3. Hubbell Control Solutions; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
4. Leviton Manufacturing Co., Inc.
5. Lithonia Lighting; Acuity Brands Lighting, Inc.
6. Lutron Electronics Co., Inc.
7. NSi Industries LLC.
8. Philips; Signify North America; Signify Holding.
9. Sensor Switch, Inc.

B. General Requirements for Sensors:

1. Ceiling-mounted, solid-state indoor occupancy and vacancy sensors.
2. Dual technology.
3. Separate power pack.
4. Hardwired connection to switch.
5. Listed and labeled in accordance with NFPA 70, by a qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
6. Operation:
 - a. Occupancy Sensor: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
7. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A Sensor is powered from the power pack.
8. Power: Low voltage.
9. Power Pack: Dry contacts rated for 20 A LED load at 120 and 277 V(ac), for 13 A tungsten at 120 V(ac), and for 1 hp at 120 V(ac). Sensor has 24 V(dc), 150 mA, Class 2 power source.
10. Mounting:
 - a. Sensor: Suitable for mounting in any position in a standard device box or outlet box.
 - b. Relay: Externally mounted through a 1/2 inch (13 mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
11. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
12. Bypass Switch: Override the "on" function in case of sensor failure.
13. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lx); turn lights off when selected lighting level is present.

C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6 inch (150 mm) minimum movement of any portion of a human body that presents a target of not less than 36 sq. inch (23 200 sq. mm), and detect a person

of average size and weight moving not less than 12 inch (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inch/s (305 mm/s).

2.3 EMERGENCY SHUNT RELAY

- A. 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:
 - 1. Lighting Control and Design.
 - 2. WattStopper; Legrand North America, LLC.
- B. Description: NC, electrically held relay, arranged for wiring in parallel with manual [**or automatic**] switching contacts; complying with UL 924.
 - 1. Coil Rating: 120 V.

2.4 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SENSORS

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's instructions.

3.3 INSTALLATION OF WIRING

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).
- B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors in accordance with conductor manufacturer's instructions.
- C. Size conductors in accordance with lighting control device manufacturer's instructions unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, device, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring in accordance with Section 260553 "Identification for Electrical Systems".
 - 1. Identify controlled circuits in lighting contactors.
 - 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

3.5 FIELD QUALITY CONTROL

- A. Field tests must be witnessed by Architect.
- B. Tests and Inspections:
 - 1. Operational Test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Nonconforming Work:
 - 1. Lighting control devices will be considered defective if they do not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- D. Prepare test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to support field tests and inspections.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

END OF SECTION 260923

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. General-use switches, dimmer switches, and fan-speed controller switches.
 - 2. General-grade straight-blade receptacles.

1.2 DEFINITIONS

- A. UL 1472 Type I Dimmer: Dimmer in which air-gap switch is used to energize preset lighting levels.

1.3 SUBMITTALS

- A. Product Data:
 - 1. General-use switches, dimmer switches, and fan-speed controller switches.
 - 2. General-grade straight-blade receptacles.
- B. Field quality-control reports.
- C. Sample warranties.

1.4 WARRANTY FOR DEVICES

- A. Manufacturer Warranty: Manufacturer warrants that devices perform in accordance with specified requirements and agrees to provide repair or replacement of devices that fail to perform as specified within warranty period.
 - 1. Warranty Period: One years from date of Substantial Completion; coverage for labor, materials, and equipment.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES, DIMMER SWITCHES, AND FAN-SPEED CONTROLLER SWITCHES

- A. Type I Dimmer Switch:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. GE Lighting; General Electric Company.

- c. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated.
 - d. Leviton Manufacturing Co., Inc.
 - e. Lutron Electronics Co., Inc.
 - f. Pass & Seymour; Legrand North America, LLC.
2. Regulatory Requirements:
- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
- a. Reference Standards: UL CCN EOYX and UL 1472 Type I dimmer.
4. Options:
- a. Device Color: Black.
 - b. Dimming Control Style: Slide or rotary.
5. Accessories:
- a. Cover Plate: stainless steel; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

2.2 DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector: 5362.
 - b. Hubbell Wiring Device-Kellems; brand of Hubbell Electrical Solutions; Hubbell Incorporated: 5362.
 - c. Leviton Manufacturing Co., Inc: 5362.
 - d. Pass & Seymour; Legrand North America, LLC: 5362.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: Black.
 - b. Configuration:
 - 1) Heavy-duty, NEMA 5-20R.

5. Accessories:
 - a. Cover Plate: Stainless steel; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wall plate finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Receptacles:
 1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 INSTALLATION OF SWITCHES

- A. Comply with manufacturer's instructions.
- B. Reference Standards:
 1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
 2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
 3. Consult Architect for resolution of conflicting requirements.
- C. Identification:
 1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

- A. Comply with manufacturer's instructions.
- B. Reference Standards:
 1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
 2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
 3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
 4. Consult Architect for resolution of conflicting requirements.
- C. Identification:
 1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL OF SWITCHES

A. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

B. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.5 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

A. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage. Acceptable range is 105 to 132V.
4. Measure percent voltage drop under 15-A load: A value of 3 percent or higher is unacceptable. Test a single outlet furthest from panelboard for each circuit.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms. Test single outlet furthest from panelboard for each circuit.
6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

B. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.6 SYSTEM STARTUP FOR SWITCHES

A. Perform startup service.

1. Complete installation and startup checks for momentary switches, dimmer switches, and fan-speed controller switches in accordance with manufacturer's instructions.

3.7 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.
2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262726

SECTION 262813 - FUSES

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. Plug-fuse adapters for use in Edison-base, plug-fuse sockets.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.5 FIELD CONDITIONS

- A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Bussmann, an Eaton business.
 - 2. Littelfuse, Inc.
 - 3. Mersen USA.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 PLUG FUSES

- A. Characteristics: UL 248-11, rejection base, nonrenewable plug fuses, dual-element, time-delay, 125-V ac.
- B. Characteristics: Adapters for using Type S, rejection-base plug fuses in Edison-base fuseholders or sockets; ampere ratings matching fuse ratings; irremovable once installed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Plug Fuses:
 - 1. Branch Circuits: Edison-base type, single-element fast acting.

3.3 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install plug-fuse adapters in Edison-base fuseholders and sockets. Ensure that adapters are irremovable once installed.

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Molded-case circuit breakers (MCCBs).

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF format.
- B. Shop Drawings:
 - 1. Include wiring diagrams for power, signal, and control wiring.

1.5 QUALIFICATION DATA

- A. Qualification Data: For qualified testing agency.
- B. Field quality-control reports.

1.6 OPERATION AND MAINTENANCE DATA

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers 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. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF format.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- C. Comply with NFPA 70.

2.2 MOLDED-CASE CIRCUIT BREAKERS

- A. Molded Case Fixed Trip Unit, 15A to 50A.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton – Power Defense Frame 2.
 - b. SIEMENS Industry, Inc. –BLH, HBL, 3VA Series.
 - c. Square D; by Schneider Electric – HL series.
 - 2. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
 - 3. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

4. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. .
 5. The MCCBs shall have provision for Lock-Out / Tag-Out capable of accepting padlocks.
- B. Lugs shall be suitable for 194 deg F (90 deg C) rated wire, sized according to the 167 deg F (75 deg C) temperature rating in NFPA 70.
1. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents and as specified in contract document.
- C. Molded Case Electronic Trip Unit (LI), 60A to 225A
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following for electronic trip unit breaker:
 - a. Eaton – Power Defense Frame 2 with PXR10, 20.
 - b. Siemens Industry, Inc.– 3VA61 W/Trip unit ETU 320.
 - c. Square D: – Power Pact - H, J Frame with 3.3-Dial.
 2. Electronic Trip Unit: Equipped with self-powered, microprocessor-based trip device to sense overload and short circuit conditions. The device shall measure true RMS current. The tripping system shall consist of high accuracy (less than 1%) coil sensors on each phase, a release mechanism, Field Installable and interchangeable front mounted trip units. The trip unit shall include Dial Type. Trip units shall be designed to be upgraded for future expansion in functionality, such as communication, with the following field-adjustable functions for 50 ampere and up to 225 ampere:
 - a. Functions: Long term, and instantaneous protection function.
 - b. Each shall have an adjustable pick-up setting.
 - c. Current Adjustability shall be accomplished by use of dial settings keypad and rating plugs on trip units.
 - d. Pickup Points: Minimum of 8 field adjustable Settings.
 3. The MCCBs shall have provision for Lock-Out / Tag-Out capable of accepting padlocks.
- D. MCCBs shall have provision for Lock-Out / Tag-Out capable of accepting padlocks.
- E. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 3. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 4. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.
 5. Alarm Switch: One NO and NC contact that operates only when circuit breaker has tripped.
 6. Key Interlock Kit where applicable: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
 7. Electrical Operator where applicable: Provide remote control for on, off, and reset operations.
 8. Accessory Control Power Voltage: Integrally mounted, self-powered.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Architect, Construction Manager, Owner no fewer than fourteen days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Architect's, Construction Manager's, Owner's written permission.
 - 4. Comply with NFPA 70E.

3.3 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NFPA 70 and NECA 1.

3.4 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.
 - f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - h. Verify correct phase barrier installation.
 - i. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

- C. Tests and Inspections for Molded Case Circuit Breakers:
 - 1. Visual and Mechanical Inspection:
 - a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and clearances.
 - d. Verify that the unit is clean.
 - e. Operate the circuit breaker to ensure smooth operation.
 - f. Inspect operating mechanism, contacts, and chutes in unsealed units.
 - g. Perform adjustments for final protective device settings in accordance with the coordination study.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.6 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 265119 - LED INTERIOR LIGHTING

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. Luminaires.
 - 2. Materials.
 - 3. Luminaire support.
- B. Related Requirements:
 - 1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.3 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, driver and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
- B. Shop Drawings: For nonstandard or custom luminaires.
 - 1. Include plans, elevations, sections, and mounting and attachment details.

2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing laboratory providing photometric data for luminaires.
- B. Product Certificates: For each type of luminaire.
- C. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 QUALITY ASSURANCE

- A. Luminaire Photometric Data Testing Laboratory Qualifications:
 1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion cover parts.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Ambient Temperature: 5 to 104 deg F (Minus 15 to plus 40 deg C).
 - 1. Relative Humidity: Zero to 95 percent.
- B. Altitude: Sea level to 1000 feet (300 m).

2.2 LUMINAIRE REQUIREMENTS

- 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. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.

2.3 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Steel:
 - 1. ASTM A36/A36M for carbon structural steel.
 - 2. ASTM A568/A568M for sheet steel.
- C. Stainless Steel:
 - 1. Manufacturer's standard grade.
 - 2. Manufacturer's standard type, ASTM A240/240M.
- D. Galvanized Steel: ASTM A653/A653M.
- E. Aluminum: ASTM B209.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LIGHT FIXTURE

A. General:

1. LED light fixtures shall be in accordance with IES, NFPA, UL, as shown on the drawings, and as specified.
2. LED light fixtures shall be Reduction of Hazardous Substances (RoHS)-compliant.
3. LED drivers shall include the following features unless otherwise indicated:
 - a. Minimum efficiency: 85% at full load.
 - b. Minimum Operating Ambient Temperature: -20° C. (-4° F.)
 - c. Input Voltage: 120 - 277V ($\pm 10\%$) at 60 Hz.
 - d. Integral short circuit, open circuit, and overload protection.
 - e. Power Factor: ≥ 0.95 .
 - f. Total Harmonic Distortion: $\leq 10\%$.
 - g. Comply with FCC 47 CFR Part 15.

B. LED modules shall include the following features unless otherwise indicated:

1. Comply with IES LM-79 and LM-80 requirements.
2. Minimum CRI 80 and color temperature 3500° K unless otherwise specified in Light Fixture Schedule.
3. Minimum Rated Life: 50,000 hours per IES L70.
4. Light output lumens as indicated in the Light Fixture schedule.

2.6 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Each luminaire shall be circuited directly from a j-box. Daisy chaining circuit from fixture to fixture is prohibited.
- E. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- G. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
 - 1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 - 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 265119