

**JEFFERSON COUNTY ENVIRONMENTAL SERVICES  
FACILITY IMPROVEMENTS – SHADES VALLEY,  
VILLAGE CREEK, AND FIVE MILE**



Owner:  
**JEFFERSON COUNTY ENVIRONMENTAL SERVICES:**  
1295 OAK GROVE ROAD  
Birmingham, AL 35209

Architect:  
**STUDIO 2H DESIGN, LLC**  
1721 4TH AVENUE NORTH,  
SUITE 101  
BIRMINGHAM, ALABAMA 35203

**ARCHITECT PROJECT NO. 202123**

**March 29, 2024**



**BID SET NO. \_\_\_\_\_**





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### NOTE:

This Table of Contents is for convenience only. Its accuracy and completeness is not guaranteed and it is not to be considered as part of the Specifications. In case of discrepancy between the Table of Contents and the Specifications, the Specifications shall govern.

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## SECTION 00 0100

### NOTICE TO BIDDERS

Sealed Bid Proposals will be received by the Environmental Services Department, Jefferson County, Alabama, online at QuestCDN.com (eBidDoc #9060268) until **2:00 P.M. local time on Wednesday, May 22, 2024**, for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK, AND FIVE MILE.**

The scope of work generally consists of the following:

1. Shades Valley site: 9 buildings. Work includes selective demolition, re-roofing; exterior repainting; repairing gutters, downspouts, and fascia; closing in skylights at selected buildings; installing sealant at windows and doors; renovation of toilets/showers/locker areas; new finishes; and associated plumbing/mechanical/electrical work. The work is further described on construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.
2. Village Creek site: 5 buildings. Work includes selective demolition; recladding of metal storage building; metal roofing; masonry cleaning; renovation of toilets/showers/locker areas; new finishes; and associated plumbing/mechanical/electrical work. The work is further described in construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.
3. Five Mile site: 2 buildings. The work includes renovation of toilets/showers/locker areas; new finishes; new casework; office renovations; service fixtures; and associated plumbing/mechanical/electrical work. The work is further described in construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.

Bidding Documents are on file for inspection, by appointment only, in the following locations:

**Environmental Services Department**  
**716 Richard Arrington Jr. Boulevard North, Suite A-300**  
**Birmingham, Alabama 35203**  
**Contact for Appointment: Ronald R. Thomas at (205) 215-1661**

Complete digital project Bidding Documents (Specifications and Drawings) are available at [www.jeffcoes.org](http://www.jeffcoes.org). Navigate to "Business" to "Notice To Bidders" and then "Asset Management Program – Project Bid Information" for a complete listing. Prior to downloading the Bidding Documents, Bidders will be required to set up a QuestCDN.com account and pay a \$42.00 fee. Hard copies of the Bidding Documents are the responsibility of the Bidders. Contact QuestCDN at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance with navigating the website and digital project information.

Bids will only be accepted from pre-qualified contractors who are listed on the Plan Holders List, signifying that they have purchased a set of documents from the Engineer, and who attend the MANDATORY Pre-Bid Conference.

**NO BID PROPOSAL SHALL BE ACCEPTED AFTER THE TIME STATED FOR RECEIVING BID PROPOSALS IN THIS NOTICE. A FORM CONTAINING THE CONTRACTOR'S NAME AND ADDRESS OF THE FIRM AND THE**

**CONTRACTOR'S ALABAMA LICENSE NUMBER WITH THE DATE OF EXPIRATION IS REQUIRED WITH THE SUBMISSION OF THE BID. THESE REQUIREMENTS SHALL NOT BE WAIVED.**

The Contractor is hereby advised that TIME IS OF THE ESSENCE on this project. The Contract Time for this project is **Three-hundred Sixty-five (365)** consecutive calendar days from the effective date of the written Notice to Proceed to achieve Final Acceptance. Liquidated damages will be assessed if this time limit is exceeded. The Contractor may apply for an extension of time in accordance with the provisions of the Contract; however, such an extension must be approved prior to the Contract Completion Date to avoid the imposition of liquidated damages.

**The Contractor is hereby advised that a Pre-Bid Conference will be held Wednesday, May 8, 2024, 2:00 p.m. local time at the Shades Valley Campus. Visits to the Village Creek and Five Mile campuses are scheduled for Thursday, May 9, 2024 at 2 p.m. local time. This Pre-Bid Conference and site visits are MANDATORY for all contractors planning to submit a Bid Proposal on this project. An optional site visit will be available.**

**Questions concerning meaning or intent of Bidding Documents shall be submitted to Charles Jordan, Studio 2H Design, LLC, at email [charles@studio2hd.com](mailto:charles@studio2hd.com), no later than 5:00 p.m. local time on Wednesday, May 15, 2024. All questions must be in writing on Bidder's company's letterhead.**

THE ATTENTION OF ALL BIDDERS IS CALLED TO THE PROVISIONS OF THE STATE LAW GOVERNING GENERAL CONTRACTORS, AS SET FORTH IN ALABAMA CODE SECTIONS 34-8-1 THROUGH SECTION 34-8-28 (1975), AS AMENDED, CHAPTER 4, SECTION 65 TO 82 (INCLUSIVE) OF TITLE 46 OF THE CODE OF ALABAMA OF 1940, AS AMENDED; AND BIDDERS SHALL BE GOVERNED BY SAID LAW INSOFAR AS IT IS APPLICABLE. THE ABOVE-MENTIONED PROVISIONS OF THE CODE MAKE IT ILLEGAL FOR THE OWNER TO CONSIDER A BID PROPOSAL FROM ANYONE WHO IS NOT PROPERLY LICENSED UNDER SUCH CODE PROVISIONS.

THE ATTENTION OF BIDDERS IS CALLED TO THE PROVISIONS OF ALABAMA CODE SECTION 39-2-14 (1975) AS AMENDED, REQUIRING A NONRESIDENT CONTRACTOR TO REGISTER WITH THE DEPARTMENT OF REVENUE PRIOR TO ENGAGING IN THE PERFORMANCE OF A CONTRACT IN THE STATE OF ALABAMA.

THE ATTENTION OF BIDDERS IS CALLED TO THE PROVISIONS OF ALABAMA CODE SECTION 39-3-5 (1975) AS AMENDED, REGARDING PREFERENCE TO RESIDENT CONTRACTORS.

THE ATTENTION OF BIDDERS IS CALLED TO THE PROVISIONS OF ALABAMA ACT 2016-312 AS AMENDED, REGARDING NOT ENGAGING IN THE BOYCOTT OF A PERSON OR ENTITY BASED IN OR DOING BUSINESS WITH A JURISDICTION WITH WHICH THIS STATE ENJOYS OPEN TRADE.

**All prospective bidders must complete and submit a "Statement of Bidder's Qualifications" to Studio 2H Design, LLC, Attn: Charles Jordan 1721 4<sup>th</sup> Ave N, Suite 101, Birmingham, AL 35203. The deadline for the submission of a "Statement of Bidder's Qualifications" is Friday, May 3, 2024, by 5:00 p.m. local time.**

**Submission of the "Statement of Bidder's Qualifications" is required of all bidders regardless of previous work experience with Jefferson County.**

Bidder's Statement of Bidder's Qualifications" shall fully address, in the same sequence, each of the following items:

1. Location, telephone number, and fax number of the bidder's headquarters and other offices in Alabama.
2. List jurisdictions and trade categories in which the bidding firm is legally qualified to do business. List all applicable license numbers.
3. A list of all projects similar in size and scope including renovation projects completed by the bidder in the last five (5) years. Include the name of the project, project description, name and telephone number of the owner and the architect, contract amount, start and completion dates, and percentage of work performed by the bidder's own forces.
4. A list and description of all judgments, claims, and suits pending or outstanding against the bidder that are associated with the projects listed in items 3 and 4.
5. A list of all lawsuits associated with the projects listed in items 3 and 4 filed by the bidder.
6. A list of names and experience records of key project management and field supervision personnel planned for this project.
7. List any restrictions placed on the bidding firm by local, state or federal government barring the firm from doing work for those bodies.
8. Provide a statement of bidder's bonding capacity from bidder's surety.
9. List major construction equipment currently owned or leased by bidding firm.
10. Attach bidding firm's financial statement from the most recent fiscal year.
11. Attach any other pertinent documentation to substantiate bidding firm's competence and financial responsibility.

The Owner may make such investigations as deemed necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the owner all such information for this purpose as the owner may request. The Owner reserves the right to reject any bid proposal if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the agreement and to complete the work under this contract. Such evidence should include, but not be limited to, successful completion of three (3) projects as the prime contractor within the last five years. The bid will be rejected if this requirement is not met.

BY: \_\_\_\_\_

David Denard  
Director of Environmental Services  
Jefferson County, Alabama

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## **SECTION 00 0101**

### **INSTRUCTIONS TO BIDDERS**

#### **PART 1 - GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Prequalification of Bidders
- B. Bid Proposal Form
- C. Issuance of Bid Proposal Forms
- D. Interpretation of Estimated Bid Proposal Quantities
- E. Examination of Contract Documents and Site of the Work
- F. Preparation of Bid Proposal
- G. Rejection of Bid Proposals
- H. Bid Proposal Guaranty
- I. Delivery of Bid Proposal
- J. Withdrawal or Revision of Bid Proposals
- K. Public Opening of Bid Proposals
- L. Disqualification of Bidders
- M. Consideration of Bid Proposals
- N. Award of Contract
- O. Cancellation of Award
- P. Return of Bid Proposal Guaranty (Certified Checks)
- Q. Requirements of Contract Bonds
- R. Execution of Contract
- S. Approval of Contract
- T. Failure to Execute Contract

U. Nondiscrimination in Employment

1.02 **PREQUALIFICATION OF BIDDERS**

- A. Only those contractors pre-qualified to bid work for the Jefferson County Environmental Services Department will be allowed to submit Bids for this project. To obtain Pre-qualification status, each Bidder shall furnish the Owner satisfactory evidence of his competency to perform the proposed Work. Such evidence of competency, unless specified otherwise, shall consist of statements covering the Bidder's past experience on similar work, a list of equipment that would be available for the Work, and a list of key personnel that would be available. In addition, each Bidder shall furnish the Owner satisfactory evidence of his financial responsibility. Such evidence of financial responsibility, unless specified otherwise, shall consist of a confidential statement or report of the Bidder's financial resources and liabilities as of the last calendar year or the Contractor's last fiscal year. Such statements or reports shall be certified by a public accountant. At the time of submitting such financial statements or reports, the Bidder shall further certify whether his financial responsibility is approximately the same as stated or reported by the public accountant. If the Bidder's financial responsibility has changed, the Bidder shall qualify the public accountant's statement or report to reflect his (Bidder's) true financial condition at the time such qualified statement or report is submitted to the Owner.
- B. Along with a signed Pre-qualification Application, each Pre-qualification applicant shall submit "evidence of competence" and "evidence of financial responsibility" to the Jefferson County Environmental Services Department, 716 Richard Arrington Jr. Boulevard North, Suite A300, Birmingham, Alabama 35203, no later than the deadline date for receipt of Pre-Qualification Applications as specified in Section 00100 – Notice to Bidders.
- C. Once a Bidder has pre-qualified to submit a Bid Proposal on County work, said Bidder will not be required to resubmit the Pre-qualification documents previously specified herein in order to bid subsequent work of a similar nature unless specifically requested to do so by the Jefferson County Environmental Services Department. Pre-qualification shall be applicable only to the particular individual, partnership, firm, corporation, or joint venture named in the documents submitted as evidence of competence and financial responsibility.
- D. All Bidders must be licensed contractors in the State of Alabama at the time Bid Proposals are submitted, and each Bidder must furnish certain information pertaining to the State License on the outside of the Bid Proposal envelope in accordance with requirements of this Section, or said Bid Proposals will not be opened.



## 1.03 BID PROPOSAL FORM

- A. The Owner has furnished Bidders with a Bid Proposal Form which contains a list of materials to be furnished and/or items of work to be done. The Bid Proposal Form is presented in Section 00 0300 – Bid Proposal. The complete Specifications ARE NOT to be returned with the completed Bid Proposal Form and associated documentation. As part of the Bidding Documents, the Engineer will electronically provide each bidder with an Adobe Acrobat® Portable Document Format (.pdf) file that includes the Bid Proposal Form and all of the associated documentation that each bidder will be required to complete and submit as their complete Bid Proposal as follows:
1. Section 00 0300 – Bid Proposal
  2. Section 00 0350 – Non-Collusion Affidavit
  3. Section 00 0360 – MBE/DBE Documentation Statement Jefferson County Commission Environmental Services Department
  4. Section 00 0410 – Bid Bond
  5. Section 00 0430 – List of Subcontractors
  6. Appendix C – Jefferson County Environmental Services Department MBE/DBE Forms
  7. Appendix D – State of Alabama Resident Status Form
  8. Appendix E – Jefferson County, Alabama – Equal Employment Opportunity Certification Form
- B. The Drawings, Specifications, and other documents designated in the Bid Proposal shall be considered a part of the Bid Proposal, whether attached or not.
- C. Clarifications, corrections, and minor changes to the Bid Proposal Form, Specifications, or Drawings may be put into effect through a numbered addendum issued by facsimile, by certified letter, or by hand delivery from the Owner or Engineer, notifying all prospective Bidders to whom Bid Proposal Forms have been previously issued.
1. Questions concerning meaning or intent of Bidding Documents shall be submitted to Tad Powell, PE, Associate, Hazen and Sawyer, at email [tpowell@hazenandsawyer.com](mailto:tpowell@hazenandsawyer.com). All questions must be in writing on Bidder's company's letterhead. Questions submitted may or may not be answered via Addenda. Any and all replies to questions will be issued by Addenda faxed, mailed, or delivered to parties recorded by the Engineer as having received the Bid Proposal Form. If Addenda are mailed, each

Bidder must provide a UPS account number to pay for mailing of the Addenda. Questions received after 5:00 p.m. local time on Wednesday, May 15, 2024, will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

2. Addenda may be issued to modify any part of the Contract Documents as deemed necessary by the Engineer or Owner.

#### **1.04 ISSUANCE OF BID PROPOSAL FORMS**

A. The Owner reserves the right to refuse to issue a Bid Proposal Form to a prospective Bidder, should such Bidder be in default for any of the following reasons:

1. Failure to comply with any prequalification regulations of the Owner, if such regulations are cited, or otherwise included, in the Specifications as a requirement for bidding.
2. Failure to pay or satisfactorily settle all valid bills due for labor and materials on former Contracts in force (with the Owner) at the time the Owner issues the Bid Proposal Form to a prospective Bidder.
3. Contractor default under previous Contracts with the Owner.
4. Unsatisfactory work, at the sole discretion of the Owner, on previous Contracts with the Owner.
5. Failure to prequalify as required in this section.

#### **1.05 INTERPRETATION OF ESTIMATED BID PROPOSAL QUANTITIES**

A. The quantities of the Work and materials shown on the Bid Proposal Form or on the Drawings are believed to represent the approximate volume of Work to be performed and materials to be furnished and are to be used for comparison of Bid Proposals. Payment to the Contractor will be made only for the actual quantities of work performed or materials furnished and in accordance with the procedures set out in the Drawings and Specifications and it is understood that the quantities may be increased or decreased as hereinafter provided without invalidating the bid prices in any way.

#### **1.06 EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF THE WORK**

A. Bidders are advised that the Drawings, Specifications, and Addenda, if any, constitute all the information which the Owner will furnish for Bidding. Except those items listed in the preceding sentence, no information given by the Owner, or

any representative thereof, prior to the execution of the Contract shall become a part of or change the Contract Drawings or Specifications or be binding upon the Owner. Bidders are required, prior to submitting a Bid Proposal, to read carefully the Specifications, the Bid Proposal, Contract and Bond forms; to examine the Drawings; to visit the site of the Work; to carefully examine local conditions; to inform themselves by their independent research of the difficulties to be encountered; and judge for themselves of the accessibility of the Work and all attending circumstances affecting the cost of doing the Work or the time required for its completion and obtain all information required to make an informed Bid Proposal. Bidders shall rely exclusively upon their own estimates, investigation, and other data which are necessary for full and complete information upon which the Bid Proposal may be based. It is mutually agreed that submission of the Bid Proposal will be prima facie evidence that the Bidder has made the examination and investigations required herein.

#### **1.07 PREPARATION OF BID PROPOSAL**

- A. The Bidder shall submit his Bid Proposal on the Bid Proposal Form furnished by the Owner. Each item for which a quantity of Work is shown shall show a unit price, and each item shall be correctly extended and summarized. Should there develop a discrepancy between the unit price and the extended amount shown, the unit price shall govern and the extended amount shall be corrected.
- B. The Bid Proposal must be signed in black ink by the individual, by one or more members of the partnership, by one or more members or officers of each firm representing a joint venture, by one or more officers of a corporation, or by an agent of the Contractor legally qualified and acceptable to the Owner.
- C. If the Bid Proposal is made by an individual, his name and post office address must be shown; by a partnership, the name and post office address of each partnership member must be shown; as a joint venture, the name and post office address of each member or officer of the firms represented by the joint venture must be shown; by a corporation, the name of the corporation and the business address of its corporate officials must be shown.
- D. Anyone signing a Bid Proposal as an agent shall file evidence of his authority to do so and that his signature is binding upon the firm or corporation.
- E. The Bidder certifies with his Bid Proposal that prices bid shall be firm for a period of 120 days from date of the Bid Proposal or for a longer time if mutually agreeable by the Owner and the Contractor.
- F. Bid shall contain acknowledgment Bidder has received Addenda (Addenda numbers shall be filled in on Bid Proposal).

#### **1.08 REJECTION OF BID PROPOSALS**

- A. Bid Proposals may be considered irregular and rejected for the following reasons:

1. If the Bid Proposal is on a form other than that furnished by the Owner, or if the Owner's form is altered.
  2. If there are unauthorized additions, conditional, or alternate pay items, or irregularities of any kind which make the Bid Proposal incomplete, indefinite, or otherwise ambiguous as may be determined by the Owner.
  3. If it is determined that the Bidder did not prequalify as previously required herein.
  4. If the Bid Proposal does not contain a unit price for each pay item listed in the Bid Proposal.
  5. If the Bid Proposal contains unit prices that are obviously unbalanced.
  6. If the Bid Proposal is not accompanied by the Bid Proposal Guaranty specified by the Owner.
  7. If the Bid Proposal does not prominently display the name of the project, the contractor's name and address, and the contractor's Alabama license number with date of expiration on the front of the envelope.
- B. The Owner reserves the right to reject any and all Bid Proposals and the right to waive technicalities and/or informalities, if such waiver is in the best interest of the Owner and conforms to local laws and ordinances pertaining to the letting of construction contracts.

#### 1.09 **BID PROPOSAL GUARANTY**

- A. Each Bidder must submit with his Bid Proposal a certified check made payable to the Owner, or a Bid Bond made by a company qualified and authorized to transact business in the State of Alabama in an amount not less than five percent (5%) of the total amount of his Bid Proposal, not to exceed \$10,000.00, as a guaranty that if awarded a Contract, the Bidder will execute the required Contract and furnish the required construction bonds (surety bonds) within ten (10) days after date of notice of such award.

#### 1.10 **DELIVERY OF BID PROPOSAL**

- A. Each Bid Proposal, which shall only consist of the Bid Proposal Form and the associated documentation as listed in Article 1.03 herein, must be filed in a sealed envelope, together with the Bid Proposal Guaranty, and received by the Owner in hand at the Commission Chambers, Room 270, Courthouse, Birmingham, Alabama, within the time limit for receiving Bid Proposals as stated in Section 00100 – Notice to Bidders, and shall be made on the Bid Proposal Form provided

with the Bidding Documents. Written on the outside of the envelope containing the Bid Proposal shall be the name of the project, the name and address of the Bidder, the Bidder's Alabama Contractor's license number, and the expiration date of the current license; otherwise, the bid will not be opened. Any Bid Proposal mailed must have the Bid Proposal Form and associated documentation as listed in Article 1.03 herein enclosed in the bid envelope and further placed in an additional mailing envelope clearly marked on the outside, "Bid Proposal Enclosed". Bidder may mail Bid Proposal at his own risk to Environmental Services Department, Suite A-300, 716 Richard Arrington Jr. Blvd. North, Birmingham, Alabama, 35203. The Owner will not be responsible for Bid Proposals mailed. Bid Proposals filed after the scheduled date and time of receiving Bid Proposals will not be considered and will be returned to the sender unopened.

#### **1.11 WITHDRAWAL OR REVISION OF BID PROPOSALS**

- A. A Bidder may withdraw or revise a Bid Proposal, provided that the Bidder's request for withdrawal or revision is received by the Owner before the time specified for opening bids. Revised Bid Proposals must be received at the place specified in the advertisement before the deadline specified for receiving all bids.

#### **1.12 PUBLIC OPENING OF BID PROPOSALS**

- A. Bid Proposals shall be opened and read aloud publicly at the place, time, and date specified in Section 00100 – Notice to Bidders. Bidders, their authorized agents, and other interested persons are invited to attend.
- B. Bid Proposals that have been withdrawn or received after the time specified for receiving bids shall be returned to the Bidder unopened.
- C. For Bid Proposals to be received at the County Commission Audience Chambers in the Jefferson County in Birmingham and Bessemer, the clock inside the respective Chambers shall be used to determine the time if the clock appears to be set within five minutes of the correct time. If not, the time shall be as determined by the County official or employee who is responsible for receipt and opening of bids.

#### **1.13 DISQUALIFICATION OF BIDDERS**

- A. A Bidder shall be considered disqualified for any of the following reasons:
  - 1. Submitting more than one Bid Proposal from the same individual, partnership, firm, or corporation under the same or different name.
  - 2. Evidence of collusion among Bidders. Bidders participating in such collusion shall be disqualified as Bidders for any future work of the Owner until any such participating Bidder has been reinstated by the Owner as a qualified Bidder.

3. If the Bidder is considered to be in "default" for any reason specified in this section.

#### **1.14 CONSIDERATION OF BID PROPOSALS**

- A. After the Bid Proposals are publicly opened and read, they will be compared on the basis of the summation of the products obtained by multiplying the quantities shown in the Bid Proposal by the unit bid prices. If a Bid Proposal contains a discrepancy between unit bid prices and the extension, the unit price shall govern.
- B. Until the award of the Contract is made, the Owner reserves the right to reject a Bid Proposal for any of the following reasons:
  1. If the Bid Proposal is irregular as specified in this section.
  2. If the Bidder is disqualified for any of the reasons specified in this section.
- C. Until the award of the Contract is made, the Owner reserves the right to reject any or all Bid Proposals; waive technicalities, if such waiver is in the best interest of the Owner and is in conformance with applicable state and local laws or regulations pertaining to the letting of construction contracts; advertise for new Bid Proposals; or proceed with the work otherwise. All such actions shall promote the Owner's best interests.

#### **1.15 AWARD OF CONTRACT**

- A. The award of the Contract, if made, shall be to the lowest responsive, qualified Bidder whose Bid Proposal complies with the requirements of the Owner. The Owner shall have 120 days to award the contract.
- B. Before an award is made, the Owner reserves the right to investigate the previous experience, financial status, and general reputation of all Bidders.

#### **1.16 CANCELLATION OF AWARD**

- A. The Owner reserves the right to cancel the award of the Contract without liability to the Bidder, except return of Bid Proposal Guaranty, at anytime before a Contract has been fully executed by all parties and is approved by the Owner in accordance with the requirements of this section.

#### **1.17 RETURN OF BID PROPOSAL GUARANTY (CERTIFIED CHECKS)**

- A. All Bid Proposal Guaranties submitted in the form of certified checks, except those of the three (3) lowest bonafide Bidders, will, upon request, be returned without undue delay after Bid Proposals have been checked, tabulated, and the relation to the Bid Proposals established.

- B. The Bid Proposal Guaranty of the three (3) lowest bonafide Bidders will be returned, at the discretion of the Owner and upon specific request of the Bidder, as soon as the Contract bonds and the Contract with the successful Bidder have been properly executed and approved.
- C. Should no award be made, all guaranties will be returned.
- D. Should the successful Bidder agree in writing to a stipulated extension in the time limit for award, the Owner may, at his discretion, permit the successful Bidder to substitute a satisfactory Bidder's Bond, if a certified check was submitted with his Bid Proposal, as a Bid Proposal Guaranty.
- E. The Owner reserves the right to return all Bid Proposal Guaranties with a letter of transmittal by mail and his responsibility shall end upon the mailing thereof.

#### **1.18 REQUIREMENTS OF CONTRACT BONDS**

- A. With the execution and delivery of the Contract, the Contractor shall furnish to the Owner a Performance Bond for the full amount of the Contract and a Payment Bond for an amount not less than one hundred percent (100%) of the total amount of the Contract and for the payment of all persons performing labor and furnishing materials under the Contract. Maintenance provisions of the bonds shall remain in effect for twelve (12) months after completion and acceptance of the Work. The Contract completion date shall be designated as the date of execution of the final estimate by the Owner. The bonds shall be in a form satisfactory to the Owner. The surety shall be a reputable bonding company authorized to transact business in the State of Alabama and shall be acceptable to the Owner.

#### **1.19 EXECUTION OF CONTRACT**

- A. The Contract shall be executed by the successful Bidder and returned to the Owner with acceptable Contract bonds together with Insurance documents required under Section 00822 – Insurance Requirements within ten (10) days after the date of Notice of Award by the Owner. The Contract, bonds, and other documents, shall be approved by the Owner's attorney, if required, before acceptance and execution by the Owner.

#### **1.20 APPROVAL OF CONTRACT**

- A. Upon receipt of the Contract, the Contract bonds, and the complete insurance documents, the Owner shall review and complete the execution of the Contract in accordance with local laws and ordinances, and return the fully executed Contract to the Contractor. Delivery of the fully executed Contract to the Contractor shall constitute the Owner's approval to be bound by the successful Bidder's Bid Proposal and the terms of the Contract.

## 1.21 FAILURE TO EXECUTE CONTRACT

- A. Should the successful Bidder to whom the Contract has been awarded fail to execute the Contract and furnish satisfactory Contract Bonds and Insurance Requirements within ten (10) days after date of Notice of Award, it shall be considered that he has abandoned his Bid Proposal. The tender of Contract may be withdrawn by the Owner, and the amount of the Bid Proposal Guaranty shall be forfeited to the Owner. The filing of a Bid Proposal by any Bidder shall be considered as an acceptance by him of this provision.
- B. In the event of the death of the successful Bidder (if an individual and not a partnership or corporation) between the date of the opening of the Bid Proposals and the 10 days following the date of award of the Contract as required by these Specifications for furnishing Contract bonds and insurance documents and executing the Contract, the Bid Proposal Guaranty will be returned intact to the estate of the deceased successful Bidder and the project either rebid or awarded to the second low Bidder, at the discretion of the Owner.

## 1.22 NONDISCRIMINATION IN EMPLOYMENT

- A. Contracts for Work under this Bid Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.
- B. Bidders must comply with the President's Executive Order No. 11246; one requirement of which is that all qualified applicants will receive consideration for employment without regard to race, creed, color, sex, disability, or national origin.
- C. Bidder must also comply with Jefferson County's anti-discrimination policy contained in administrative order AO 2008-04 by executing the form attached hereto as Appendix E.

**END OF SECTION**





ALABAMA DEPARTMENT OF REVENUE  
 SALES AND USE TAX DIVISION  
 P.O. Box 327710 • Montgomery, AL 36132-7710

ST: EXC-01  
 11/23

# Application For Sales and Use Tax Certificate of Exemption

## FOR GOVERNMENT ENTITY PROJECT

This Certificate of Exemption will be limited to purchases which qualify for an exemption of sales and use taxes pursuant to Rule No. 810-6-3-.77

### PROJECT INFORMATION:

PROJECT NAME		PROJECT OWNER'S FEIN (EXEMPT ENTITY)	
STREET ADDRESS OF PROJECT (CITY AND COUNTY INCLUDED)	CITY	ZIP	COUNTY

### APPLICANT'S INFORMATION:

RELATION: (CHOOSE ONE)

Government Entity   
  Statutorily Exempt Entity   
  General Contractor   
  Subcontractor

APPLICANT'S LEGAL NAME	FEIN
DBA	CONSUMER'S USE TAX ACCOUNT NUMBER
MAILING ADDRESS: STREET	CITY STATE ZIP COUNTY
CONTACT PERSON	BUSINESS TELEPHONE NUMBER (    )
EMAIL ADDRESS	

PROJECT START DATE	PROJECT END DATE
WILL THE APPLICANT HAVE ANY SUBCONTRACTORS ON THIS JOB? <input type="checkbox"/> Yes <input type="checkbox"/> No    If yes, please attach list.	NAME OF PARTY TO THE CONTRACT

JOB DESCRIPTION

WILL ANY POLLUTION CONTROL EXEMPTION BE APPLICABLE? <input type="checkbox"/> Yes <input type="checkbox"/> No	ESTIMATED POLLUTION CONTROL COST \$	
TOTAL PROJECT BID AMOUNT (APPLICANT'S PORTION OF PROJECT) \$	LABOR COST (APPLICANT'S PORTION OF PROJECT) \$	MATERIAL COST (APPLICANT'S PORTION OF PROJECT) \$

### REVENUE DEPARTMENT USE ONLY

PENDING DOCUMENTATION / INFORMATION:

GCL   
  SBL   
  Contract / NTP / LOI   
  LOS   
  Project Dates / Breakdown of Costs

Contact Dates: \_\_\_\_\_ Received Date: \_\_\_\_\_

Forwarded for Denial: \_\_\_\_\_

PROJECT NAME

PROJECT OWNER'S FEIN (EXEMPT ENTITY)

FORM OF OWNERSHIP:

Individual  Partnership  Corporation  Multi member LLC  Single member LLC  Government Entity

If applicant is a corporation, a copy of the certified certificate of incorporation, amended certificate of incorporation, certificate of authority, or articles of incorporation should be attached. If the applicant is a limited liability company or a limited liability partnership, a copy of the certified articles of organization should be attached.

OWNERSHIP INFORMATION:

Corporations – give name, title, home address, and Social Security Number of each officer.

Partnerships – give name, home address, Social Security Number or FEIN of each partner.

Sole Proprietorships – give name, home address, Social Security Number of owner.

LLC – give name, home address, and Social Security Number or FEIN of each member.

LLP – give name, home address, and Social Security Number or FEIN of each partner.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NAME (PLEASE PRINT)

SIGNATURE

TITLE

DATE

**REVENUE DEPARTMENT USE ONLY**

PENDING OTHER:

Government Entity  General Contractor  Not on LOS

Contact Dates: \_\_\_\_\_ Received Date: \_\_\_\_\_

Forwarded for Denial: \_\_\_\_\_

Examiner's Remarks \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Examiner \_\_\_\_\_ Date \_\_\_\_\_

# Instructions For Preparation of Form ST: EXC-01

## Sales and Use Tax Certificate of Exemption for Government Entity Project

NOTE: Exemption Certificates will be issued as of the project start date or the received date of the application. If, upon receipt of the application, the project has already commenced, the certificate will be issued as of the received date of the application. Any purchases made prior to the issuance of a certificate will not be exempt.

In order to expedite the processing of your application, please include the following documentation when submitting your application:

### **Exempt Entity:**

1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed

### **General Contractor:**

1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed
3. List of Subcontractors
4. Alabama Board of General Contractor's License
5. State/County Business License (usually obtained through county probate office)

### **Subcontractor:**

1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. List of Subcontractors (if any)

### **General contractors and subcontractors:**

- Any additions and/or deletions to the list of subcontractors working on a project must be submitted to the Department within 30 days of occurrence.
- If an extension is needed for a project, please contact the Department of Revenue at the address, number, or email listed below. Extension requests should be submitted no more than 30 days after expiration date.
- Subcontractors Project Start Date should be the date they will begin working on the project and ordering materials

The application and required documentation may be mailed, faxed, or emailed to the following:

Fax: (334) 353-7867

Email: [STContractorsExempt@revenue.alabama.gov](mailto:STContractorsExempt@revenue.alabama.gov)

Mailing Address: ATTN: Contractor's Exemption  
Alabama Department of Revenue  
Sales & Use Tax Division  
Room 4303  
PO Box 327710  
Montgomery, AL 36132-7710

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**SECTION 00 0300**

**BID PROPOSAL**

DATE: \_\_\_\_/\_\_\_\_/\_\_\_\_

TO: The Commission of  
Jefferson County  
Birmingham, Alabama

Gentlemen:

In response to your request the undersigned Bidder submits this Bid Proposal for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK AND FIVE MILE**, as described and specified in the Drawings and Specifications:

1. Bidder proposes and agrees, in the event this Bid Proposal be accepted, to enter into a Contract with the above named Commission (herein designated and referred to as the Owner), in the form herein specified, to furnish all materials, equipment, machinery, tools, means of transportation, power and fuel, and to perform all labor necessary for or incidental to the construction of the aforementioned improvements, all in complete accordance with the requirements of the Contract Documents, to the entire satisfaction of the Owner, at the unit and lump sum prices we have inserted opposite each item of work listed in the accompanying Bid Proposal Form, which is an integral part of this Bid Proposal.
2. In submitting this Bid Proposal, the Bidder understands and agrees that a Contract may be awarded for the Work as may appear to the interest of the Owner; that the quantities as stated are approximate only; that no claim shall be made against the Owner on account of any excess or deficiency, either absolute or relative, therein; that the estimated quantities will be used as a basis for canvassing and evaluating Bid Proposals and for determining the estimated amount of the Contract; and that, within the limits of available funds, the Owner reserves the right to increase or decrease the estimated quantities by such amounts as may be necessary to complete the Work, provided, however, that the stated unit prices shall remain firm and unchanged.
3. Bidder hereby declares that the only person or persons interested in this Bid Proposal as principal or principals is, or are, named herein and that no other person than herein mentioned has any interest in this Bid Proposal or in the Contract to be entered into, that this Bid Proposal is made without connection with any other person, company, or parties making Bid Proposal, and that this Bid Proposal is in all respects fair and made in good faith without collusion or fraud.
4. Bidder further declares that he has examined the site of the Work and the building and labor conditions and has informed himself fully in regard to all conditions pertaining to the place where the Work is to be done; that he has examined the Drawings and these Specifications for the Work and other Contract Documents relating thereto and has read all Special Conditions furnished prior to the opening of bids; and that he has satisfied himself relative to the Work to be performed.
5. Bidder further proposes and agrees that, if awarded a Contract for this project, he will commence Work immediately on or before the date stated in a written notice from the Owner to commence Work; that he will furnish all materials, and perform all labor for the completion of the Contract and will

complete same, including all accepted alternates thereto, within the time stated in the Special Conditions; and that on his failure to complete the Work within such time he will pay to the Owner for each calendar day that the Work, or any part thereof remains uncompleted beyond such specified time, the amount specified in the Special Conditions; this payment shall be made as liquidated damages.

6. The Bidder further declares that accompanying this Bid Proposal is a certified check or satisfactory Bid Bond in the sum of five percent (5%) of this Bid Proposal, not to exceed \$10,000.00 and it is hereby agreed that in case of the withdrawal of this Bid Proposal without the consent of the Owner within one hundred twenty (120) days after the Bid opening, or that in case of failure on the part of the undersigned to execute the Contract as aforesaid and to deliver same and the required security for the faithful performance of the Contract (executed in the form annexed hereto), to said Owner within ten days from the date a notice of acceptance of this Bid Proposal is given to the undersigned personally, or by mail to the address as herein stated, then the undersigned Bidder will be deemed to have abandoned the Contract, and thereupon the amount of such check or bond shall be absolutely due and payable thereunder to the Owner.
  
7. The Bidder further declares his understanding that the Bid Proposal may contain quantities for Bid Items that exceed the quantities identified in the Contract Documents. If applicable, the quantities that are not shown in the Contract Documents may be identified by the Owner and/or Engineer and, if so identified, will be completed in this Contract.

Individual or Firm Name of Bidder

Bidder's Address \_\_\_\_\_

Bidder's Telephone Number (include area code): \_\_\_\_\_

Bidder's Email Address: \_\_\_\_\_

Bidder's State of Alabama License Number: \_\_\_\_\_

Licensed to be awarded Contracts not exceeding: \_\_\_\_\_

Note: If the Bidder is a corporation, give the following information:

State in which incorporated: \_\_\_\_\_

Address of Principal Office: \_\_\_\_\_

The Contractor is advised that **TIME IS OF THE ESSENCE** on this project and that the Contract time of **335** consecutive calendar days from the effective date of the written Notice to Proceed to achieve Substantial Completion and **365** consecutive calendar days from the effective date of the written Notice to Proceed to achieve Final Acceptance shall be strictly observed. **LIQUIDATED DAMAGES WILL BE ASSESSED IF THE CONTRACT TIME IS EXCEEDED.** The Contractor may apply for an extension of time in accordance with provisions of the Contract and these Specifications; however, such an extension of time must be approved **PRIOR** to the Contract completion date to avoid the imposition of liquidated damages. The Contractor is referred to Section 01 1015 – Prosecution and Progress and to the Special Conditions.

Bidder has examined the following addenda, and receipt of them is acknowledged:

No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____

Signature of Bidder: \_\_\_\_\_





## BID PROPOSAL FORM

### JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK AND FIVE MILE

All Bid Items shall include costs for furnishing to Owner all materials, equipment, and supplies and for all costs incurred in completing the Work, including installation of all materials, equipment, and supplies furnished, complete in-place and ready for continuous service, and all other labor, permit fees, taxes, insurance, miscellaneous costs, overhead, and profit.

ITEM NO.	ITEM DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION AND DEMOBILIZATION (NOT TO EXCEED 5% OF THE GRAND TOTAL OF BID)	LS	1	\$	\$
2	UNIT PRICE FOR METAL SOFFIT WITH VENT INCLUDING 1/2" MARINE GRADE PLYWOOD SUBSTRATE	2'-6" x 8' ASSUME BOTTOM CHORDS ARE 16" O.C.	1	\$	\$
3	UNIT PRICE FOR PAINTING CMU IN ADDITION TO OR DELETION FROM WORK SPECIFIED OR INDICATED	SF	1	\$	\$
4	PROVIDE UNIT PRICE FOR PAINTING GYPSUM BOARD IN ADDITION TO OR DELETION FROM WORK SPECIFIED OR INDICATED	SF	1	\$	\$
5	PROVIDE UNIT PRICE FOR WINDOW REPLACEMENT AT BUILDING 1299, WINDOW SIZE 3'10' W X 6" HIGH	WINDOW	1	\$	\$
6	WINDOW REPAIR IN ADDITION TO WINDOW REPLACEMENT ITEM 5 AT BUILDING 1299	LS	1	\$25,000.00	\$25,000.00
7	OWNER CONTINGENCY ALLOWANCE	LS	1	\$50,000.00	\$50,000.00
8	OWNER TESTING ALLOWANCE	LS	1	\$7,500.00	\$ 7,500.00
9	STRUCTURAL ALLOWANCE IN ADDITION TO OR DELETION FROM WORK SPECIFIED OR INDICATED	LS	1	\$ 10,000.00	\$ 10,000.00
10	MECHANICAL ALLOWANCE IN ADDITION TO OR DELETION FROM WORK SPECIFIED OR INDICATED	LS	1	\$50,000.00	\$ 50,000.00
11	ELECTRICAL ALLOWANCE IN ADDITION TO OR DELETION FROM WORK SPECIFIED OR INDICATED	LS	1	\$ 25,000.00	\$ 25,000.00
12	FURNITURE ALLOWANCE	LS	1	\$100,000.00	\$100,000.00
13	PROJECT WIDE REPAIR AND/OR REPLACEMENT OF DOOR HARDWARE ALLOWANCE	LS	1	75,000.00,	\$ 75,000.00



**SHADES VALLEY (8 BUILDINGS)**

<b>ITEM</b>	<b>ITEM DESCRIPTION</b>	<b>UNI TS</b>	<b>ESTIMATED QUANTITY</b>	<b>UNIT PRICE</b>	<b>TOTAL AMOUNT</b>
14	<b><u>BUILDING 1295 DISPATCH FACILITY</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
15	<b><u>BUILDING 1296 TV INSPECTION</u></b> – ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
16	<b><u>BUILDING 1299 SEWER LINE MAINTENANCE</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL				
17	<b><u>BUILDING 1300 MAINTENANCE SHOP</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
18	<b><u>BUILDING 1310 PUMP STATION OPERATIONS</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
19	<b><u>BUILDING 1330 TRAINING BUILDING</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
20	<b><u>BUILDING 1331 TRAINING FACILITY</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
21	<b><u>BUILDING 1351 OPERATIONS CREW FACILITY</u></b> - ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
22	<b><u>BUILDING 1357 INSTRUMENTATION BUILDING</u></b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$



**VILLAGE CREEK (5 BUILDING)**

ITEM NO.	ITEM DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
23	<b>CONSTRUCTION SHOP BUILDING</b> ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
24	<b>WATER TOWER</b> - ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
25	<b>HEADWORKS</b> – UNIT PRICE FOR METAL SOFFIT WITH VENT INCLUDING ROOF TRUSS BOTTOM CHORD PLYWOOD SUBSTRATE, TRIM, AND SEALANT	LS	1	\$	\$
26	<b>FIELDHOUSE</b> – UNIT PRICE FOR METAL SOFFIT WITH VENT INCLUDING ROOF TRUSS BOTTOM CHORD PLYWOOD SUBSTRATE, TRIM, AND SEALANT	LS	1	\$	\$
27	<b>DEWATERING BUILDING</b> - UNIT PRICE FOR METAL SOFFIT WITH VENT INCLUDING ROOF TRUSS BOTTOM CHORD PLYWOOD SUBSTRATE, TRIM, AND SEALANT	LS	1	\$	\$

**FIVE MILE (2 BUILDINGS)**

ITEM NO.	ITEM DESCRIPTION	UNITS	ESTIMATED QUANTITY	UNIT PRICE	TOTAL AMOUNT
28	<b>ADMINISTRATION BUILDING</b> - ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$
29	<b>MAINTENANCE BUILDING</b> – ALL SERVICES AND EQUIPMENT NECESSARY FOR COMPLETION OF THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT MANUAL	LS	1	\$	\$

<b>GRAND TOTAL OF BASE BID:</b>	\$
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**SECTION 00 0350**

**NON-COLLUSION AFFIDAVIT**

STATE OF ALABAMA  
JEFFERSON COUNTY

**BID PROPOSAL DATE:** \_\_\_\_\_

I hereby certify that \_\_\_\_\_(Name of Contracting Firm) has not either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this Contract.

Signed: \_\_\_\_\_  
(Name of Contracting Firm)

By: \_\_\_\_\_

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_

\_\_\_\_\_  
Notary Public

**FAILURE TO EXECUTE THIS AFFIDAVIT SHALL BE CAUSE FOR REJECTION OF THIS BID PROPOSAL.**

**END OF SECTION**

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**SECTION 00 0360**

**MBE/DBE DOCUMENTATION STATEMENT JEFFERSON COUNTY COMMISSION  
ENVIRONMENTAL SERVICES DEPARTMENT**

**PROJECT NAME: JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS  
IMPROVEMENTS – SHADES VALLEY, VILLAGE CREEK, AND  
FIVE MILE**

---

**The Jefferson County Commission, Environmental Services Department has initiated a program to encourage the participation of Minority Business Enterprises/Disadvantaged Business Enterprises (MBE/DBE) on its construction projects. This signed statement serves as a commitment by the undersigned company to comply with this program as outlined in Specification Section 00630, JEFFERSON COUNTY ENVIRONMENTAL SERVICES DEPARTMENT MBE/DBE PROGRAM.**

---

Signature

---

Date

---

Principal and Title (Print or Type)

---

Company Name

---

Alabama Contractor License Number

---

Mailing Address

---

Telephone Number

---

City, State Zip

---

Fax Number

**INSTRUCTIONS:**

- 1. FAILURE TO EXECUTE THIS STATEMENT MAY BE CAUSE FOR REJECTION OF THIS BID.**
- 2. SUBMIT WITH BID DOCUMENTS.**

**END OF SECTION**

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**SECTION 00 0410**

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, as Principal, and \_\_\_\_\_ a Surety, are hereby held and firmly bound unto Jefferson County, Alabama, as OWNER in the penal sum of \_\_\_\_\_ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

The condition of the above obligation is such that whereas the Principal has submitted to Jefferson County, Alabama, a certain Bid Proposal, attached hereto and hereby made a part hereof to enter into a Contract in writing, for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK, AND FIVE MILE.**

NOW, THEREFORE,

- (a) If said Bid Proposal shall be rejected, or in the alternate,
- (b) If said Bid Proposal shall be accepted and the Principal shall execute and deliver a Contract in the form of Contract attached hereto (Properly completed in accordance with said Bid Proposal) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid Proposal, then this obligation shall be void, otherwise the same remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid Proposal; and said Surety does hereby waive notice of any such extension. IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the day and year first set forth above.

Principal \_\_\_\_\_ (L.S.)

Surety \_\_\_\_\_

SEAL

By \_\_\_\_\_

**END OF SECTION**

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**SECTION 00 0430**

**LIST OF SUBCONTRACTORS**

In compliance with the Instructions to Bidders and other Contract Documents, the undersigned submits the following names of subcontractors to be used in performing the Work for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK, AND FIVE MILE.**

Bidder certifies that all subcontractors listed are eligible to perform the Work.

<u>Subcontractor's Work</u>	<u>Subcontractor's Name</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NOTE: This form must be submitted with the Bid in accordance with the Instructions to Bidders.

\_\_\_\_\_  
Bidder's Signature

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**SECTION 00 0500**

**CONTRACT**

THIS CONTRACT, made and entered into this the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_, by  
and between Jefferson County, Alabama hereinafter referred to as the Owner and \_\_\_\_\_  
\_\_\_\_\_ hereinafter referred to as the Contractor.

WITNESSETH:

That the parties hereto do mutually agree as follows:

1. The Contractor will furnish all materials, equipment, supplies, tools, power, fuel, and services and perform all labor necessary for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMNTS - SHADES VALLEY, VILLAGE CREEK, AND FIVE MILE**, and will perform same in strict conformity with the terms and conditions set forth in the following named documents which are hereto attached and made a part of this contract:

Project No. \_\_\_\_\_: Notice to Contractors, Special Conditions, Bid Proposal, Wage Rates, Performance Bond, Payment Bond, and Contract Drawings as enumerated and identified in these Specifications.

2. The Owner will pay to the Contractor, on faithful performance of his undertakings hereunder, in lawful money of the United States, the respective unit prices set forth in the aforementioned Bid Proposal for each unit of work performed or installed by the Contractor, the estimated sum total of all payments hereunder being \_\_\_\_\_dollars (\$\_\_\_\_\_).
3. The Owner will make payments to the Contractor as specified in these Specifications.
4. Within a period of 30 days after completion and acceptance of the Work the Owner will make a final and complete payment in full to the Contractor on account of this Contract; provided that, during said 30 day period, the Contractor has submitted to the Owner satisfactory written evidence that all payrolls and other costs incurred by the Contractor in connection with the Work have been paid in full; otherwise final payment will be made only after such evidence has been submitted.

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5. The Contractor will commence the Work on or as of the date set in a notice from the Owner to proceed with the Work, will prosecute same diligently and continuously with the stated requirements within **Three Hundred and Thrity-five (335)** consecutive calendar days from the effective date of the written Notice to Proceed to achieve Substantial Completion and **Three Hundred and Sixty-five (365)** consecutive calendar days from the effective date of the written Notice to Proceed to achieve Final Acceptance. Should the Work or any separate part thereof be not completed by such time or date, then the Contractor will pay to the Owner as fixed, agreed and liquidated damages the sum stipulated in the Special Conditions.

IN WITNESS WHEREOF, the parties have executed this Contract on the day and date first above written in 5 original counterparts.

JEFFERSON COUNTY, ALABAMA

ATTEST OF RESOLUTION:

\_\_\_\_\_

By: \_\_\_\_\_  
President – County Commission of  
Jefferson County

WITNESS:

\_\_\_\_\_

By: \_\_\_\_\_

Title \_\_\_\_\_

CONTRACTOR

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CERTIFICATE OF SECRETARY OF CORPORATION

I, \_\_\_\_\_ certify that I am the Secretary of the Corporation named as Contractor herein; that \_\_\_\_\_ who signed this Contract on behalf of the Contractor, was then \_\_\_\_\_ of said Corporation; that said Contract was duly signed for and on behalf of said Corporation by authority of its governing body and is within the scope of its corporate powers.

\_\_\_\_\_  
SECRETARY

(Corporate Seal)

**END OF SECTION**

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**SECTION 00 0610**

**PERFORMANCE BOND**

KNOW ALL MEN BY THE PRESENTS, THAT WE \_\_\_\_\_  
hereinafter called the Principal, and \_\_\_\_\_  
hereinafter called the Surety, and held and firmly bound unto Jefferson County, Alabama in the  
penal sum of \_\_\_\_\_  
\_\_\_\_\_ dollars(\$ \_\_\_\_\_)

for payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns for the faithful performance of a certain written Contract, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, entered into between the Principal and the Owner for the **JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS- SHADES VALLEY, VILLAGE CREEK, AND FIVE MILE.** A copy of which Contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

NOW THEREFORE, the condition of this obligation is such that if the Principal shall faithfully perform the terms and conditions of the Contract in all respects on his or their part, and shall fully pay all obligations incurred in connection with the performance of such Contract on account of labor and materials used in connection therewith, and all such other obligations of every form, nature, and character, and shall save harmless the Owner from all and any liability of every nature, kind, and character which may be incurred in connection with the performance or fulfillment of such Contract or other such liability resulting from negligence or otherwise on the part of such Principal, and further shall save harmless the Owner from all cost and damage which may be suffered by reason of the failure to fully and completely perform said Contract and shall fully reimburse and repay the Owner for all expenditures of every kind, character, and description which may be incurred by the Owner in making good any and every default which may exist on the part of the Principal in connection with the performance of said Contract; and further that the Principal shall pay all lawful claims of all persons, firms, partnerships, or corporations for all labor performed and materials furnished in connection with the performance of the Contract, and that failure to do so with such persons, firms, partnerships, or corporations shall give them a direct right of action against the Principal and Surety under this obligation, and provided, however, that no suit, action or proceeding by reason of any default whatever shall be brought on this bond after one (1) year from the date on which the final payment on the Contract falls due; and provided further that if any alterations or additions which may be made under the Contract, or in the Work to be done under it, or the giving by the Owner of any extension of time for the performance of the Contract or any other forbearance on the part of either the Owner or the Principal shall not in anyway release the Principal and Surety, or either of them, their heirs, executors, administrators, successors, or assigns from their liability hereunder; notice to the Surety of any such alterations, extensions, or forbearance being expressly waived.

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This obligation shall remain in full force and effect until the performance of all covenants, terms, and conditions herein stipulated and after performance it shall be null and void. Executed in 5 original counterparts.

IN TESTIMONY WHEREOF witness the hands and seals of the parties hereto on the \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
(Signature of Principal)

WITNESS:

\_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
(Signature of Surety)

WITNESS:

\_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

COUNTERSIGNED:

\_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

**- END OF SECTION -**

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**SECTION 00 0611**

**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, THAT WE \_\_\_\_\_  
hereinafter called the Principal, and \_\_\_\_\_ hereinafter  
called the Surety, are held and firmly bound unto Jefferson County, Alabama hereinafter called  
the Obligee, in the penal sum of \_\_\_\_\_ dollars,  
(\$\_\_\_\_\_) lawful money of the United States, for the payment of which sum well  
and truly to be made, we bind ourselves, our heirs, personal representatives, successors and  
assigns, jointly and severally, firmly by these presents:

WHEREAS, said Principal has entered into a certain Contract with said Obligee dated the  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, for the **JEFFERSON COUNTY  
ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY,  
VILLAGE CREEK, AND FIVE MILE**, which Contract and the Drawings and Specifications  
for said Work shall be deemed a part thereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said  
Principal and all subcontractors to whom any portion of the Work provided for in said Contract is  
sublet and all assignees of said Principal and of such subcontractors shall promptly make  
payments to all persons supplying him or them with labor, materials, feed-stuffs, or supplies for  
or in the prosecution provided for in such Contract, or in any amendment or extension of or  
addition to said Contract, and for the payment of reasonable attorneys' fees, incurred by the  
claimant or claimants in suits of said bonds, then the above obligation shall be void; otherwise to  
remain in full force and effect. PROVIDED, however that this bond is subject to the following  
conditions and limitations:

- (a) Any person, firm, or corporation that has furnished labor, materials, feed-stuffs, or  
supplies for or in the prosecution of the Work provided for in said Contract shall  
have a direct right of action against the Principal and Surety on this bond, which  
right of action shall be asserted in a proceeding, instituted in the County in which  
said Principal or Surety does business. Such right of action shall be asserted in a  
proceeding instituted in the name of the claimant or claimants for his or their use  
and benefit against said Principal and Surety or either of them (but not later than  
one year after the final settlement of said Contract) in which action such claims or  
claim shall be adjudicated and judgment rendered thereon.

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- (b) The Principal and Surety hereby designate and appoint JEFFERSON COUNTY, ALABAMA as the Agent of each of them to receive and accept services, processes or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such services shall be the same as personal service on the Principal and/or Surety.
- (c) The Surety shall not be liable hereunder for any damages or compensation recoverable under workman's compensation or employer's liability statute.
- (d) In no event shall Surety be liable for a greater sum than the penalty of this bond or subject to any suit, action, or proceeding thereof that is instituted later than one year after the final settlement of said Contract.

SIGNED, SEALED, AND DELIVERED THIS \_\_\_\_\_ day of \_\_\_\_\_  
 20\_\_\_\_, in 5 original counterparts.

WITNESS: \_\_\_\_\_ (Signature of Principal)

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
 (Signature of Surety)

WITNESS:  
 \_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

COUNTERSIGNED:  
 By \_\_\_\_\_  
 (Resident Agent)

**END OF SECTION**

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## SECTION 00 0630

### **JEFFERSON COUNTY ENVIRONMENTAL SERVICES DEPARTMENT MINORITY BUSINESS ENTERPRISE/DISADVANTAGED BUSINESS ENTERPRISE (MBE/DBE) PROGRAM**

- A. The Jefferson County Commission Environmental Services Department has adopted a program designed to encourage the participation of MBE/DBEs in construction projects. **THE MBE/DBE FORMS CAN BE FOUND IN APPENDIX C.**
- B. All General Contractors are required to submit the following:
1. All Contractors are required to read and sign a statement that they fully understand and will participate in and follow the guidelines and instructions included in this section, JEFFERSON COUNTY ENVIRONMENTAL SERVICES DEPARTMENT MBE/DBE PROGRAM. This statement shall be submitted with the bid documents. Additionally, all Contractors shall submit with the bid documents a list of all MBE/DBE firms submitting proposals. Form "A" (attached) shall be utilized to satisfy this requirement.
  2. Prior to award of the Contract, the successful General Contractor is required to submit a list of all MBE/DBE firms the Contractor proposes to utilize during the execution of the Contract (Form "B"). Include with Form "B" any MBE/DBE firms that the major subcontractors propose to utilize. This list must be received by the Environmental Services Department (ESD) prior to contract award by the Commission. The Contract will not be awarded without submission of Forms "A" and "B" (attached).
  3. With each monthly pay estimate submitted to the Environmental Services Department, Contractors are required to submit updated monthly MBE/DBE reports which identify any changes in the MBE/DBE firms' utilization, either adds or deducts. Monthly pay estimates will not be processed without the updated list of MBE/DBEs. The Contractor shall use Form "C" (attached) to meet the requirements of this paragraph.
  4. Upon completion of the Contract and prior to release of retainage, the General Contractor is required to submit a Project Close-Out Report that includes final accounting of all MBE/DBE firms utilized on the project. The Project Close-Out Report with documented MBE/DBE utilization is a prerequisite for the release of the retainage. The Contractor shall use Form "D" (attached) to meet the requirements of this paragraph.

- C. In addition to the requirements of Item B, pre-qualified General Contractors bidding on construction projects for the Environmental Services Department are required to comply with the following:
1. After deciding to bid a project, a prospective bidder must notify the Birmingham Construction Industry Authority (BCIA) of his/her intentions as soon as possible but no less than 5 days before the time set for receiving bids. The Contractor shall complete Form "E" (attached) and submit the completed form to the ESD no later than the scheduled date of the Pre-Bid Conference. This form may be submitted in person at the Pre-Bid Conference. The submission of Form "E" to ESD shall fulfill the notification requirement to the BCIA.
  2. The potential prime bidder should obtain the BCIA listing of certified MBE/DBEs to assist in soliciting MBE/DBE participation for the project. The BCIA has advised the County that this listing will be continually monitored and updated by the BCIA. After once receiving the BCIA listing, it will be necessary to only obtain revisions thereafter.
  3. In cases of dispute between a MBE/DBE and a General Contractor with respect to whether the MBE/DBE has a low bid, the BCIA Executive Director, with the concurrence of the General Contractor, shall be allowed to view the General Contractor's sub bids, sub analysis sheets, and summary sheets for that specific area of the project. The General Contractor shall not, however, be requested to use a MBE/DBE subcontractor who cannot display reasonable technical and financial qualifications to perform the work in question.
  4. Monthly, or as requested by the BCIA, the General Contractor shall furnish data similar to the data being forwarded to ESD under Item B. This information will be accumulated by the BCIA for all participating firms to determine the annual level of business activity in the area. The BCIA is concerned about confidentiality of Contractor reports. This information is intended for use by the BCIA to measure overall minority participation in the Birmingham Metropolitan Area and specifically, in Jefferson County. Every effort will be made to protect the identity of any specific Contractor.
  5. After closeout of a specific project, the General Contractor shall submit to the BCIA, a final accounting of the MBE/DBE participation for the project.

**END OF SECTION**

JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS  
SHADES VALLEY, VILLAGE CREEK AND FIVE MILE  
S2HD PROJECT NO. 202123

SECTION 00 0637 ROOFING GUARANTEE

ROOFING GUARANTEE

Name of Project

Location

General Contractor

Address

Date of Acceptance

Date of Expiration

1. The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturer's recommendations.

2. The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal; roof decking and/or sheathing; all material used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of any roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of substantial completion of the project. The guarantee does not include liability for damage or interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the general contractor did not damage or did not accomplish or was not charged to accomplish.

3. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashing etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in watertight conditions, and further, to respond on or with three (3) calendar days upon proper notification of leaks or defects by the Owner or Architect.

A. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.

B. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall be null and void, unless the Contractor notifies the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or

JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS  
SHADES VALLEY, VILLAGE CREEK AND FIVE MILE  
S2HD PROJECT NO. 202123

deteriorate the work, thereby reasonably justifying a termination of the Guarantee.

C. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. In this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with existing roof.

D. During the Guarantee Period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.

E. The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

General Contractor's Authorized Signature

Typed Name and Title

END OF SECTION



**SECTION 00 0700**  
**GENERAL CONDITIONS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Award
- B. Contractor's Pre-Start Presentation
- C. Starting the Project
- D. Qualifications of Subcontractors, Materialmen, and Suppliers
- E. Correlation, Interpretation, and Intent of Contract Documents
- F. Availability of Lands
- G. Subsurface Conditions
- H. Differing Site Conditions
- I. Supervision and Superintendence
- J. Labor, Materials, and Equipment
- K. Subcontractors
- L. Patent Fees and Royalties
- M. Permits
- N. Laws and Regulations
- O. Safety and Protection
- P. Public Convenience and Safety
- Q. Sanitary Provisions
- R. Indemnifications
- S. Work During Inclement Weather

- T. Contract Time
- U. Liquidated Damages
- V. Restoration of Services disturbed by others.

## 1.2 **AWARD**

- A. The award of the Contract, if it is awarded, will be to the lowest responsible, responsive Bidder. No Notice of Award will be given until the Owner has concluded such investigations as he deems necessary to establish the responsibility, qualifications, and financial ability of the Bidder to do the Work in accordance with the Contract Documents to the satisfaction of the Owner within the time prescribed. The Owner reserves the right to reject the Bid Proposal of any Bidder who does not pass such investigation to the Owner's satisfaction. In analyzing Bid Proposals, the Owner may take into consideration alternates and unit prices, if itemized in the Bid Proposal Form. If the Contract is awarded, the Owner will issue the Notice of Award and give the successful Bidder a contract for execution.

## 1.3 **CONTRACTOR'S PRE-START PRESENTATIONS**

- A. The Contractor represents that he has familiarized himself with, and assumes full responsibility for having familiarized himself with, the nature and extent of the Contract Documents, Work, locality; and has familiarized himself with all local conditions and federal, state, and local laws, ordinances, rules, and regulations that may in any manner affect performance of the Work; and represents that he has correlated his study and observations with the requirements of the Contract Documents. The Contractor also represents that he has studied all surveys and investigation reports of subsurface and latent physical conditions referred to in the Specifications, and has made such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract Price in accordance with the requirements of the Contract Documents, and has correlated the results of all such data with the requirements of the Contract Documents.
- B. Before undertaking each part of the Work, the Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures and drawings shown thereon and all applicable field measurements. He shall at once report in writing to the Engineer any conflict, error, or discrepancy which he may discover.

## 1.4 **STARTING THE PROJECT**

- A. The Contractor shall start to perform his obligations under the Contract Documents on the date when the Contract Time commences. No Work shall be

done at the site prior to the date on which the Contract Time commences, except with the written consent of the Owner.

**1.5 QUALIFICATIONS OF SUBCONTRACTORS, MATERIALMEN, AND SUPPLIERS**

- A. In accordance with Section 00430 – List of Subcontractors, the Contractor shall submit to the Owner for acceptance as part of the Bid Proposal, a list of the names of the subcontractors and such other persons and organizations (including those who are to furnish principal items of materials or equipment) proposed for those portions of the Work as to which the identity of the subcontractors and other persons and organizations must be submitted. Within ten (10) working days after opening of Bid Proposals, the Owner will notify the Contractor in writing if either the Owner or Engineer, after due investigation, have reasonable objection to any subcontractor, person, or organization on the List of Subcontractors. The failure of the Owner or Engineer to make objection to any subcontractor, person, or organization on the List of Subcontractors within ten (10) days of receipt shall constitute an acceptance of such subcontractor, person, or organization. Acceptance of any such subcontractor, person, or organization shall not constitute a waiver of any right of the Owner or Engineer to reject defective Work, material, or equipment, not in conformance with the requirements of the Contract Documents.
- B. The Contractor shall certify that subcontracts have not and will not be awarded to any firm that is currently on the USEPA Master List of Debarred, Suspended, and Voluntarily Excluded Persons.

**1.6 CORRELATION, INTERPRETATION, AND INTENT OF CONTRACT DOCUMENTS**

- A. It is the intent of the Drawings and Specifications to describe completely the project to be constructed in accordance with the Contract Documents. The Contract Documents comprise the entire Agreement between the Owner and the Contractor.
- B. The Contract Documents are complementary, what is called for by one is as binding as if called for by all. If the Contractor finds a conflict, error, or discrepancy in the Contract Documents, he shall call it to the Engineer's attention in writing at once and before proceeding with the Work affected thereby. The various Contract Documents shall be given precedence, in case of conflict, error, or discrepancy, as follows: Supplemental General Conditions, Agreement Modifications, Addenda, Special Conditions, Instructions to Bidders, General Conditions, Specifications, and Drawings. If the requirements of other Contract Documents are more stringent than the General Conditions, the more stringent requirements shall apply.

- C. The words “furnish”, “furnish and install”, “install”, and “provide” or words with similar meaning shall be interpreted, unless otherwise specifically stated, to mean “furnish and install complete in place and ready for service.”
- D. Miscellaneous items and accessories which are not specifically mentioned, but which are essential to produce a complete and properly operating installation, or usable structure or plant, providing the indicated function, shall be furnished and installed without change in the Contract Price. Such miscellaneous items and accessories shall be of the same quality standards, including material, style, finish, strength, class, weight, and other applicable characteristics, as specified for the major component of which the miscellaneous item or accessory is an essential part, and shall be approved by the Engineer before installation. The previously specified requirement is not intended to include major components not covered by or inferable from the Drawings and Specifications.
- E. The Work of all trades under this Contract shall be coordinated by the Contractor in such a manner as to obtain the best workmanship possible for the entire project, and all components of the Work shall be installed or erected in accordance with the best practices of the particular trade.

#### **1.7 AVAILABILITY OF LANDS**

- A. The Owner will furnish, as indicated in the Contract Documents, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the Owner, unless otherwise specified in the Contract Documents. Other access to such lands or rights-of-way for the Contractor's convenience shall be the responsibility of the Contractor. The Contractor will provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- B. The Owner will, upon request, furnish to the Contractor copies of all available record drawings and subsurface tests.

#### **1.8 SUBSURFACE CONDITIONS**

- A. The Contractor acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling, and storage of materials; availability of labor, water, electric power, and roads; uncertainties of weather, river stages, tides, water tables, or similar physical conditions at the site; the conformation and conditions of the ground; and the character of equipment and facilities needed preliminary to and during prosecution of the Work. The Contractor further acknowledges that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be

encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done on behalf of the Owner on the site or any contiguous site, as well as from information presented in the Drawings and Specifications made a part of this Contract, or any other information made available to him prior to receipt of the Bid Proposals. Any failure by the Contractor to acquaint himself with available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by or through the Owner.

#### **1.9 DIFFERING SITE CONDITIONS**

- A. The Contractor shall promptly, and before such conditions are disturbed, notify the Owner in writing of:
  - 1. Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract.
  - 2. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract. The Owner shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the Work under this Contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and a change order issued in accordance with Section 01028 – Change Order Procedures.

#### **1.10 SUPERVISION AND SUPERINTENDENCE**

- A. The Contractor shall supervise and direct the Work. The Contractor shall be solely responsible for the means, methods, the techniques, sequences, and procedures of construction. The Contractor shall employ and maintain on the Work a qualified superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the site. The superintendent shall have full authority to act on behalf of the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. The superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the Work. Copies of written communications given to the superintendent shall be mailed to the Contractor's home office.
- B. All Contractor work groups or crews crossing private property to work in sewer easements shall have at least one individual who can speak English and who is specifically designated to deal with any questions from the property owners

located adjacent to the Work or other members of the public. This person shall be knowledgeable of the Work and capable of answering questions. The designated individual will remain with the crew at all times while work in backyards or on private property is in progress. Questions that cannot be answered shall be forwarded to the Engineer and/or Owner.

#### **1.11 LABOR, MATERIALS, AND EQUIPMENT**

- A. The Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site.
- B. The Contractor shall furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, local telephone, water and sanitary facilities, and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the Work.
- C. All materials and equipment shall be new, except as otherwise provided in the Contract Documents. When special makes or grades of material which are normally packaged by the supplier or manufacturer are specified or approved, such materials shall be delivered to the site in their original packages or container with seals unbroken and labels intact.
- D. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable manufacturer, fabricator, or processors except as otherwise provided in the Contract Documents.

#### **1.12 SUBCONTRACTORS**

- A. The Contractor shall perform, with his own forces, the minimum percentage of work for this Project as specified in Section 00820 – Special Conditions.
- B. The Contractor shall be fully responsible for all acts and omissions of his subcontractors and of persons and organizations directly or indirectly employed by them, and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between the Owner and any subcontractor or other person or organization having a direct or indirect relationship or contract with the Contractor, nor shall it create any obligation on the part of the Owner to pay or to see the payment of any monies due any subcontractor or other person or organization, except as may otherwise be required by law.

- C. The Contractor agrees to bind specifically every subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the Owner.
- D. All Work performed for the Contractor by a subcontractor shall be pursuant to an appropriate agreement between the Contractor and the subcontractor.
- E. The Contractor shall be responsible for the coordination of the trades, subcontractors, and materialmen engaged upon his Work.
  - 1. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of these General Conditions and other Contract Documents insofar as applicable to the Work of subcontractors, and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise of the Contractor under any provisions of the Contract Documents.
  - 2. The Owner or Engineer will not undertake to settle any differences between the Contractor and his subcontractors or between subcontractors.
  - 3. If in the opinion of the Engineer, any subcontractor on the project proves to be incompetent or otherwise unsatisfactory, he shall be replaced by the Contractor if and when directed in writing by the Engineer.

#### **1.13 PATENT FEES AND ROYALTIES**

- A. The Contractor will pay all license fees and royalties and assume all costs incident to the use of any invention, design, process, or device which is the subject of patent rights or copyrights held by others. He will indemnify and hold harmless the Owner and the Engineer and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees) arising out of any infringement of such rights during or after completion of the Work, and shall defend all such claims in connection with any alleged infringement of such rights.
- B. The Contractor shall be responsible for determining the application of patent rights and royalties on materials, appliances, articles, or systems prior to bidding.

#### **1.14 PERMITS**

- A. The Contractor will secure and pay for all construction permits and licenses and will pay all governmental charges and inspection fees necessary for the prosecution of the Work. When such charges are normally made by the Owner and when so stated in the Special Conditions, there will be no charges to the Contractor. The Contractor will also pay all public utility charges.

### 1.15 LAWS AND REGULATIONS

- A. The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations applicable to the Work. If the Contractor observes that the Specifications or Drawings are at variance therewith, he will give the Engineer prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to the Engineer, he will bear all cost arising there from.
- B. The Contractor shall comply with all laws, ordinances, rules, and regulations of the Alabama Plumbers and Gas Fitters Board.

### 1.16 SAFETY AND PROTECTION

- A. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury, or loss to:
  - 1. All employees on the Work and other persons who may be affected thereby.
  - 2. All the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site.
  - 3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.
- B. The Contractor will designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Engineer.

### 1.17 PUBLIC CONVENIENCE AND SAFETY

- A. The Contractor shall, at all times, conduct the Work in such a manner to ensure the least practical obstruction to public travel. The convenience of the general public and of the residents along and adjacent to the area of the Work shall be provided for in a satisfactory manner, consistent with the operation and local condition. "Street Closed" signs shall be placed immediately adjacent to the Work, in a conspicuous position, at such locations as traffic demands. At anytime that streets are required to be closed, the Contractor shall notify law enforcement agencies, fire departments, and parties operating emergency vehicles before the



street is closed and again as soon as it is opened. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times.

- B. All chemicals used during construction or furnished for project operation, including but not limited to herbicides, pesticides, disinfectants, polymers, and reactants, must be labeled to show approval of either USEPA or USDA. Use of all such chemicals and disposal of residues shall be in conformance with the instructions of the applicable state or federal agency.

#### 1.18 **SANITARY PROVISIONS**

- A. The Contractor shall furnish necessary toilet conveniences, secluded from public observation, for use of all personnel on the Work, whether or not in his employ. They shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the public authorities having jurisdiction. Sanitary provisions shall commit no public nuisance. Temporary sanitary facilities shall be removed upon completion of the Work and the premises shall be left clean.

#### 1.19 **INDEMNIFICATIONS**

- A. The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses, and expenses including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss, or expense is:
  - 1. Attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting there from.
  - 2. Caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.
- B. In any and all claims against the Owner or the Engineer or any of their agents or employees, by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable. The indemnification obligation shall not be limited in anyway by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor under workmen's compensation acts, disability benefit acts, or other employee benefit acts.

## 1.20 WORK DURING INCLEMENT WEATHER

- A. Liability for work performed by the Contractor during inclement weather shall be borne exclusively by the Contractor. The Owner or the Engineer shall maintain the ability to suspend the Contractor's work during inclement weather should the Engineer consider suspension to be in the best interest of the Owner. Inferior work performed during inclement weather or work damaged during periods of suspension due to inclement weather shall be repaired and/or replaced by the Contractor. Any time extensions or compensation for repairs or replacement shall be subject to approval by the Engineer.

## 1.21 CONTRACT TIME

- A. The number of days in which the Contractor shall fully perform the proposed Work have been specified in Section 00100 – Notice to Bidders and Section 00820 – Special Conditions. The date of the beginning and the time for completion of the Work are essential conditions of the Contract.
- B. In arriving at any credit due the Contractor for extension of time on the Contract, the Owner, upon the recommendation of the Engineer, may allow such credit as, in his judgement, is deemed equitable and just for all delays occasioned by a Change Order, any act, or failure to act, on the part of the Contractor or caused by forces beyond the Contractor's control. Additional time will also be allowed the Contractor to cover approved overruns or additions to the Contract in the same proportion that the said overruns or additions in monetary value bears to the original Contract amount. Delays caused by normal and ordinary weather conditions will not be the basis for an extension of Contract Time.
- C. If the Contractor claims that any instructions by the Engineer involve an extension of time, he shall give the Engineer written notice of said claim within ten (10) days after the receipt of such instructions, and in any event before proceeding to execute the Work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.
- D. The Contractor shall make no claim for extra compensation due to delays of the project beyond his control. Such delays may include those caused by any act of neglect on the part of the Owner or Engineer, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delays in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or by delay authorized by the Engineer pending arbitration, or by any other cause which the Engineer determines may justify the delay.
- E. Time extensions may be granted upon proper justification by the Contractor. Any claim for time extensions under these provisions shall be submitted in writing to the Engineer not more than ten (10) days following commencement of the delay;

otherwise, claim will be waived. With submission of claim, the Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

- F. Additional costs incurred in accelerating the Work to compensate for such delays (as previously defined herein) shall also not form the basis for extra compensation claims.

#### **1.22 LIQUIDATED DAMAGES**

- A. If the Contractor shall fail to complete the Work within the Contract Time, the Contractor will pay to the Owner the amount for liquidated damages as specified in the Special Conditions for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents.

#### **1.23 RESTORATION OF SERVICES DISTURBED BY OTHERS**

- A. The Owner reserves the right to authorize the construction, reconstruction, or maintenance of any public or private utility service, at anytime during the progress of the Work.
- B. Except as previously listed herein, the Contractor shall not permit any individual, firm, partnership, or corporation to excavate or otherwise disturb such utility services located within the limits of the Work without the written approval of the Engineer.
- C. Should the owner of a public or private utility service be authorized to construct, reconstruct, or maintain such utility service during the progress of the Work, the Contractor shall cooperate with such owner by arranging and performing the work in this Contract so as to facilitate such construction, reconstruction, or maintenance by others whether or not such work by others is part of this contract. When ordered as extra work by the Engineer, the Contractor shall make all necessary repairs to the Work which are due to such authorized work by others, unless otherwise provided for in the Contract, Drawings, or Specifications. It is understood and agreed that the Contractor shall not be entitled to make any claim for damages due to such authorized work by others or for any delay to the Work resulting from such authorized work.

#### **1.24 AGREEMENTS WITH PROPERTY OWNERS**

- A. Any agreement entered into by the Contractor with any property owner, in connection with construction of this project, must be made in writing and a copy supplied to the Engineer. A written release must also be supplied to the Engineer upon termination of any agreement.

**END OF SECTION**

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## SECTION 00 0802

### NPDES GENERAL PERMIT

#### PART 1 - GENERAL

##### 1.01 PERMIT APPLICATION

It shall be the responsibility of the Contractor to determine if a State NPDES General Permit ALR100000 for construction site runoff is required as part of this project. When required by the Alabama Department of Environmental Management (ADEM):

- A. Contractor shall submit a Notice of Intent (NOI) to be covered under the ADEM National Pollutant Discharge Elimination System (NPDES) General Permit.
  - 1. Application forms and instructions are to be obtained from ADEM.
  - 2. The NOI must be submitted at least 30 days before construction activities begin.
- B. Public notice of submittal of the NOI must be published in a local newspaper for one (1) day immediately before submission of the NOI.
- C. With the NOI submit a Construction Best Management Practices Plan (CBMPP) and Spill Prevention, Control and Countermeasure (SPCC) Plan.
- D. Submit the NOI electronically through the eNOI system. Contact information as follows:

Alabama Department of Environmental Management  
Attn: Water Division  
1400 Coliseum Boulevard  
Montgomery, Alabama 36110  
[cswmail@adem.alabama.gov](mailto:cswmail@adem.alabama.gov)  
(Mailing Address)  
P.O. Box 301463  
Montgomery, Alabama 36130-1463  
Telephone (334) 271-7700

#### PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

### 3.01 IMPLEMENTATION

- A. Submit three (3) copies (or the number directed by the Engineer) of the NOI to the Engineer for records.
- B. Do not begin construction before receiving ADEM acknowledgement of the submitted NOI and approval of coverage of the discharge.
- C. Show NOI submittal and ADEM review as an activity on the Project Schedule specified in Section 01310 – Progress Schedules.
- D. Comply with all Permit-required inspections, monitoring, documentation, and testing requirements. Submit copies of all Tests, Inspection, Non-Compliance, or other related Reports to the Engineer for records.

**END OF SECTION**

## SECTION 00 0820

### SPECIAL CONDITIONS

#### PART 1 -- GENERAL

##### 1.01 QUALIFICATIONS OF THE CONTRACTOR

- A. The Contractor shall have previous experience in demolition, and general new and renovation construction practices and shall employ sub-contractors, workmen and foremen with sufficient knowledge, skill, and experience to perform the work identified in the plans and specifications.

##### 1.02 CONTRACT TIME

- A. The Contract Time for completion of all work under this project is **Three-hundred and Sixty-five (365)** calendar days from the effective date of the written Notice to Proceed to achieve Final Acceptance. The Contractor may apply for an extension of time in accordance with provisions of the Contract; however, such an extension of time must be approved by the Owner prior to the Contract completion date and in accordance with Section 00 0700 – General Conditions to avoid the imposition of liquidated damages.
- B. Shades Valley Plant work includes nine buildings. Work on multiple buildings can occur concurrently.
  - 1. Building 1295 Dispatch Facility shall be completed within 60 days of beginning onsite work at this building.
  - 2. Building 1330 Training Building shall be completed within 120 days of beginning onsite work at this building. The Contractor shall relocate the furniture and equipment from Building 1296 to this building after the work at Building 1330 is completed.
  - 3. Building 1296 TV Inspection shall be completed within 120 days of beginning onsite work at this building. This building may be completed as the last component of the project and must be completed with the Contract Time.
  - 4. Building 1299 Sewer Line Maintenance shall be completed within 90 days of beginning onsite work at this building.
  - 5. Building 1300 Maintenance Shop shall be completed within 120 days of beginning onsite work at this building.
  - 6. Building 1310 Pump Station Operations shall be completed within 90 days of beginning onsite work at this building.
  - 7. Building 1331 Training Facility shall be completed within 60 days of beginning onsite work at this building.
  - 8. Building 1351 Operations Crew Facility shall be completed within 90 days of beginning onsite work at this building.
  - 9. Building 1357 Instrumentation Building shall be completed within 120 days of

beginning onsite work at this building.

- C. Village Creek Plant. Work on multiple buildings can occur concurrently except that the Headworks Building and Field House Building cannot be renovated during the same time frame.
1. Headworks Building shall be completed within 120 days of commencing onsite work at this at this building.
  2. Field House Building shall be completed within 120 days of commencing onsite work at this building.
  3. Shop Building shall be completed within 90 days of commencing onsite work at this building.
  4. Water Tower Building shall be completed with 90 days of commencing onsite work at this building.
  5. Dewatering Building shall be completed within 90 days of commencing work on this building.
- D. Five Mile Plant work includes two buildings. One building must be completed and furniture and equipment moved back into renovated spaces before onsite work at the second building can begin.
1. Maintenance Building shall be completed within 105 days of beginning onsite work on this building.
  2. Administration Building shall be completed within 105 days of beginning onsite work on this building.
- E. This project includes multiple buildings at three project sites. Each building is critical to the operation of the plant. Once work begins at each building, work is to progress without interruption until completion of that building so that the spaces being renovated can be ready for use. Work at the three plant sites should be scheduled concurrently, except as noted elsewhere in these Special Conditions, so that all work is completed within the Contract Time.
- F. Where spaces or buildings are being renovated, the Contractor is responsible for relocating furniture and equipment from the area of renovation to a location designated by the Owner and moving furniture and equipment back into the area after the work in that area is accepted.
- G. Extension of the Contract Time may be granted by the Engineer, with approval of the Owner, if the work is on the project's critical path. No extension of time shall be granted to the Contractor for delays occurring to parts of the work that have no specific impact on the critical path as determined by the Owner and Engineer.
- H. No extension for Contract Time will be considered for normal weather conditions reasonably anticipated for the area in which the work is being performed. Normal weather conditions shall be defined as the average number of days with precipitation greater than or equal to a



trace amount (0.01-inch) for a particular month over a recent 30-year period and shall be based on the 1981-2010 Climate Normals released by the National Oceanic and Atmospheric Administration's National Climatic Data Center for the station located closest to the project site. If the actual number of precipitation days received during any month exceeds the normal precipitation days and more than 50% of the Contractor's work force was affected, the Contractor may be entitled to a Contract extension. If a Contract extension is granted due to weather conditions, the Contract Time shall be extended by the number of days in which actual precipitation exceeded the anticipated precipitation. If the Contractor requests any rain day delays for a particular time period, they must be submitted with the pay request for that time period. No requests for additional days will be granted if not requested at that time.

- I. All other requested Contract extensions shall be evaluated by the Owner and Architect, with their determination deemed final.

#### 1.03 LIQUIDATED DAMAGES

- A. The Contractor is advised that TIME IS OF THE ESSENCE on this project. Liquidated damages will be assessed if either the Contract Time to achieve Substantial Completion or the Contract Time to achieve Final Acceptance is exceeded. By executing the Contract, the Contractor agrees to pay as liquidated damages the amount of \$1,000.00 per day for each consecutive calendar day after the Contract Time for Substantial Completion has expired.

#### 1.04 RECORD OF EMPLOYEES

- A. The Contractor shall keep an accurate record showing the name, place of residence, citizenship, and per diem pay for each person engaged in the execution of the Contract and shall cause every subcontractor under him, who shall undertake the performance of any part of the Contract, to also keep a similar record of each person engaged in the execution of said subcontract. All such records shall be available at any time to the Owner or his duly authorized representative.

#### 1.05 ARCHEOLOGICAL FINDS

- A. Notwithstanding anything to the contrary herein, in the event any archaeological artifacts within the project are discovered during the course of the Work, the Owner shall have and retain all right, title, and interest to such artifacts and shall have the further right, during the course of the Contract, to examine, or cause to have examined, the site of the Work for any such artifacts and to perform, or have performed, archeological excavations and all other related work to explore for, discover, recover, and remove such artifacts from the site of the Work. In the event the archeological examination and related work delays the Contractor's work, he shall be entitled to request an extension of time to complete the Work equal to the number of days he is thus delayed.

#### 1.06 NOTIFICATION TO PROPERTY OWNERS

- A. It shall be the responsibility of the Contractor to notify, in writing, any property owner whose service could be affected by the work being performed in the area. Property owner shall be notified a minimum of 48 hours prior to performing any work. The notification shall be on the Contractor's company letterhead and shall contain the following information:
1. Date
  2. Name of Project
  3. Description of the type of work
  4. Time of construction, including start date and end date
  5. Contractor's Project Manager's name and phone number
  6. Contractor's Superintendent's name and phone number
  7. Contractor's Foreman's name and phone number
  8. 24-hour emergency number
- B. The Contractor shall be solely responsible for any damage to private service lines or sewer backups caused by the sanitary sewer and manhole replacement work. The Contractor shall provide hotel accommodations for any residents either whose wastewater backs up into their home as a result of the Contractor's work or if use of their sewer service line is limited or prohibited due to the Contractor's operations. Hotel accommodations shall be provided for as long as required to return the resident's home to its original or better condition.

#### 1.07 SAFETY

- A. All activities shall be performed in accordance with the manufacturer's recommendations and regulations established by OSHA. Particular attention shall be directed to those safety requirements and regulations involving excavations and entering confined spaces. The Contractor shall provide OSHA-approved access to all work areas for the Owner and Engineer. The Contractor shall be solely responsible for the safety of this project.

#### 1.08 DRUG DETECTION AND DETERRENCE

- A. It is the policy of the Owner to achieve a drug-free work force and to provide a workplace that is free from the use of illegal drugs and alcohol. It is also the policy of the Owner that the manufacture, distribution, dispensation, possession, sale, or use of illegal drugs or alcohol by Contractor while on the Owner's premises is prohibited.

#### 1.09 CONTRACT DRAWINGS

- A. The Work shall be performed in accordance with the set of Drawings entitled “**JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK AND FIVE MILE,**” and dated March 29, 2024, which are incorporated herein as part of the Contract Documents.

#### 1.10 STORED MATERIALS

- A. No payment will be made for stored materials for this Project, unless otherwise approved by the Owner or Engineer.

#### 1.11 SUBCONTRACTORS

- A. The Contractor shall perform a minimum of 50 percent of the total value of this Contract utilizing his own forces.
- B. All subcontractors performing sewer and manhole replacement work included in this Project shall be pre-qualified by the Jefferson County Environmental Services Department to perform their specific work as classified in Section 00 0101 – Instructions to Bidders.
- C. A list of all subcontractors and the work they will perform must be submitted to the Engineer for approval as part of the Bid Proposal in accordance with Section 00 0700 – General Conditions. Subcontractors who do not meet pre-qualification requirements to perform their specific work may not perform any Work on the project.
- D. No subcontractors will be allowed to perform work on this project without the Contractor’s Superintendent on site.

#### 1.12 CONSTRUCTION RUNOFF PERMITTING

- A. The Contractor shall obtain a National Pollutant Discharge Elimination System (NPDES) permit for Storm Water Discharge Associated With Construction Site Runoff if the Contractor determines a NPDES permit is required as part of this project. The Contractor shall forward one (1) copy of the permit to the Engineer prior to commencement of work activities.

#### 1.13 ABANDONMENT OF SEWER LINES

- A. Where indicated in the Plans or directed by the Engineer, the Contractor shall perform CCTV assessment and/or dyed - water testing to determine whether there are active service connections. The Contractor shall not abandon sewers with an active service connection.

- B. The Contractor shall abandon sewers by grouting using a free flowing grout with a 28 - day compressive strength of 1000 psi.
- C. Measurement and payment for CCTV assessment performed to determine the presence or absence of active service connections on sewer lines to be abandoned will be on a linear foot basis. Payment shall be made under:
  - 1. CCTV Assessment, per linear foot (size).
- D. No separate measurement or payment will be made for dyed-water testing performed to determine the presence or absence of active service connections on sewer lines to be abandoned.
- E. Measurement and payment for abandoning sewer lines by grouting will be per linear foot.

#### 1.14 ALABAMA DEPARTMENT OF TRANSPORTATION

- A. Appendix B of the Jefferson County Standard Specifications contains the blanket Utility Permit No. 3-1-3982.
- B. Any work within the Alabama Department of Transportation right-of-way shall be performed in accordance with the requirements of the Permit. The Alabama Department of Transportation must be notified of and must approve of all work within their right-of-way.

#### 1.15 EXISTING FLOW MONITORS

- A. When work is required on manholes that contain existing flow monitors, the flow monitor must be left in-place and shall not be disturbed whatsoever during performance of the Work.
- B. If a specific flow monitor must be temporarily removed to perform the work at that existing manhole, Contractor shall be responsible for contacting Cedric Hayden with Jefferson County Environmental Services Department at (205) 214-8611 a minimum of seventy-two (72) hours in advance to coordinate monitor removal.
- C. The removal, storage, and reinstallation of any existing flow monitors that require temporary removal must be conducted by ADS, LLC. ADS, LLC will invoice the Owner for the full removal, storage, and reinstallation fees.

#### 1.16 QUANTITIES

- A. The Bid Proposal Form may contain quantities for Bid Items that exceed the quantities identified on the Contract Drawings. These quantities may be used to accommodate unforeseen circumstances that may arise during construction.

- B. The Bid Proposal Form may contain quantities for Bid Items that underrun the quantities listed on the Bid Proposal Form. Contractor shall make no claim for lost profits due to underrun of Bid Quantities listed on the Bid Form.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

#### 1.17 ALLOWANCES

- A. If applicable, any amount listed in the Bid Proposal Form for designated Allowance Items are considered to be part of the Contract Price; however, the use of these funds will follow the procedures set forth in Section 01028 – Change Order Procedures. If the item involves Owner-initiated work, a request for proposal will be issued to the Contractor and, following receipt and review of the proposal and negotiation of the scope of work and cost, a form for modifying the allowance, as provided by the Owner, will be executed and the Owner will formally notify the Contractor in writing to proceed with the Owner-initiated work. If the work involves the response to eligible unforeseen conditions, the scope of the work and method of payment will be determined by the Engineer following notification by the Contractor and an assessment of the situation.

#### 1.18 PROJECT COMMUNICATION

- A. The Contractor shall provide each crew which performs work on this Project with a cell phone at no additional cost to the Owner. A list of contacts and phone numbers for each crew shall be supplied by the Contractor to the Owner and Engineer before beginning any work.

#### 1.19 EXISTING CONDITIONS AND EXISTING UTILITIES

- A. The Engineer has attempted to show on the Plans all pertinent surface features and utilities as existed at the time of the survey. The Contractor is urged to view the construction route and to identify any new or overlooked features. Claims for extra work may not be allowed for any feature not shown on the Plans.
- B. Only approximate utility locations are shown on the Plans. The Contractor shall be responsible for notifying the appropriate utility company for determining the precise location and having the utility company mark the utility location in the field, and for coordinating his work with the utility company. The Contractor shall notify the utility company a minimum of seventy-two (72) hours in advance of performing any work in the area of the utility. No extra payment shall be made for any deviation from the proposed alignment as shown on the Plans (or increased depth) to avoid existing utilities.

#### 1.20 SERVICE LATERAL CONNECTION AND REPAIR PERMIT

- A. Contractor is required to obtain a permit for each service line connection from the Jefferson County Environmental Services Department. The permit must be obtained by a licensed Master Plumber from a company that is licensed by the State of Alabama and has a current Bond with Jefferson County. No fee will be charged to obtain the permit for Jefferson County construction projects. No additional inspections/tests (hydrostatic/wooden ball) will be required other than what is required by the on-site inspector provided to inspect the Jefferson County construction project.

#### 1.21 SERVICE LATERAL RE-ROUTE

- A. Service Lateral Re-Route shall consist of required modifications of the service lateral to accommodate connection to a separate sewer main than originally connected. Service lateral installation shall be in accordance with the Jefferson County Environmental Services Department Standard Specifications for Sanitary Sewer Service Lines and Connections.
- B. Measurement and Payment for Service Lateral Re-Route shall be made on a linear foot basis. Payment will be full compensation for furnishing all labor, materials, tools, and equipment necessary to perform all work.

#### 1.22 OBSTRUCTIONS WITHIN THE SANITARY SEWER LINE

- A. Damage or an obstruction in the sanitary sewer line caused by the Contractor during work within this Contract shall be repaired or removed within 24 hours. If the repair or removal is not performed within the allotted time, the Owner will perform the necessary work at the expense of the Contractor.

#### 1.23 SUBSTANTIAL COMPLETION

- A. When the Contractor considers the entire Work to be ready for its intended use, Contractor shall notify Owner and Engineer in writing that he believes Substantial Completion has been achieved, except for items specifically listed by Contractor as incomplete, and request that the Engineer issue a certificate of Substantial Completion. For Substantial Completion to have been achieved, the entire Project must be fully capable of providing its intended use to the satisfaction of the Engineer. "Substantial Completion" means that all portions of the Project shall be installed and operational. All field testing shall be completed; all final paving, grading, and other finish items shall have been completed; and all warranties shall have been submitted and approved. The Contractor's notification shall include an itemized list of remaining incomplete work.
- B. Promptly after the Contractor's notification, Owner, Contractor, and Engineer shall perform an inspection of the Work to determine the status of completion. If the Engineer does not consider Substantial Completion of the Work to be achieved, Engineer will notify the Owner and Contractor in writing identifying the particulars in which this determination revealed the Work to be incomplete or defective. If the Engineer does consider Substantial Completion of the Work to be achieved, Engineer will meet with the Contractor to:

1. Prepare a Punch List of incomplete or incorrect items of the Work and establish a date for their completion;
  2. Define the division of responsibilities between Owner and Contractor with respect to security, operation, safety, and protection of the Work; maintenance; insurance; and warranties and guarantees; and
  3. Describe any other outstanding issues related to Substantial Completion of the Work.
- C. Upon reaching agreement with the Contractor, the Engineer will submit a tentative certificate of Substantial Completion to the Owner that states in writing that the Work has achieved Substantial Completion, includes a list of the items to be completed or corrected before final payment, establishes the date for completion of the incomplete or incorrect work, describes the division of responsibility between the Owner and Contractor, and sets forth any other items related to acceptance. Owner shall have seven days after receipt of the tentative certificate to issue a written objection to Engineer regarding any provisions of the certificate or attached list. If, after considering such objections, if any, Engineer concludes that the Work has not achieved Substantial Completion, Engineer will, within fourteen days after submission of the tentative certificate to the Owner, notify Contractor in writing, stating the reasons why. If, after consideration of Owner's objections, if any, Engineer considers the Work to have achieved Substantial Completion, Engineer will, within said fourteen days, execute and deliver to the Owner a definitive certificate of Substantial Completion, including a revised tentative list of items to be completed or corrected, that has been revised to reflect changes from the tentative certificate that the Engineer believes are justified after consideration of the Owner's objections, if any.
- D. The Owner, who has sole discretion for final determination of definitive Substantial Completion, will review the Engineer's definitive certificate that Substantial Completion has been achieved, and if the Owner concurs with that certification, the Owner will notify the Contractor, in writing, that the Work has achieved Substantial Completion. Substantial Completion will not occur until the entire Project is ready for possession and use. The Owner's acceptance notice will include a Punch List of remaining incomplete or incorrect work items, establish the date for their completion, confirm the division of responsibilities between the Owner and Contractor, and describe any other outstanding terms of acceptance. The Contractor will acknowledge receipt of the acceptance notice in writing, indicating acceptance of all of its terms and provisions.
- E. Upon receipt of the Contractor's acknowledgement letter, the Owner shall take possession of the Work and put it into its intended service. The date that the Work is put into service will become the date of Substantial Completion. Unless otherwise specified, warranties will begin on the date of Substantial Completion.
- F. Upon attainment of Substantial Completion, the Contractor shall become eligible for payment of retainage, subject to a withholding of 200 percent of the value of the outstanding Work,

including Punch List items, as determined by the Engineer.

#### 1.24 FINAL ACCEPTANCE

- A. Once the Contractor has achieved Substantial Completion as detailed in Article 1.22 herein and has completed the itemized Punch List of the remaining incomplete or incorrect items of the Work from the Owner's notice to the Contractor of acceptance of Substantial Completion, Contractor shall notify Owner and Engineer in writing that he believes Final Acceptance has been achieved and request that the Engineer issue a certificate of Final Acceptance. To achieve Final Acceptance, Contractor shall have removed all of his equipment, materials, tools, trash, labor, etc. from the site of the Work, shall have cleaned the site of the Work to the Owner's satisfaction, and shall have complied with any and all additional requirements for Final Acceptance as listed in the Contract Documents.
- B. Promptly after the Contractor's notification, Owner, Contractor, and Engineer shall perform an inspection of the Work to determine the status of acceptance. If the Engineer does not consider Final Acceptance to be achieved, Engineer will notify the Owner and Contractor in writing identifying the particulars in which this determination revealed the Work to be incomplete or defective. If the Engineer does consider the requirements of Final Acceptance to be met, Engineer will execute and deliver to the Owner a definitive certificate of Final Acceptance.
- C. The Owner, who has sole discretion for final determination of definitive Final Acceptance, will review the Engineer's definitive certificate that Final Acceptance has been achieved, and if the Owner concurs with that certification, the Owner will notify the Contractor, in writing, that the Work has achieved Final Acceptance.
- D. Upon attainment of Final Acceptance, the Contractor shall become eligible for final payment, including any retainage being withheld after Substantial Completion was achieved. Once Final Acceptance is granted to the Contractor, the Owner shall become responsible for all security, operation, safety, and protection of the Work, maintenance, and insurance that were formerly the responsibility of the Contractor prior to achieving Final Acceptance.

#### 1.25 TERMINATION OF THE CONTRACT

- A. Upon seven (7) days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, elect to terminate the Agreement. In such case, Contractor shall be paid (without duplication of any items) for:
  - 1. Completed and acceptable work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit directly on such work
  - 2. Expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents



in connection with uncompleted work, plus fair and reasonable sums for overhead and profit directly on such expenses

3. Reasonable expenses directly attributable to termination (demobilization)

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or extended overhead or interest or underutilization of personnel or economic loss whatsoever arising out of or resulting from such termination.

#### 1.26 CLEARING OF SANITARY SEWER EASEMENT

A. Furnishing all labor, equipment, and materials for clearing of sanitary sewer easement to access a sanitary sewer and/or manhole shall be considered incidental to the sewer and manhole replacement work. The clearing of the sanitary sewer easement shall be the minimum necessary for the Contractor to access the sewer line and/or manhole with all necessary vehicles and equipment needed for replacement. After completing the Work, the Contractor shall remove all debris, construction materials, and equipment from the site and shall restore the entire construction area to a clean, neat, and serviceable condition in accordance with the requirements of Section 02910 – Final Grading and Landscaping.

#### 1.27 ACQUISITION OF ADDITIONAL RIGHT-OF-WAY

A. Additional right-of-way may have been acquired for the sanitary sewer work. Any acquired permanent right-of-way and/or temporary construction easement shall be indicated on the Issued for Construction drawings. If right-of-way has not been acquired for the work, the Contractor shall determine the most practical means to gain access to each area where any sanitary sewers and manholes to be replaced are located and shall receive approval of these means from the Owner and Engineer. In these cases, the Contractor shall be responsible for negotiating temporary right-of-entry agreements with any property owner(s).

#### 1.28 TEMPORARY ACCESS ROAD CONSTRUCTION

A. Temporary access road construction shall consist of furnishing all labor, equipment, and materials required to construct a temporary access road. Temporary access road surface shall consist of 6 inches of 2.5-inch to 3.5-inch diameter coarse aggregate backfill. All components of the temporary access road, including, but not limited to, excavation, geotextiles, stone backfill, erosion and sedimentation control, and restoration, shall be considered incidental to the Work with no additional payment.

B. The following Sections of the Specifications shall be used as references in the construction of the temporary access road.

1. Section 02200 – Earthwork

2. Section 02207 – Aggregate Materials

3. Section 02270 – Slope Protection and Erosion Control

4. Section 02910 – Final Grading and Landscaping

#### 1.29 GOVERNING LAW/DISPUTE RESOLUTION

- A. The parties agree that this Contract is made and entered into in Jefferson County, Alabama and that all services, materials, and equipment to be rendered pursuant to said Agreement are to be delivered in Jefferson County, Alabama. The interpretation and enforcement of this Agreement will be governed by the laws of the State of Alabama, without giving effect to the conflict of laws rules thereof. The parties agree that jurisdiction and venue over all disputes arising under this Agreement shall be in the Circuit Court of Jefferson County, Alabama, Birmingham Division.

#### 1.30 ASSIGNMENT

- A. No portion of this Contract may be sold, assigned, or transferred to a third party without the express written consent of the Owner, its successors, assigns, or designees. Any attempt to assign this Contract without the written consent of the Owner, its successors, assigns, or designees is null and void.

#### 1.31 GENERAL CODE OF THE CITY OF BIRMINGHAM, 1980

- A. The Contractor shall adhere to Ordinance No. 10-115 as it relates to Title 4, “Municipal Services”, Chapter 5, “Streets and Sidewalks” Article H, “Excavations”, of the General Code of the City of Birmingham, 1980 when performing work within the City of Birmingham. A copy of said Ordinance is attached as Appendix F.

#### 1.32 CONTRACTOR OVERTIME

- A. Contractor (and Subcontractor) regular working hours consist of up to ten (10) working hours within an 11-hour period between 7:00 a.m. and 6:00 p.m. on a regularly scheduled basis, excluding Sundays and holidays. Overtime work is work in excess of forty (40) hours per week.
- B. The Contractor shall compensate the Engineer(s), Engineer’s Subconsultant(s), and the Resident Project Representative(s) for overtime work caused by the Contractor or his Sub-Contractor(s). The Owner shall evaluate what constitutes as overtime and their determination shall be final. Compensation shall be based on the following maximum rates:

1. Engineer: up to \$150/hour
2. Resident Project Representative: up to \$120/hour

#### 1.33 CONTRACTOR’S RESPONSIBILITY FOR WORK:

## SECTION 00 0822

### INSURANCE REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDES

- A. General
- B. Workman's Compensation and Employer's Liability Insurance
- C. Comprehensive General Liability Insurance
- D. Contractual Liability
- E. Comprehensive Automobile Liability Insurance (Owned, Non-Owned, and Hired)
- F. Umbrella Excess Liability over All Primary Insurance
- G. Property Insurance
- H. Special Hazards or Perils
- I. Measurement and Payment

##### 1.2 GENERAL

- A. The Contractor shall not commence any work on the project until he obtains, at his own expense, all required insurance; and the Contractor shall not, at any time conduct any operations on the project or associated with the project unless such operations are covered by the specified insurance. Such insurance must have the approval of the Owner as to limit, form, and amount. The Contractor shall not permit any subcontractor(s) to commence work on the project until the same insurance coverage requirements have been complied with by such subcontractor(s) with limits to be determined by the Contractor. However, the failure of the subcontractor(s) to carry adequate insurance shall in no way affect the coverage afforded by the Owner by the Contractor's insurance. The insurance coverage shall be maintained throughout the full period of the Contract. Any insurance bearing on adequacy of the performance shall be maintained after completion of project for the full guaranty period.
- B. Proof of insurance coverage specified herein shall be furnished to the Director of Environmental Services, Jefferson County Courthouse, 716 Richard Arrington Jr. Boulevard North, A300, Birmingham, Alabama 35203, in the form of copies of the

policies. The Owner, however, in lieu of copies of the policies, and at his discretion, may accept certificates issued by the insurance carrier and showing such policies to be in force for specified periods. The Contractor shall furnish to the Owner, prior to the expiration date of any policy, renewal certificates showing that policies will remain in force throughout the full period of the Contract. The insurance carrier shall be satisfactory to the Owner. No insurance coverage shall be canceled or materially changed without prior written notice having been given to the Owner, and then only after arrangements satisfactory to the Owner have been made to ensure insurance coverage until the project has been completed and accepted. All Contractors in a joint venture shall have insurance coverage through the same company; or, if that is not practical, then the Owner must be furnished an endorsement which allocates primary and secondary payment responsibilities.

- C. The Owner, its governing body, its elected officials, employees, and agents and the Engineer shall also be additional named insured in all insurance policies provided by the Contractor and his subcontractor(s) as respects all work performed under this Contract.
- D. In the event that the Contractor or his Surety is prevented by law or by charter from naming the Owner, its governing body, its elected officials, employees, and his agents, and the Engineer as insured in the policies providing the coverage listed herein, the Contractor shall purchase and maintain during the life of this Contract an Owner's and Contractor's Protective Liability Insurance Policy in an amount equal to the maximum amount specified under the various coverage including Umbrella Excess Liability over primary insurance; and the named insured in the Owner's and Contractor's Protective Liability Insurance Policy shall be the Owner, its governing body, its elected officials, employees, agents, and the Engineer. The insurance shall protect the Owner and his agents, and the Engineer, from any claim or loss arising from any act of the Contractor or his subcontractors, or any failure to act on the part of the Contractor or his subcontractors, during the performance of work under this Contract.
- E. The specified limits and coverage in any of the policies for the various types of insurance shall not be construed as limiting the Contractor's responsibility to provide contractual coverage sufficiently broad so as to ensure the provisions of the Articles of these specifications relating to Indemnity, or limiting the responsibilities of the Contractor as outlined under aforesaid Articles.
- F. Nothing contained in these insurance requirements shall be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operation under this Contract.
- G. Insurance carried by the Contractor on the Work shall not relieve the Contractor of the responsibility for the protection of all materials and all work until the project has

been accepted by the Owner. Any loss, including insurance deductibles surrendered on the project, shall be borne by the Contractor and/or the insurance company providing the coverage for the Contractor; and the Owner shall not be liable for any cost or replacement of lost or damaged work or material.

H. All policies required under this section shall have a 60-day written Notice of Cancellation or material change to coverage clause. All changes shall be reported and addressed to the Risk Manager, Jefferson County Courthouse, 716 Richard Arrington Jr. Boulevard North, Suite A610, Birmingham, Alabama 35203, and to the Director of Environmental Services, 716 Richard Arrington Jr. Boulevard North, Suite A300, Birmingham, Alabama 35203.

1.3 WORKMEN'S COMPENSATION AND EMPLOYER'S LIABILITY INSURANCE

A. Workmen's Compensation and Employer's Liability Insurance shall be in strict accordance with the requirements of the current and applicable Workmen's Compensation Laws of the State of Alabama. The insurance shall cover all of the Contractor's employees employed or associated with the project; and where any part of the Work is subcontracted, the Contractor shall require subcontractor(s) to provide similar Workmen's Compensation and employer's liability insurance for all employees of the subcontractor(s) unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide, and shall cause such subcontractor(s) to provide, adequate coverage for the protection of all employees on the project not otherwise protected under applicable provisions of the Statutes relating to Workmen's Compensation and Employer's Liability Insurance. The minimum limits of coverage shall be as follows:

- 1. State of Alabama Statutory
- 2. Applicable Federal Statutory
- 3. Employer's Liability \$500,000.00
- 4. Voluntary Compensation Statutory
- 5. Broad Form All State Endorsement
- 6. Benefits received by Union Labor Contracts - As Applicable

1.4 COMPREHENSIVE GENERAL LIABILITY INSURANCE

A. Comprehensive General Liability Insurance shall protect the Contractor and any

subcontractor performing work under this Contract from any claims for bodily injury, sickness or disease, death, personal injury, and property damages which may arise either directly or indirectly out of, or in connection with, the performance of Work under this Contract. The Comprehensive General Liability Insurance Coverage shall include: Premises - Operations; Independent Contractor's Protective; Explosion, Collapse, and Underground Property Damage; Broad Form Property Damage; Contractual Liability (written and oral); and fellow Employee Coverage. The minimum limits of coverage shall be as follows:

- |    |  |   |
|----|--|---|
| 1. | Bodily Injury<br>(Includes Personal Injury)                    | \$1,000,000.00 Each Occurrence<br>\$2,000,000.00 Annual Aggregate |
| 2. | Property Damage  | \$1,000,000.00 Each Occurrence<br>\$2,000,000.00 Annual Aggregate |
|    | or   |   |
| 3. | Bodily Injury and<br>Property Damage,<br>Combined Single Limit | \$4,000,000.00 Annual Aggregate<br>(where applicable)             |

1.5 CONTRACTUAL LIABILITY

A. The minimum limits of coverage shall be as follows:

- |    |                  |                                |
|----|------------------|--------------------------------|
| 1. | Bodily Injury    | \$1,000,000.00 Each Occurrence |
| 2. | Property Damage  | \$1,000,000.00 Each Occurrence |
| 3. | Annual Aggregate | \$2,000,000.00                 |

1.6 COMPREHENSIVE AUTOMOBILE LIABILITY INSURANCE (OWNED, NON-OWNED, AND HIRED)

A. Comprehensive Automobile Liability Insurance (Owned, Non-owned, and Hired) shall protect the Contractor and any subcontractor performing work under this Contract from any claims for bodily injury, death, and property damage which may arise either directly or indirectly out of, or in connection with, the performance of work under this Contract. The minimum limits of coverage shall be as follows:

- |    |                 |                                |
|----|-----------------|--------------------------------|
| 1. | Bodily Injury   | \$1,000,000.00 Each Occurrence |
| 2. | Property Damage | \$1,000,000.00 Each Occurrence |

or

3. Bodily Injury and Property Damage \$2,000,000.00 Each Occurrence

#### 1.7 UMBRELLA EXCESS LIABILITY OVER ALL PRIMARY INSURANCE

A. The minimum limits of coverage shall be as follows:

1. Each Occurrence \$5,000,000.00
2. Aggregate (where applicable) \$5,000,000.00

#### 1.8 PROPERTY INSURANCE

A. Unless otherwise specified, the Contractor shall provide All Risk Course of Construction Insurance (excluding floods and earthquakes) to cover the interests of all Contractor and subcontractors of any tiers. The Contractor and subcontractors of any tiers shall be responsible for all risks of physical loss to the Work.

1. The total amount of the insurance shall be the amount of the Contract.
2. The policy or policies shall be endorsed to waive all rights of subrogation among, between, and to each insured under the policy or policies. The waiver, however, shall apply only to the policy, or policies, and not to another part or parts of this Contract.
3. Any claim coming under the terms and conditions of the policy or policies, shall be immediately reported to the Engineer.

#### 1.9 SPECIAL HAZARDS OR PERILS

A. The Liability and Property Damage Insurance Coverage of the Contractor's operations shall provide adequate protection against any death, any bodily injury, or any property damage resulting from the blasting operations in connection with the Contractor's work, or in connections with the work of his subcontractors.

#### 1.10 MEASUREMENT AND PAYMENT

A. The cost of insurance required herein shall be included in the unit prices bid on other Bid Proposal items, and no additional amount will be paid.

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## SECTION 00 0825

### ALABAMA LAW

#### AN ACT

#### Alabama Code Section 39-2-14

- (a) Every nonresident Contractor, as defined in Section 39-2-12 of the Code of Alabama 1975, shall register with the Department of Revenue prior to engaging in the performance of a Contract in this state. At the time of registration, the Contractor shall deposit with the Department of Revenue five per centum (5%) of the amount such Contractor is to receive for the performance of the Contract which shall be held within a "Contractors Use Tax Fund" pending the completion of the Contract, the determination of the taxes due this state and other governmental bodies, and the payment of same. In lieu of such deposit, the Contractor may provide a corporate surety bond to be approved by the Commissioner of Revenue as to form, sufficiency, value, amount, stability, and other features necessary to provide a guarantee of payment of the taxes due this state and other governmental bodies.
- (b) In addition, within thirty (30) days after registration, the Contractor shall file a statement with the Department of Revenue itemizing the machinery, materials, supplies, and equipment that he has or will have on hand at the time he begins the fulfillment of the Contract where such tangible personal property has been brought, shipped, or transportation from outside the State of Alabama upon which neither the use taxes or ad valorem taxes have been paid and shall pay the tax due thereon at the time of filing and thereafter shall report and pay the tax as required by the Commissioner of Revenue.
- (c) Upon payment of the said taxes due, as required hereby, the deposit or the surety bond required herein shall be returned forthwith to the out-of-state Contractor posting same.
- (d) The Commissioner of Revenue shall have authority to promulgate rules and regulations to carry out the provisions of this Act.

## ALABAMA LAW

### Alabama Code Section 39-3-5

Preference to resident contractors in letting of certain public contracts.

- (a) In the letting of public Contracts in which any state, county; or municipal funds are utilized, except those Contracts funded in whole or in part with funds received from a federal agency, preference shall be given to resident Contractors, and a non-agency, preference shall be given to resident Contractors, and a non-resident bidder domiciled in state having laws granting preference to local Contractors shall be awarded Alabama public Contracts only on the same basis as the non-resident bidder's state awards Contracts to Alabama Contractors bidding under similar circumstances; and resident Contractors of Alabama, as defined in Section 39-2-12, Code of Alabama 1975, be they corporate, individuals, or partnerships, are to be granted preference over non-residents in awarding of the Contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the non-resident.
- (b) A summary of this law shall be made a part of the advertised specifications of all projects affected by this law.

## **ALABAMA LAW**

### **Alabama Code Section 31-13-9.**

By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

### **Alabama Act 2016-312**

Contractor certifies that it is not currently engaged in, and for the duration of this agreement will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state enjoys open trade.

**END OF SECTION**

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SECTION 00 4300 - UNIT PRICES AND ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Section:
  - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.2 DEFINITIONS

- A. Unit price is an amount proposed by Bidders as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.
- B. Allowances based on Unit Prices are the units requested in the Bid Proposal Form multiplied by the unit price to be included in Contractor's base bid; or the stipulated sums included in the Bid Proposal Form.

1.3 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Contractor to employ a licensed surveyor to verify required quantities for fill material before ordering any fill material after walls are demolished. Spot elevations and quantity calculations to be submitted to Program Manager for review and comment before request for payment.
- C. Contractor must verify measurement of base bid work –in-place that involves allowances listed under paragraph 3.1 of this section.
- D. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- E. List of Unit Prices: A list of unit prices is included in the Bid Proposal Form. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 LIST OF UNIT PRICES

- A. Each unit price shall include all consideration for labor, materials, overhead, profit, equipment, and any other costs for installation of the unit. Unit prices shall be the same for additive or deductive amounts.
- B. Refer to Bid Proposal Form for list of Unit Prices.

3.2 LIST OF ALLOWANCES

- A. Lump Sum Allowances are the documented direct costs for the Work described in the Allowance and shall include Labor, Materials, delivery of materials and applicable taxes for providing the Work. General Contractor's Overhead and Profit including insurance, bonds, superintendent and other job office personnel, watchman, use and rental of small tools, job office supplies and expenses, temporary facilities and utilities, and job office supplies and expenses are carried in the Base Bid as a component of the Contract Sum and are not to be added to or deducted from the direct costs for providing the Work under the Allowance. Subcontractors providing Work under Lump Sum Allowances are permitted a 10% markup for overhead and profit.
- B. Refer to Bid Proposal Form for list of Allowances.

END OF SECTION 00 4300

SECTION 01 1010 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Worked covered by the Contract Documents.
  - 2. Use of premises.
  - 3. Owner's occupancy requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Jefferson County Environmental Services Shades Valley Complex Re-roofing and Village Creek Renovation studio 2H Design, LLC job no. 201930.
  - 1. Project Location: Shades Valley, 1295 Oak Grove Road South, Birmingham, AL 35209.
  - 2. Project Location: Village Creek, 1440 Pleasant GHill Road, Birmingham, AL 35214.
  - 3. Project Location: Five Mile, 3410 Happy Hollow Lane, Fultondale, AL 35068
- B. Owner: Jefferson County, Alabama
  - 1. Owner's Representative: Mr. Ronald R. Thomas.
- C. Architect: Studio 2H Design, LLC; 1721 4<sup>th</sup> Avenue North, Suite 101; Birmingham, AL 35203; ph. 205-264-9988; Attn: Charles Jordan.
- D. The Work generally consists of the following:
  - 1. Shades Valley site: 8 buildings. Work includes selective demolition, re-roofing; exterior repainting; repairing gutters, downspouts, and fascia; closing in skylights at selected buildings; installing sealant at windows and doors; renovation of toilets/showers/locker areas; new finishes; and associated plumbing/mechanical/electrical work. The work is further described on construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.
  - 2. Village Creek site: 6 buildings. Work includes selective demolition; recladding of metal storage building; metal roofing; masonry cleaning; renovation of toilets/showers/locker areas; new finishes; and associated plumbing/mechanical/electrical work. The work is further described in construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.
  - 3. Five Mile site: 2 buildings. The work includes renovation of toilets/showers/locker areas; new finishes; new casework; office renovations; service fixtures; and associated plumbing/mechanical/electrical work. The work is further described in construction documents, drawings and specifications prepared by the Architect and his consultants, dated 03/29/2024.
  - 4. Inspection of Job Site: Before submitting a proposal, the Contractor must attend an on-site inspection of all sites to examine the conditions for purposes of determining amount of work

JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS  
SHADES VALLEY, VILLAGE CREEK AND FIVE MILE  
S2HD PROJECT NO. 202123

to be done. The contractor is to furnishing all equipment, superintendence, labor, skill, material, and all other items necessary for the construction of the the Campus Imprvements to Shades Valley, Village Creek, and Five Mile Plants including, but not limited to, all civil, mechanical, structural, and appurtenant work, complete in-place, tested, and ready for full operation, including temporary facilities as required, all in conformance with the Contract Documents and as directed by the Architect/Engineer.

5. The Contractor is expected to verify all dimensions and quantities necessary to complete the project.

- E. Intent of Plans and Specifications: The intent of the plans and specifications is to prescribe a complete Work which the Contractor undertakes to do in full compliance with the Contract. The Contractor shall do all Work as provided in the Plans, Specifications, and other parts of the Contract Documents and shall do such additional extra and incidental Work as may be considered necessary to complete the Work in a satisfactory and acceptable manner. Any work or material not shown on the Plans or described in the Specifications, but which may be fairly implied as included in any item of the Contract, shall be performed and/or furnished by the Contractor without additional charge therefore. The Contractor shall furnish all labor, material, tools, equipment, and incidentals necessary to the prosecution and successful completion of the Work.
- F. Base Bid: Base Bid shall be for a single contract for work completed as specified herein, except as specifically excluded. The Contractor shall execute the work in accordance with the true intent of the Contract Documents, which is to affect a complete, first class job without additional cost to the Owner, whether or not each and every item necessary therefore is specifically mention.

### 1.3 ATTENTION TO WORK

- A. The Contractor shall give his/her personal attention to and shall supervise the Work to the end that is shall be procecuted faitfully; and, when he/she is not personally present on the Work, he/she shall at all time be represented bya compenent superintendent or foreman who shall be present at the Work to receive and obey all instructions or orders given under this Contract; and who shall have full authority to execute the same, and to supply materials, tools, and labor without delay; and who shall be the legal representative of the Contractor. The Contractor shall be liable for the faithful observance of any instruction delivered to him or his authorized representatives.

### 1.4 USE OF PREMISES

- A. Contractor shall have limited use of the sites for construction operations as indicated. The Contractor shall at all times provide proper facilities for access and inspection of the Work by representatives of the Owner and of such official Governmental agencies as may be designated by the Owner as having jurisdictional rights to inspect the Work.



JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS  
SHADES VALLEY, VILLAGE CREEK AND FIVE MILE  
S2HD PROJECT NO. 202123

- B. Use of Site: Do not disturb areas beyond project limit of construction without prior approval from the Owner.

PART 2 - PRODUCTS

PART 3 - EXECUTION (Not Used)

3.1 TIME FOR CONSTRUCTION

- A. The Contractor shall provide a written work schedule with an estimate completion date within two days of award of contract. Work is anticipated to begin October 1, 2024, and must be completed with Final Acceptance by the Owner within Three-hundred and Sixty-five (365) consecutive days.

END OF SECTION 01 1000

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SECTION 01 1011  
DEFINITIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Definitions of Selected Terms Used in These Specifications

1.02 DEFINITIONS OF SELECTED TERMS USED IN THESE SPECIFICATIONS

- A. Wherever the words, forms, or phrases defined or pronouns used in their stead occur in the Specifications, in the Contract, in the Advertisement, or in any document or instrument herein contemplated or to which these Specifications apply, the intent and meaning shall be construed and interpreted as follows:

1. Abbreviations: The following organizations are referred to in these Specifications by the following abbreviations of their titles:
  - a. AASHTO – American Association of State Highway and Transportation Officials
  - b. ACI – American Concrete Institute
  - c. ACIFS – American Cast Iron Flange Standards
  - d. ADEM – Alabama Department of Environmental Management
  - e. AFBMA – Anti-Friction Bearing Manufacturers Association
  - f. AGA – American Gas Association
  - g. AGMA – American Gear Manufacturers Association
  - h. AIA – American Institute of Architects
  - i. AISC – American Institute of Steel Construction
  - j. AISI – American Iron and Steel Institute
  - k. ALDOT – Alabama Department of Transportation
  - l. ANSI – American National Standards Institute

- m. API – American Petroleum Institute
- n. ASA – American Standards Association
- o. ASCE – American Society of Civil Engineers
- p. ASHRAE – American Society of Heating, Refrigerating and Air-Conditioning Engineers
- q. ASME – American Society of Mechanical Engineers
- r. ASTM – American Society for Testing and Materials
- s. AWS – American Welding Society
- t. AWWA – American Water Works Association
- u. CEMA – Conveyor Equipment Manufacturers Association
- v. CRSI – Concrete Reinforcing Steel Institute
- w. DIPRA – Ductile Iron Pipe Research Association
- x. EPA – United States Environmental Protection Agency
- y. FDA – United States Food and Drug Administration
- z. Fed Spec – Federal Specifications
- aa. ICRI – International Concrete Repair Institute
- bb. IEEE – Institute of Electrical and Electronic Engineers
- cc. IPCEA – Insulated Power Cable Engineers Association
- dd. ISO – Insurance Services Offices
- ee. NACE – National Association of Corrosion Engineers
- ff. NASSCO – National Association of Sewer Service Companies
- gg. NBS – National Bureau of Standards
- hh. NEC – National Electrical Code

- ii. NEMA – National Electrical Manufacturers Association
  - jj. OSHA – Occupational Safety and Health Administration
  - kk. PCI – Precast Concrete Institute
  - ll. SSPC – The Society for Protective Coatings
  - mm. UL – Underwriters Laboratories, Inc.
  - nn. USDA – United States Department of Agriculture
  - oo. USGS – United States Geological Survey
2. Addenda: Any clarification, correction, or change to Drawings and/or Specifications after advertisement for bids has commenced but prior to opening of bids shall be made by addenda, with appropriate supplemental Drawings and/or Specifications issued to all Bidders. After issuance, any addenda shall become a part of the Contract Documents as much as though fully contained therein.
  3. Advertisement: A public announcement inviting bids for Work to be performed and materials to be furnished
  4. Bid: The offer or Bid Proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed
  5. Bid Bond: The approved form of security furnished by the Bidder and his surety, with the Bid Proposal, as a guarantee that the Bidder will enter into an agreement with the Owner for construction of the Work should the Contract be awarded to him
  6. Bid Proposal: The written and signed statement of the Bidder submitted on the prescribed form setting forth the prices to perform the contemplated Work and furnish the necessary materials in accordance with the provisions of the Drawings and Specifications
  7. Bid Proposal Form: The prescribed form on which the offer of a Bidder is to be submitted
  8. Bidder: Any individual, firm, partnership, or corporation submitting a Bid for the advertised Work
  9. Calendar Days: Every day shown on the calendar, beginning and ending at midnight, including Sundays and holidays

10. Change Order: A written order to the Contractor covering changes in the Drawings, Specifications, or Bid Proposal quantities and establishing the basis of payment and Contract Time adjustment, if any, for the Work affected by such changes
11. Contract: The written agreement between the Owner and the Contractor covering the performance of the Work
12. Contract Documents: The Contract, including Advertisement for Bids, Bid Proposal, Contractor Performance Requirements, Special Conditions, Technical Specifications, Agreement, Bonds, Drawings, Notice of Award, Notice to Proceed, Addenda, if any, and all approved Change Orders
13. Contract Time: The number of calendar days or working days, stated in the Bid Proposal, allowed for completion of the Contract, including authorized time extensions. If a calendar date of completion is stated in the Bid Proposal in lieu of a number of calendar or working days, the Contract shall be completed by that date.
14. Contractor: The individual, firm, partnership, or corporation selected by the Owner as the successful Bidder, who has become a party to the Contract, and his duly authorized representatives for performance of prescribed Work
15. County: The County of Jefferson, within the State of Alabama, the party of the first part of the Contract, acting by and through the Jefferson County Commission
16. Drawings: The official Contract Drawings or exact reproduction thereof which show and describe the Work to be done and which are to be considered as a part of the Contract, supplementary to the Specifications
17. Employee: Any person working on the project to which these Specifications apply who is under the direction or control of, and receives compensation from, the Contractor or subcontractors
18. Engineer: An authorized agent of the Jefferson County Environmental Services Department assigned to make interpretation and enforcement of the Drawings and Specifications, approve submittals, generally oversee the quality and progress of the Work, and determine the amount, quantity, acceptability, and fitness of the Work as specified in the Drawings and Specifications. In some circumstances, the Owner may elect to act as Engineer on all or a portion of the Project.
19. Equipment: All machinery, together with the necessary supplies for upkeep and maintenance, and all tools and apparatus necessary for the proper construction and acceptable completion of the Work

20. Extra Work: An item of Work not provided for in the awarded Contract as previously modified by Change Order but which is found by the Engineer to be necessary to complete the Work within the intended scope of the Contract as previously modified.
21. Final Acceptance: As defined in Section 00820 – Special Conditions.
22. Inspector: An authorized representative of the Engineer assigned to make all necessary inspections and/or tests of the Work performed or of the materials furnished or being furnished by the Contractor
23. Laboratory: The official testing laboratories of the Owner or such other laboratories as may be designated by the Engineer
24. Mainline Sanitary Sewer: A pipe or conduit which is closed and not flowing full, which is intended to carry only sanitary and industrial wastewater from residences, commercial buildings, industrial parks, and institutions
25. Major and Minor Contract Items: A major Contract item shall be any item that is listed in the Bid Proposal Form, the total cost of which is equal to or greater than ten percent (10%) of the total amount of the awarded Contract. All other items shall be considered minor Contract items.
26. Materials: Any substance specified for use in the Contract Work and its appurtenances
27. Notice of Award: The written notice of the acceptance, by the Owner, of the successful Bidder's Bid Proposal
28. Notice to Proceed: The written notice issued by the Owner to the Contractor authorizing him to proceed with the Contract Work and establishing, when applicable, the date of commencement and termination of the Contract Time
29. Or Equal: Wherever a particular process, material, device, detail, or part is specified herein, followed by these words or by similar or equivalent expressions, such words or expressions shall be understood to mean and permit the use of another process, material, device, or part that the Engineer shall determine is fully equal in suitability, quality, durability, performance, and in all other respects, to the process, material, device, detail, or part herein specified for such use, and shall approve for such use in the Work.
30. Owner: The term Owner shall mean the Jefferson County Commission (Alabama), its successors, assigns, or designees.

31. Partial Utilization: As defined in Section 00820 – Special Conditions
32. Pay Item: A specifically described unit of Work for which a price is provided in the Contract
33. Payment Bond: The approved form of security furnished by the Contractor and his Surety as a guarantee that he will pay in full all bills and accounts for materials and labor used in the construction of the Work
34. Performance Bond: The approved form of security furnished by the Contractor and his Surety as a guarantee that the Contractor will complete the Work in accordance with all Contract Documents
35. Project: The agreed Work to be performed as provided in the Contract
36. Proposal Guaranty: The certified check or Bid Bond furnished with a bid to assure that the Bidder will enter into the Contract if his bid is accepted
37. Resident Project Representative: An authorized representative of the Owner who is assigned to observe the construction of the Work and advise the Owner of the Work's prosecution
38. Samples: Physical examples which illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged
39. Sanitary Sewer: A sewer which carries wastewater
40. Sanitary Sewer Overflow (SSO): An SSO shall occur when uncontained wastewater outside the construction work area (that does not drain back into the trench) comes in contact with the ground or is able to reach waters of the State. This may include non-dewatered spoils removed from trench excavation (that does not drain back to the trench) as determined by the on-site inspector. This does include leakage of water from dump trucks and/or excavation equipment traveling on public streets. This also includes overflow of manholes and/or trenches due to contractors work (failure of bypass pumps, inadequate plugs, etc.).
41. Sanitary Sewer Service Lateral: Any pipe connected to a mainline sewer which carries sanitary and industrial wastewater from residences, commercial buildings, industrial facilities, and institutions to the mainline sanitary sewer
42. Shop Drawings: All drawings, diagrams, illustrations, brochures, schedules, and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier, or distributor, which illustrates how specific portions of the Work shall be fabricated, erected, or installed
43. Special Conditions: Additions and revisions to the Standard Specifications



applicable to an individual project. The Special Conditions are intended to supplement, modify, or delete items covered in the Standard Specifications. Special Conditions shall prevail over General Conditions.

44. Specifications: A part of the Contract Documents containing the written directions, provisions, and requirements for completing the Contract Work. Standards for specifying materials or testing which are cited in the Contract Specifications by reference shall have the same force and effect as if included in the Contract physically.
45. State: The State of Alabama
46. Station: A specific point on the centerline of the sewer or on the survey baseline designating some specific distance from the point of origin. Stations are numbered in terms of one hundred linear feet measured horizontally.
47. Storm Sewer: A sewer which carries surface runoff and subsurface waters
48. Structures: Facilities such as bridges, culverts, catch basins, inlets, retaining walls, cribbing, storm and sanitary sewer lines, water lines, under drains, electrical ducts, manholes, handholes, lighting fixtures and poles, transformers, flexible and rigid pavements, buildings, vaults, and other manmade features that may be encountered in the Work and not otherwise classified herein
49. Subcontractor: An individual, firm, partnership, or corporation, approved by the Owner, having a direct contract with the Contractor for the performance of specified portions of the Contract
50. Substantial Completion: As defined in Section 00820 – Special Conditions
51. Superintendent: The Contractor's representative who is present on the Work during progress, authorized to receive and fulfill instructions from the Engineer, and who shall supervise and direct the construction
52. Supplier: Any individual, firm, partnership, or corporation who sells, rents, or supplies materials or equipment for the proper execution of the Work, including that fabricated to a special design, but who does not perform labor at the site. Establishment of a temporary plant or facility of any kind on or near a project for the purpose of furnishing material for that project only will not be considered a “Supplier” but will be considered a “Subcontractor” as defined in these Specifications, unless such plant is established and operated by the Contractor.
53. Surety: The individual, firm, partnership, or corporation, other than the Contractor, executing Bid, Payment, or Performance Bonds which are furnished

to the Owner by the Bidder or Contractor, licensed under the Laws of Alabama

54. Work: The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the Contract, Drawings, and Specifications
  
55. Written Notice: Any notice to any party of the Contract relative to any part of the Contract in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the Work

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

SECTION 01 1015  
PROSECUTION AND PROGRESS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Subcontractors and Assignments
- B. Notice to Proceed
- C. Beginning and Completion of Work
- D. Prosecution of the Work
- E. Temporary Suspension of the Work
- F. Weekend, Holiday, and Night Work
- G. Contract Time
- H. Failure to Complete Work on Time and Liquidated Damages
- I. Annulment of Contract
- J. Termination for National Emergencies
- K. Notice and Service Thereof

1.02 RELATED WORK

- A. Section 01010 – Summary of Work
- B. Section 01025 – Measurement and Payment
- C. Section 01310 – Progress Schedules

1.03 SUBCONTRACTS AND ASSIGNMENTS

- A. The Contractor may utilize the services of specialty subcontractors on those parts of the Work which, under traditional contracting practices, are performed by specialty subcontractors.

- B. The Contractor shall not award any Work to any subcontractor without prior written approval of the Owner; such approval shall not be given until the Contractor submits to the Owner a written statement, which shall contain such information as the Owner may require, concerning the proposed award to the subcontractor. All subcontractors shall carry insurance as specified in Section 00822 – Insurance Requirements.
- C. The Owner shall not recognize any subcontractor on the Work. The Contractor shall at all times, when Work is in progress, be represented either in person by a qualified superintendent or by other designated qualified representative who is duly authorized to receive and execute orders of the Engineer. The Contractor shall be as fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them as he is for the acts and omissions of persons directly employed by him.
- D. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents, insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- E. Nothing contained in this Contract shall create any contractual relation between any subcontractor and the Owner.
- F. The Contractor shall not assign the whole or any part of this Contract or any monies due him or to become due under this Contract without written consent of the Owner. In case the Contractor assigns all or any part of any monies due him or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior liens of all persons, firms, partnerships, and corporations for services rendered or materials supplied for the performance of the Work called for in this Contract.

#### 1.04 NOTICE TO PROCEED

- A. The Notice to Proceed shall state the date which the Owner directs the Contractor to begin the construction and from which date Contract Time shall be charged. The Contractor shall begin the Work to be performed under this Contract within 10 days of the date of the written Notice to Proceed, but in any event, the Contractor shall notify the Engineer at least 24 hours in advance of the time actual construction operations shall begin on the site.

#### 1.05 BEGINNING AND COMPLETION OF WORK

- A. It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning, rate of progress, and the time for completion of the Work to be performed under this Contract are ESSENTIAL CONDITIONS of this Contract, and it is further mutually understood and agreed that the Work embraced in this Contract shall be commenced within 10 days of the Notice to Proceed. Should the Contractor fail to initiate and prosecute the Work as previously stated herein, then the Owner may act to annul the Contract in accordance with this Section.
- B. The Contractor agrees that said Work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress to ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the Work described in this Contract is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- C. It is further agreed that time is of the essence of each and every portion of this Contract and of the Specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever, and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract. Provided that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is due:
  - 1. To any preference, priority, or allocation order duly issued by the State or Federal government;
  - 2. To unforeseeable cause beyond the control and without the fault or negligence of the Contractor including, but not limited to, Acts of God or of the public enemy, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; and
  - 3. To any delays of subcontractors occasioned by any of the causes specified in Article 1.05, Paragraph C, Items 1 and 2.
- D. Provided, further, that the Contractor shall, within ten (10) days from the beginning of such delay, notify the Owner in writing of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

#### 1.06 PROSECUTION OF THE WORK

- A. The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the Work to full completion in the manner and time required by the Contract, Drawings, and Specifications.

- B. All workers shall have sufficient skill and experience to properly perform the work assigned to them. Workers engaged in special work or skilled work shall have sufficient experience in such work and in the operation of the equipment required to perform the work satisfactorily.
- C. Any person employed by the Contractor or by any subcontractor who, in the opinion of the Engineer, does not perform his Work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or subcontractor employing such person and shall not be employed again in any portion of the Work without the approval of the Engineer.
- D. Should the Contractor fail to remove such person or persons or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until compliance with such orders.
- E. The Contractor shall comply with all federal, state, and local laws, regulations, and ordinances governing the employment of labor and the payment of wages thereto for Work performed under this Contract.
- F. The Contractor shall furnish such equipment as is considered necessary for the prosecution of the Work in an acceptable manner and at a satisfactory rate of progress. All equipment which is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as to meet requirements of the Work and to produce a satisfactory quality of Work. Equipment used on any portion of the Work shall be such that no injury to previously completed Work, adjacent property, or existing facilities shall result from its use. All equipment, tools, and machinery shall be subject to the approval of the Engineer.
- G. When methods and equipment to be used by the Contractor in accomplishing the Work are not prescribed in the Contract, the Contractor is free to use any methods or equipment that he demonstrates, to the satisfaction of the Engineer, shall accomplish the Work in conformity with the requirements of the Contract, Drawings, and Specifications.
- H. When the Contract specifies the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Engineer. If definite work methods are not prescribed in the Contract or if the Contractor desires to use a method or type of equipment other than specified in the Contract, he may request authority from the Engineer to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed and the reasons for desiring to make the change. If approval is given, it shall be on the condition that the Contractor shall be fully responsible for producing Work in conformity with the Contract requirements and making demonstrations which are satisfactory to the Engineer. If, after trial use of the substituted methods or equipment, the Engineer determines that the Work produced does not meet Contract requirements, the Contractor shall discontinue the use of the substitute method or equipment and shall complete the remaining Work with the specified methods

and equipment. The Contractor shall remove any deficient Work and replace it with Work of specified quality or take such other corrective action as the Engineer may direct. No change shall be made in basis of payment for the Contract items involved nor in Contract Time as a result of authorizing a change in methods or equipment under this Section.

#### 1.07 TEMPORARY SUSPENSION OF THE WORK

- A. The Engineer shall have the authority to suspend the Work wholly or in part for such period or periods of time as he may deem necessary due to unsuitable weather or such other reason as determined by the Owner to be in the best interest of the County. The Contractor shall proceed with the Work promptly when notified by the Engineer to resume operations.
- B. The Contractor shall not suspend Work without written authority from the Engineer.

#### 1.08 TIME OF WORK

- A. The normal time of work for this Contract is limited to 40 hours per week, 8 hours per day, and shall generally be between the hours of 7:00 a.m. and 6:00 p.m., Monday through Friday.
- B. Unless otherwise specifically permitted, all work that would be subject to damage shall be stopped during inclement, stormy, or freezing weather. Only such work as will not suffer injury to workmanship or materials will be permitted. Contractor shall carefully protect his work against damage or injury from the weather, and when work is permitted during freezing weather, he shall provide and maintain approved facilities for heating the materials and for protecting the finished work.

#### 1.09 WEEKEND, HOLIDAY, AND NIGHT WORK

- A. Work at night or on Saturdays, Sundays, trade-recognized legal holidays, or Owner's governmental-recognized legal holidays shall not be permitted except in case of emergency, and then only to such an extent as is absolutely necessary and with the written permission of the Owner.
- B. Work at night or on weekends or holidays may be required when special connections to existing systems are to be made, when new facilities are to be placed in service, when existing facilities are to be taken out of service, when it is more advantageous to the utilities involved, or when an emergency arises in the Work schedule. In such cases, the permission of the Owner shall be received well in advance of the Work schedule, and arrangements shall be made for prosecution of the Work with all safety and minimum inconvenience to the public. All work necessary to be performed at night or on weekends or holidays shall be so performed without additional expense to the Owner.

1. Contractor's Notification of the Public for Night Work: For any work that the Owner specifically permits the Contractor to perform at night, the Contractor shall notify all property owners which could potentially be affected between 24 hours and 48 hours prior to beginning the work at night. This notification shall be accomplished by the Contractor distributing a door hanger, previously approved by the Owner, describing the work to be performed to adjacent residences and businesses that may be impacted. Door hangers shall be double-sided with the notification information in the English language on one side and in the Spanish language on the reverse side.
- C. The Contractor may request permission from the Owner to work beyond the hours specified in Article 1.08, Paragraph A, or on weekends or holidays for his/her convenience provided that the extended work hours are approved at least 48 hours in advance in writing by the Owner and all costs incurred by the Owner and/or Engineer for additional engineering and inspection services performed by their inspectors and/or other personnel shall be borne by the Contractor in accordance with Section 01010 – Summary of Work and Section 00820 – Special Conditions.
  1. The Owner shall have the right to deduct sufficient sums from monies due the Contractor to cover these additional engineering and inspection costs.
- D. If it shall become imperative to perform work at night, the Owner and Engineer shall be informed a reasonable time in advance of the beginning of such work. Temporary lighting and all other necessary facilities for performing and inspecting the work shall be provided and maintained by the Contractor.
- E. Maintenance work normally required for protection of persons, the Work, or property shall be permitted at anytime.

#### 1.10 CONTRACT TIME

- A. The number of calendar days allowed for completion of the Work shall be stated in the Proposal and Contract and shall be known as the Contract Time.
- B. Should the Contract Time require extension for reasons beyond the Contractor's control, it shall be adjusted as follows:
  1. Contract Time shall consist of the number of calendar days stated in the Contract counting from the effective date of the Notice to Proceed and including all Saturdays, Sundays, holidays, and non-work days. All calendar days elapsing between the effective dates of the Engineer's orders to suspend and resume all Work due to causes not the fault of the Contractor shall be excluded.
  2. When the Contract Time is a specified completion date, it shall be the date by which all Contract Work shall be fully completed. If the Contractor finds it



impossible, for reasons beyond his control, to complete the Work within the Contract Time as specified or as extended in accordance with the provisions of this Section, he may, at any time prior to the expiration of the Contract Time as extended, make a written request to the Engineer for an extension of time, setting forth the reasons which he believes shall justify the granting of his request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the Work was delayed because of conditions beyond the control of the Contractor, he may recommend that the Owner extend the time for completion in such amount as the conditions justify. The extended time for completion shall then be in full force and effect, the same as though it were the original time for completion.

3. The Director of Environmental Services may issue a time extension provided that the time extension does not change the Contract amount.

#### 1.11 FAILURE TO COMPLETE WORK ON TIME AND LIQUIDATED DAMAGES

- A. In case of delay in completion of the Work and in case the Owner does not terminate the Contractor's right to proceed, then the actual damages caused by the delay shall be impossible to accurately determine, in which event the Contractor shall pay to the Owner in lieu thereof, as fixed, agreed, and liquidated damages, an amount as stipulated in the Special Conditions for each calendar day of delay until the Work has been completed and accepted, and the Contractor and his sureties shall be liable to the Owner for the total amount thereof.
- B. The Contractor is hereby advised that time is of the essence and that the Contract completion date shall be strictly observed. **LIQUIDATED DAMAGES WILL BE ASSESSED IF THE CONTRACT TIME IS EXCEEDED.** The Contractor may apply for an extension of time in accordance with provisions of the Contract. Such an extension of time must be approved prior to the Contract completion date to avoid imposition of liquidated damages. At the Owner's option, liquidated damages due may be taken from funds being retained.

#### 1.12 ANNULMENT OF CONTRACT

- A. The Contract may be annulled by the Owner for any of the following reasons:
  1. Substantial evidence and belief that the progress being made by the Contractor is insufficient to complete the Work within the specified time
  2. Deliberate failure on the part of the Contractor to proceed with the construction of the Work when so instructed by the Engineer or to observe any requirement of these Specifications

3. Failure on the part of the Contractor to promptly make good any defects in materials or construction that may be called to his attention by the Engineer
  4. In case the Contractor becomes insolvent or is declared bankrupt, or allows any final legal judgment to stand against him unsatisfied, or shall make an assignment for the benefit of his creditors
- B. Before the Contract is annulled, the Contractor and his surety shall first be notified in writing by the Owner of the conditions which make annulment of the Contract imminent. Fifteen (15) days after notice is given, if no effective effort has been made by the Contractor or his surety to correct the conditions for which complaint is made, the Owner may declare the Contract annulled, and shall notify the Contractor and his surety accordingly.
- C. Upon receipt of notice from the Owner that the Contract has been annulled, the Contractor shall immediately discontinue all operations, safely secure all items of the Work, and remove his equipment. The Owner may then proceed with the construction in any lawful manner that it may elect until it is finally completed. When thus finally completed, the total cost of the Work (including all previous payments made to the Contractor) shall be computed and if this total cost is greater than the Contract price, the difference shall be paid to the Owner by the Contractor or his surety.

#### 1.13 TERMINATION FOR NATIONAL EMERGENCIES

- A. The Owner shall terminate the Contract or portion thereof by written notice when the Contractor is prevented from proceeding with the construction Contract as a direct result of an Executive Order of the President with respect to the prosecution of war or in the interest of national defense.
- B. When the Contract, or any portion thereof, is terminated before completion of all items of Work in the Contract, payment shall be made for the actual number of units or items of Work completed at the Contract price or as mutually agreed for items of Work partially completed or not started. No claims for loss of anticipated profits shall be considered.
- C. Reimbursement for organization of the Work, other overhead expenses (when not otherwise included in the Contract), and moving equipment and materials to and from the job shall be considered, the intent being that an equitable settlement shall be made with the Contractor.
- D. Acceptable materials, obtained or ordered by the Contractor for the Work but not incorporated in the Work, shall, at the option of the Contractor, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Engineer.

- E. Termination of the Contract or a portion thereof shall neither relieve the Contractor of his responsibilities for the completed Work, nor shall it relieve his surety of its obligation for and concerning any just claim arising out of the Work performed.

#### 1.14 NOTICE AND SERVICE THEREOF

- A. All notices, demands, requests, instructions, approvals, and claims shall be in writing.
- B. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the local office of the Contractor, or by personal service upon the representative of the Contractor in local charge of the Work, or by depositing in the United States mail in a sealed envelope with sufficient postage prepaid, addressed to such Contractor at the address stated by the Contractor in the Proposal, or at the local address used by the Contractor in the Proposal, or at the local address used by the Contractor during the process of the Work, or at such other address as the Contractor may from time to time designate to the Owner in writing. Any notice to or demand upon the Contractor shall also be sufficiently given if transmitted to the Contractor through electronic facsimile.
- C. Any notice to or demand upon the Owner shall be sufficiently given if delivered to the Owner or deposited in the United States mail in a sealed envelope with sufficient postage prepaid, or delivered with charges prepaid to said Owner or to authorized representatives of the Owner, or to such address as the Owner may subsequently specify in writing to the Contractor for such purposes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

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SECTION 01 1027  
APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Format
- B. Preparation of Applications
- C. Submittal Procedures
- D. Substantiating Data
- E. Payment Terms

1.02 RELATED SECTIONS

- A. Section 00500 – Contract
- B. Section 00700 – General Conditions
- C. Section 01010 – Summary of Work
- D. Section 01015 – Prosecution and Progress
- E. Section 01025 – Measurement and Payment
- F. Section 01028 – Change Order Procedures
- G. Section 01310 – Progress Schedules
- H. Section 01700 – Contract Closeout
- I. Section 01720 – Project Record Documents

1.03 FORMAT

- A. The Contractor shall use the form provided by the Engineer or approved equal. Form shall have a column, for each item, listing: item number, description of work, scheduled value, previous applications, work in-place, authorized Change Orders, total completed to date of application, percent of completion, balance to finish, and retainage.

#### 1.04 PREPARATION OF APPLICATIONS

- A. The Contractor shall present required information on electronic media printout.
- B. The Contractor shall execute certification by signature of authorized officer.
- C. This form to be executed shall serve as the source of the approved Schedule of Values prior to any Application for Payment.
- D. The Contractor shall list each authorized Change Order as an extension on the continuation sheet(s), including Change Order number and dollar amount as for an original item of work.
- E. The Contractor shall prepare final Application for Payment as specified in Section 01700 – Contract Closeout.

#### 1.05 SUBMITTAL PROCEDURES

- A. The Contractor shall submit five (5) signed copies of each Application for Payment, which shall include all required substantiating information (supporting invoices, etc.) as necessary.
- B. The Contractor shall submit an updated construction Progress Schedule in accordance with Section 01310 – Progress Schedules with each Application for Payment.
- C. The Contractor shall submit at intervals stipulated in the Contract.
- D. The Contractor shall sequentially number Applications for Payment.
- E. When the Engineer determines that the Application for Payment is proper and correct, he will transmit a Certificate for Payment to the Owner with a copy to the Contractor.
- F. Engineer and Owner will not approve any Application for Payment if the Contractor, at the time of review, either has not:
  - 1. Satisfactorily maintained a day-to-day “as-built” record of the construction progress on a full-size set of Contract Drawings in accordance with Section 01720 – Project Record Documents
  - 2. Adequately cleaned and/or restored the site in accordance with Section 01010 – Summary of Work
- G. Engineer and Owner will not approve the first Application for Payment if the Contractor has not submitted an acceptable construction video in accordance with Section 01010 –

Summary of Work.

1.06 SUBSTANTIATING DATA

- A. When the Engineer requires substantiating information, the Contractor shall submit data justifying quantities or dollar amounts in question.

1.07 PAYMENT TERMS

- A. The Owner shall make payment to the Contractor within fifteen (15) days upon receipt of the payment request by the Finance Department.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01 1028  
CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Submittals
- B. Change Order Procedures
- C. Field Directive
- D. Stipulated Price (Lump Sum) Change Order
- E. Unit Price Change Order
- F. Time and Material Change Order
- G. Documentation of Change in Contract Price and Contract Time
- H. Execution of Change Orders
- I. Correlation of Contractor Submittals

1.02 RELATED SECTIONS

- A. Section 00500 – Contract
- B. Section 00700 – General Conditions
- C. Section 01025 – Measurement and Payment
- D. Section 01027 – Applications for Payment
- E. Section 01310 – Progress Schedules
- F. Section 01700 – Contract Closeout
- G. Section 01720 – Project Record Documents

1.03 SUBMITTALS

- A. The Contractor shall submit the name of the individual authorized to receive Change Order

Documents and be responsible for informing others in the Contractor's employ.

#### 1.04 CHANGE ORDER PROCEDURES

- A. Change Orders shall be issued for any item of work defined as "Extra Work" that is to be performed by the Contractor and for any significant increase or decrease in quantities included in the Contract. Change Orders shall be on a form prescribed by the Owner and shall be subject to approval by the Owner.
- B. The Engineer shall advise the Contractor of minor changes in the Work, which, in his judgment, do not involve an adjustment of Contract Price or Contract Time as authorized by the General Conditions, by issuing Supplemental Instructions.
- C. The Engineer may issue a proposal request, request for change, or notice of change which includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in contract time for executing the change (with a stipulation of any overtime work required), and the period of time during which the requested price will be considered valid. The Contractor shall prepare and submit an estimate within 10 days.
- D. The Contractor may propose a change by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change and the effect on the Contract price and Contract Time with full documentation.

#### 1.05 FIELD DIRECTIVE

- A. The Engineer may issue a field directive, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
- B. The field directive shall describe changes in the Work and shall designate the method of determining any change in Contract Sum/Price or Contract Time.
- C. The Contractor shall promptly execute the change in Work upon receipt of the field directive.
- D. When field directives require an extension in Contract Time, the time extension shall apply only to that work related to the field directive and shall not be utilized by the Contractor for completion of original work items.

#### 1.06 STIPULATED PRICE (LUMP SUM) CHANGE ORDER

- A. Change Orders shall be based on proposal request, notice of change or request for change, and Contractor's fixed price quotations, or Contractor's request for a Change Order as approved by the Engineer.

#### 1.07 UNIT PRICE CHANGE ORDER

- A. For predetermined unit prices and quantities, the Change Order shall be executed on a fixed unit price basis.
- B. For unit costs or quantities of units of work which are not covered in the Contract, the Contractor shall execute the Work under a field directive.
- C. Changes in Contract Price or Contract Time shall be computed as specified for time and material Change Order.
- D. If any work under such a unit price item is not performed, if only a small percentage of the quantity listed is used, or if the quantity listed is exceeded, the Contractor shall not make any claims for not using said item, for exceeding the stated quantity, or for higher unit prices because of the quantity used or small or high percentage.

#### 1.08 TIME AND MATERIAL CHANGE ORDER

- A. After completion of a change, the Contractor shall submit an itemized account and supporting data within time limits indicated in the conditions of the Contract.
- B. The Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.
- C. The Contractor shall maintain detailed records of Work done on time and material basis.
- D. The Contractor shall provide full information required for evaluation of proposed changes to substantiate costs for changes in the Work.

#### 1.09 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

- A. The Contractor shall maintain detailed records of work done on a time and material basis and provide full information required for evaluation of proposed changes and to substantiate costs of changes in the Work.
- B. The Contractor shall document each quotation for a change in cost or time with sufficient and complete data to allow evaluation of the quotation.
- C. When requested by the Engineer, the Contractor shall provide additional data to support calculations including:
  - 1. Quantities of products, labor, and equipment
  - 2. Taxes, insurance, and bonds
  - 3. Overhead and profit

4. Justification for any change in Contract Time
  5. Credits for deletions from the Contract shall be similarly documented.
- D. The Contractor shall support each claim for additional costs and for work done on time and material basis with additional information including:
1. Origin and date of claim
  2. Dates and times work was performed and by whom
  3. Time records and wage rates paid
  4. Invoices and receipts for products, equipment, and subcontractors (similarly documented)
- E. The Contractor shall support each claim for additional Contract Time with a detailed time logic analysis in accordance with the requirements of Section 01310 – Progress Schedules.

#### 1.10 EXECUTION OF CHANGE ORDERS

- A. The Engineer will issue Change Orders for signatures of parties.

#### 1.11 CORRELATION OF CONTRACTOR SUBMITTALS

- A. The Contractor shall promptly revise Schedule of Values and Application for Payment Forms to record each authorized Change Order as a separate line item and adjust the Contract Price.
- B. Before resubmitting them, the Contractor shall promptly revise Progress Schedules to reflect any change in Contract Time and revise sub-schedules to adjust time for other items of Work affected by the change.
- C. The Contractor shall promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01 1040  
COORDINATION

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall allow the Owner or his agents, and other project contractors or their agents, to enter upon the work for the purpose of constructing, operating, maintaining, removing, repairing, altering, or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances which may be required to be installed at or in the work. The Contractor shall cooperate with all aforesaid parties and shall allow reasonable provisions for the prosecution of any other work by the Owner, or others, to be done in connection with his work, or in connection with normal use of the facilities.
- B. The Contractor shall cooperate fully with the Owner, the Engineer, and all other contractors employed on the work, to effect proper coordination and progress to complete the project on schedule and in proper sequence. Insofar as possible, decisions of all kinds required from the Engineer shall be anticipated by the Contractor to provide ample time for inspection or the preparation of instructions.
- C. The Contractor shall assume full responsibility for the correlation of all parts of his Work with that of other contractors. The Contractor's superintendent shall correlate all Work with other contractors in the laying out of Work. The Contractor shall lay out his own Work in accordance with the Drawings, Specifications, and instructions of latest issue and with due regard to the work of other contractors.
- D. Periodic coordinating conferences shall be held per Section 01200 – Project Meetings, of these Contract Documents.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01 1090  
REFERENCE STANDARDS

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. Wherever reference is made to any published standards, codes, or standard specifications, it shall mean the latest standard code, specification, or tentative specification of the technical society, organization, or body referred to, which is in effect at the date of invitation for Bids.
- B. All materials, products, and procedures used or incorporated in the work shall be in strict conformance with applicable codes, regulations, specifications, and standards.
- C. A partial listing of codes, regulations, specifications, and standards includes the following:

The Aluminum Association (AA)

American Architectural Manufacturers Association (AAMA)

American Concrete Institute (ACI)

American Hot Dip Galvanizers Association (AHDGA)

American Institute of Steel Construction (AISC)

American Iron and Steel Institute (AISI)

American National Standards Institute (ANSI)

American Society of Civil Engineers (ASCE)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

American Society of Mechanical Engineers (ASME)

American Society for Testing and Materials (ASTM)

American Standards Association (ASA)

American Welding Society (AWS)

American Wood Protection Association (AWPA)

Factory Mutual (FM)

Institute of Electrical and Electronics Engineers (IEEE)

National and Local Fire Codes

National Electrical Code (NEC)

National Electrical Manufacturers Association (NEMA)

National Electrical Safety Code (NESC)

National Electrical Testing Association (NETA)

National Fire Protection Association (NFPA)

Regulations and Standards of the Occupational Safety and Health Act (OSHA)

Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)

Underwriters Laboratories Inc. (UL)

- D. Contractor shall, when required, furnish evidence satisfactory to the Engineer that materials and methods are in accordance with such standards where so specified.
- E. In the event any questions arise as to the application of these standards or codes, copies shall be supplied on-site by the Contractor.

## PART 2 - PRODUCTS

(NOT USED)

## PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -



SECTION 01 1200  
PROJECT MEETINGS

PART 1 - GENERAL

1.01 PRE-BID CONFERENCE

- A. A Pre-Bid Conference will be held at the time and place to be designated in the Notice to Bidders.
- B. The Engineer will be available to discuss the project and answer pertinent questions. No oral interpretation will be made as to the meaning of the Documents. Interpretation, if deemed necessary by the Engineer, will be in the form of an Addendum to the Contract Documents.

1.02 PRECONSTRUCTION MEETING

- A. A Preconstruction Meeting will be held after Award of Contract, but prior to starting work at the site.
- B. Attendance:
  - 1. Owner
  - 2. Engineer
  - 3. Contractor
  - 4. Major subcontractors
  - 5. Safety representative
  - 6. Representatives of governmental or other regulatory agencies.
- C. Minimum Agenda:
  - 1. Tentative construction schedule
  - 2. Critical work sequencing
  - 3. Designation of responsible personnel
  - 4. Processing of Field Decisions and Change Orders
  - 5. Adequacy of distribution of Contract Documents

6. Submittal of Shop Drawings and samples
7. Procedures for maintaining record documents
8. Use of site and Owner's requirements
9. Major equipment deliveries and priorities
10. Safety and first aid procedures
11. Security procedures
12. Housekeeping procedures
13. Processing of Partial Payment Requests
14. General regard for community relations

#### 1.03 PROGRESS MEETING

- A. Progress Meetings will be held monthly at a location as selected by the Owner during the performance of the work of this Contract. Additional meetings may be called as progress of work dictates.
- B. Engineer will preside at meetings and record minutes of proceedings and decisions. Engineer will distribute copies of minutes to participants.
- C. Attendance:
  1. Engineer
  2. Contractor
  3. Major subcontractors, only with Engineer's approval or request, as pertinent to the agenda
- D. Minimum Agenda:
  1. Review and approve minutes of previous meetings.
  2. Review progress of Work since last meeting.
  3. Review proposed 30-60 day construction schedule.

4. Note and identify problems which impede planned progress.
5. Develop corrective measures and procedures to regain planned schedule.
6. Revise construction schedule as indicated and plan progress during next work period.
7. Maintaining of quality and work standards.
8. Complete other current business.
9. Schedule next progress meeting.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

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SECTION 01 1300 – SUBMITTALS

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 and form a part of this Section.

1.2 IDENTIFICATION

- A. The term “submittals” shall mean shop drawings, if any, manufacturer’s drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer’s review for conformance with the design concept and compliance with the Contract Documents.
- B. Shop Drawings and samples shall be properly identified by project name, description or names of equipment, materials, and items and complete identification of location at which materials or equipment are to be installed.

1.3 SHOP DRAWINGS

- A. Submit Shop Drawings for all items called for in the detail Specifications. Submit in PDF format or a minimum of five (5) black-line prints of each Drawing, unless otherwise specified in the detail Specifications. Two (2) prints each Drawing will be retained by the Architect, the remaining prints will be returned to the Contractor. Where submittals cannot be submitted electronically such as samples, colors selection etc. and as agreed to by the Architect, they are to be transmitted with all the correct information required. Work installed incorrectly from any Shop Drawing shall be removed and corrected at no change in contract price.
- B. Approval will be for general design only and will not relieve Contractor from responsibility for errors or omissions in Shop Drawings, even though same were not indicated when approved.
- C. In lieu of Shop Drawing prints, Contractor may at his option, submit one (1) reproducible transparency and one black-line print of each drawing until final approval is obtained, at which time five (5) corrected copies shall be submitted.
- D. In checking Shop Drawings, Architect shall not be required to check dimensions, quantities, electrical characteristics, specific capacities, or coordination with other trades, these being the responsibility of the Contractor. Contractor shall attest, either in writing by stamp, or signature, that all Shop Drawings submitted for approval have been checked for compliance with the Drawings and Specifications prior to submission to the Architect; otherwise they will be returned unchecked.

- E. Approval of Shop Drawings shall be for general design only and will not relieve Contractor from responsibility for errors and omissions. Approvals shall not be construed as approved departure from Contract Drawings and Specifications.
- F. No Shop Drawings shall be submitted directly to the Architect from a manufacturer, jobber, or subcontractor. All submittals shall be through the General Contractor.

1.4 SAMPLES

- A. Furnish all samples called for in the detail Specifications and such other samples as the Architect may direct.
- B. Samples for color selection shall include a complete selection of available colors and finishes. After Architect has selected colors and finishes, submit four (4) additional samples of the selected colors and finishes which will become a master color guide to be used throughout the progress of the Work.

1.5 SUBMISSION

- A. Submission of Shop Drawings and samples shall be by a transmittal letter, in duplicate, containing project name, Contractor's name, subcontractor's and/or vendor's name, a complete listing of Drawings and samples.
- B. Samples of the selection of color and finishes shall be made in one submittal. No color selections will be made until samples on all items requiring the color selection have been submitted.
- C. The Contractor shall schedule submittals well in advance of the need for the material or equipment for construction and shall allow time to make delivery of material or equipment after submittal is approved.
- D. The Contractor shall develop a submittal schedule that allows sufficient time for initial review, correction, resubmission, and final review of all submittals. The Architect shall review and return submittals to the Contractor as expeditiously as possible but the amount of time required for review will vary depending on the complexity and quantity of data submitted. In no case will a submittal schedule be acceptable which allows less than 14 days for initial review by the Architect. The time for review shall in no way be justification for delays or additional compensation to the Contractor.

END OF SECTION 01 1300

SECTION 01 1310  
PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor's approach to prosecution of the Work shall be disclosed to the Engineer by submission of computerized, cost-and-resource loaded CPM Progress Schedules as required in this Section. These requirements are in addition to, and not in limitation of, those imposed elsewhere in the Specifications.
  
- B. A Pay Activity, as opposed to a CPM Activity, is an Activity used to simplify cost-loading of the Progress Schedule. When used, Pay Activities shall be loaded with the cost of Work that is included, at no cost, in related (generally, concurrent) CPM Activities. Pay Activities shall not control the rate of progress; however, their start and finish dates shall be consistent with those of their related CPM Activities to ensure accurate Early Date and Late Date payment plots. References to CPM (Critical Path Method) shall be CPM standards consistent with this Section.

1.02 PROGRESS SCHEDULE SUBMITTALS

- A. Progress Schedule Submittals shall include a disk with the Contractor's files, a narrative and seven (7) copies of the following reports, schedules, and plots, all in formats, sorts, and sequences acceptable to the Engineer.
  - 1. Detailed Cost Breakdown
  - 2. Activity Reports
  - 3. Equipment and Material Order Schedule
  - 4. Short Term Schedule
  - 5. Logic Diagram
  - 6. Resource Plots
  
- B. The Contractor shall uniquely identify each Progress Schedule Submittal. Resubmissions shall be identified by reusing the corresponding Submittal number and the letter A, B, etc., and shall fully address all the Engineer's Comments and objections.
  
- C. No Progress Schedule review by the Engineer shall relieve the Contractor from the responsibility to: (1) comply with the Contract Times and any sequences of Work indicated in or required by the Contract Documents, and (2) complete omitted Work within the Contract

Times. Nor will any such Progress Schedule review by the Engineer lead to approval of, or consent to, any variation from the Contract Documents, except as the Engineer may otherwise approve or consent to individual variations by means of specific, separate notations in writing.

- D. The Contractor shall submit the Preliminary Progress Schedule as stated in the Instruction to Bidders. This shall constitute the Rev. 0 Progress Schedule and shall meet all the submittal requirements specified herein.
- E. Once the Rev. 0 Progress Schedule is approved, it shall become the Rev. 0 Record Schedule or As-Planned Schedule, and shall be used for Progress Payment submittals until the Record Schedule is revised by subsequent Progress Schedules.
- F. The Contractor shall not submit Progress Payments Requests until the Rev. 0 Progress Schedule is approved.
- G. The Contractor shall submit monthly Progress Schedule revisions (Rev.1, Rev. 2, etc.) with each monthly Progress Payment Request. Updated Progress Schedules shall be submitted a minimum of 7 days in advance of each construction progress meeting along with a detailed 30 day look ahead schedule.
- H. Each monthly Progress Schedule shall be intended to document those agreements reached between the Owner and the Contractor concerning the Progress Schedule by incorporating revisions in activities, logic ties, and so forth, agreed to by the Owner upon completion of the Engineer's review of any preceding Proposal Schedule submittals made by the Contractor.
- I. The Contractor shall submit Proposal Schedules, which shall support proposals or claims for changes in Contract Price or Contract Time, schedule recovery plans and other Contractor-initiated Progress Schedule adjustments. A Proposal Schedule Submittal shall include all the reports, schedules, plots, etc. specified for a Progress Schedule Submittal.

### 1.03 DELAY PROVISIONS

- A. The Contractor shall promptly take appropriate action to recover schedule whenever the Contractor anticipates, or any Progress Schedule Submittal demonstrates, and required CPM Activity to slip, due to acts or omissions within the control of the Contractor, by fifteen (15) or more days beyond any Target Time or Contract Time. If the Contractor is not responsible for such schedule slippage, the Contractor shall give prompt written notice of a delay justifying a Contract Time extension, and follow such notice by taking prompt appropriate action nonetheless, if so directed by the Engineer.
  - 1. If schedule recovery is required, the Contractor shall enclose with the next Progress Schedule Submittal a schedule recovery plan consisting of (1) a narrative describing the cause of schedule slippage and the actions taken to recover schedule within the shortest reasonable time, and (2) a Proposal Schedule with the corresponding revisions in Activities and logic ties and other adjustments. Appropriate schedule recovery actions may include assignment of additional labor, subcontractors or construction equipment; Work during other than normal working hours; resequencing of the Work;



expediting of Submittals and deliveries; and any combination of any of these or other similar actions. Activity shortening and overlapping shall be explained as to their basis (and be supported by increases in resources).

2. If the Contractor believes that an increase in Contract Time is justified, any such extension in Contract Time and associated increase in Contract Price will not be evaluated, unless the following requisites are met: (1) the Contractor, using the procedures in this Section, demonstrates that conditions justifying extensions in Contract Time or increases in Contract Price, or both, have arisen, and (2) the Contractor's analysis is verifiable by an independent, objective evaluation by the Engineer, using the electronic files and data furnished by the Contractor.
- B. The Contractor's failure, refusal, or neglect to take appropriate schedule recovery action or, in the alternative, give written notice of a delay, and, in either case, to follow up with a timely Proposal Schedule shall be reasonable evidence that the Contractor is not prosecuting the Work with due diligence. Any such Contractor failure, refusal, or neglect shall give sufficient basis to the Owner, with the Engineer's advice, to elect any of the following: (1) demand adequate, written assurance of due performance, (2) withhold liquidated damages, and (3) in the Owner's sole discretion, direct alternate schedule recovery actions.
  - C. Once the As-Planned Schedule is established, the Engineer will select Progress Points. Progress Points will be assigned Target Times using the Late Dates in the Rev. 0 Record Schedule (As-Planned Schedule). As the Record Schedule is revised, Target Times shall be revised to reflect the Late Dates. Target Times shall be interim, Contractor-imposed deadlines; however, Target Times shall not be Contract Times.
  - D. In the event the Engineer is unable to approve any Progress Schedule Revision, both the Engineer and Contractor shall be required to use the Rev. 0 Record Schedule and Rev. 0 Target Times, and not any disputed Record Schedule, to resolve issues affecting Contract Time and Contract Price, as follows: (1) The As-Planned Schedule will be updated through several Progress Payment closing dates, and (2) actual dates for the Progress Points shall be compared with the Rev. 0 Target Times, and any slippage, by trade or equivalent Contract phase, shall be correspondingly explained.
1. Any such updating of the As-Planned Schedule through a closing date (1) shall purposely exclude all Contractor-initiated revisions affecting Work after the closing date, even if such revisions were incorporated into any Revision Submittal, but (2) shall include adjustments in Activities and logic tie changes covering changes and delays that were consented to by the Owner before the closing date. Adjustments in Activities and logic ties for Contractor-initiated revisions (including schedule recovery plans) shall be incorporated only in the update for the period when the Work reflected by those Contractor-initiated revisions actually took place.
- 1.04 PROGRESS SCHEDULE SOFTWARE
- A. The Progress Schedule software shall be current version of Primavera Project Planner® that runs on IBM PC compatible equipment and is capable of: (1) processing and plotting the

required Progress Schedule information, and (2) creating data bases accessible by other software.

#### 1.05 MEASUREMENT AND PAYMENT

- A. The Contractor represents to have included in the Contract Price all costs for Work under this Section. Payment for Work performed under this Section will be made as part of those payments made on in-progress and completed Detailed Cost Breakdown pay items, or using the Earned Values for Progress Schedule Submittal pay items, if any such pay items are established.

### PART 2 - PRODUCTS

#### 2.01 PROGRESS SCHEDULE; NARRATIVE

- A. The Progress Schedule shall detail CPM Activities and logic ties to the extent required to show the Contractor's overall approach to the Work.
- B. The Progress Schedule shall clearly define the prosecution of the Work from Notice to Proceed to Final Acceptance by using separate CPM Activities for, but not limited to: construction/installation; permitting (by the Contractor and Owner); submittal preparation; submittal review and return; submittal resubmissions and submittal re-reviews, as advisable; deliveries to the site or storage; Owner-furnished items; interfaces with other work (other contractors, public utilities, etc.); testing and Punch List; Owner training; and start-up.
- C. CPM Activity durations shall equate to the days required to complete the associated work. Activities shall not combine: (a) separate items of Unit Price or lump sum work; (b) distinct classes of work (e.g., CSI Divisions or equivalent); (c) work in separate areas, structures or facilities and, if requested by the Engineer, work in separate locations or elevations within an area, structure or facility; or (d) rough-in and finish work.
- D. Installation CPM Activities shall last from fifteen (15) to forty-five (45) days, unless a shorter duration results from the rules in Article 2.01, Paragraph C. Unless longer review times are specified in other Specifications, Submittal review CPM Activities also shall last a minimum of fifteen (15) working days as determined by the Engineer. Submittal, delivery, and start-up CPM Activities may combine materials and equipment in the same class of work, based on the detail of related installation CPM Activities.
- E. Activities shall be assigned consistent descriptions, codes, and sort codes. Sort code schemes shall: be subject to the Engineer's prior consent; indicate whether the Contractor (or a subcontractor or Supplier), Engineer, or Owner the lead; distinguish CPM Activities from pay Activities; and group Activities by unit price, area, change, Submittals, deliveries and other such schemes. Constraint dates shall be explained as to bases.
- F. The narrative shall list the CPM Activities on each Critical Path and compare Early and Late

Dates for CPM Activities designating Contract Times and Target Times. The narrative shall also recap progress and days gained or lost vs. the current Record Schedule, describe changes in resources to be used on remaining Work and identify delays, their extent and causes. The narrative shall also itemize changes in Activities, logic ties and DCB pay items by each change, recovery plan and Contractor-initiated revision.

## 2.02 REPORTS; SCHEDULES; PLOTS

- A. Activity Reports shall include CPM Activity code, description, duration, calendar, Early and Late Dates (calendar dates), Total Float, labor manhours, and sort codes. The Late Finish Date (or the Early Start Date) of any CPM Activity highlighting a Contract Time (or commencement of all or any part of the Work) shall equal the corresponding Contract Time (or Contract date). In addition, for precedence-based Progress Schedules, Activity Reports shall show, for each CPM Activity, all preceding and succeeding logic ties (lead/lag and lead times) or attach a separate report combining such Activity and logic tie data.
- B. Equipment and Material Order Schedule shall be submitted in accordance with Section 01300 – Submittals and shall be in tabular form with appropriate spaces to include the following information for principal items of equipment and materials:
1. Dates on which Shop Drawings are requested and received from the manufacturer.
  2. Dates on which certification is received from the manufacturer and transmitted to the Engineer.
  3. Dates on which Shop Drawings are submitted to the Engineer and returned by the Engineer for revision.
  4. Dates on which Shop Drawings are revised by manufacturer and resubmitted to the Engineer.
  5. Date on which Shop Drawings are returned by Engineer annotated either "Furnish as Submitted" or "Furnish as Corrected".
  6. Date on which accepted Shop Drawings are transmitted to manufacturer.
  7. Date of manufacturer's scheduled shop test.
  8. Date of manufacturer's scheduled delivery.
  9. Date on which delivery is actually made.
- C. The Detailed Cost Breakdown (DCB) shall divide the Work into pay items by significant Sections of the Specifications within areas, structures, and facilities, or vice versa. If requested by the Engineer in writing, there shall be separate DCB reports for self-performed Work and the Work of each Subcontractor.

1. Pay Activities or the features of the software shall be used to ensure that any total CPM Activity Value or, if appropriate, that any Activity labor, Subcontract, etc. Values roll up to only one DCB pay item. Once the Rev. 0 DCB is approved, the Contractor shall not modify any DCB pay item or Activity Value, unless otherwise authorized by the Engineer in writing.
- D. Short-Term Schedules shall subdivide CPM Activities into detailed tasks and cover the prior two (2) weeks and the next four (4) weeks. Each installation task shall be cross-referenced to a CPM Activity and shall not combine the Work for more than one crew. Submittals shall segregate preparation from review and shall not combine items furnished by separate Suppliers.
- E. Logic Diagrams shall be arrow or precedence and, once the Engineer has designated time-scales, shall be plotted on a time- scaled calendar, on 22-inch x 34-inch sheets. Logic Diagrams shall identify the Contract Times and Critical Path(s). CPM Activities shall be shown on the Early Dates, and Total Floats shall be noted beside the CPM Activities. Logic connectors, whether on the same sheet or not, shall identify predecessors and successors.
- F. Resource Plots shall graph monthly (or weekly, if chosen by the Engineer) and cumulative payments and manpower, using current Early Dates and Late Dates and, when requested by the Engineer, comparing As-Planned Schedule and current Early Dates. The specific trades shall be chosen by the Engineer.

### PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01 1370  
SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 REQUIREMENT INCLUDED:

- A. Procedures for preparation and submittal of Schedule of Values.

1.02 RELATED REQUIREMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.03 RELATED SECTIONS: Specified Sections elsewhere may include but are not limited to:

- A. Section 00 0700: General Conditions.
- B. Section 01 1027: Applications for Payment.
- C. Section 01 1300: Submittals.

1.04 FORMAT:

- A. Type on Jefferson County Environmental Services Department (JCESD) provided forms or approved format.

1.05 CONTENT:

- A. List installed value of each major item of work and each subcontracted item of work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.
- B. Coordinate listings with Progress Schedule.
- C. For items on which payments will be requested for stored products, list sub-values for cost of stored products.
- D. Submit a sub-schedule for each separate stage of work specified in the project manual.
- E. The sum of values listed shall equal total Contract or lump sum price items.

1.06 SUBMITTALS:

- A. Submit Preliminary Schedule of Values within fifteen (15) days after the tentative award of the Contract.
- B. Submit finalized Schedule of Values within ten (10) days from the approval date of the Overall Construction Progress Schedule.
- C. Submit one (1) digital copy of Schedule.

1.07 SUBSTANTIATING DATA:

- A. When JCESD requires substantiating information, submit data justifying line item amounts in question.

1.08 ACTION:

- A. No payment will be made for work performed on a lump sum contract or a lump sum item until the appropriate Schedule of Values is approved by the Owner
- B. The equitable value of work deleted from a lump sum contract or lump sum item shall be determined from the approved Schedule of Values

PART 2 - PRODUCTS  
(NOT USED)

PART 3 - EXECUTION  
(NOT USED)

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

- A. Work for Schedule of Values shall not be measured separately for payment.

4.02 PAYMENT:

- A. No separate payment will be made for work under this Section. The cost thereof shall be distributed among the appropriate items specified in the technical sections of these specifications.

- END OF SECTION -

SECTION 01 1400  
QUALITY CONTROL

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Testing Laboratory Services

1. Laboratory testing and checking required by the Specifications, including the cost of transporting all samples and test specimens, shall be provided and paid for by the Contractor unless otherwise indicated in the Specifications.
2. Materials to be tested include, but are not necessarily limited to the following: cement, concrete aggregate, concrete, bituminous paving materials, structural and reinforcing steel, waterproofing, select backfill, crushed stone or gravel and sand.
3. Tests required by the Owner shall not relieve the Contractor from the responsibility of supplying test results and certificates from manufacturers or suppliers to demonstrate conformance with the Specifications.
4. Procedure
  - a. The Contractor shall plan and conduct his operations to permit taking of field samples and test specimens, as required, and to allow adequate time for laboratory tests.
  - b. The collection, field preparation and storage of field samples and test specimens shall be as directed by the Engineer with the cooperation of the Contractor.
5. Significance of Tests
  - a. Test results shall be binding on both the Contractor and the Owner, and shall be considered irrefutable evidence of compliance or noncompliance with the Specification requirements, unless supplementary testing shall prove, to the satisfaction of the Owner, that the initial samples were not representative of actual conditions.
6. Supplementary and Other Testing
  - a. Nothing shall restrict the Contractor from conducting tests he may require. Should the Contractor at any time request the Owner to consider such test

results, the test reports shall be certified by an independent testing laboratory acceptable to the Owner. Testing of this nature shall be conducted at the Contractor's expense.

#### 1.02 IMPERFECT WORK, EQUIPMENT, OR MATERIALS

- A. Any defective or imperfect work, equipment, or materials furnished by the Contractor which is discovered before the Final Acceptance of the Work, as established by the Certificate of Substantial Completion, or during the subsequent guarantee period, shall be removed immediately even though it may have been overlooked by the Engineer and estimated for payment. Any equipment or materials condemned or rejected by the Engineer shall be tagged as such and shall be immediately removed from the site. Satisfactory work or materials shall be substituted for that rejected.
- B. The Engineer may order tests of imperfect or damaged work, equipment, or materials to determine the required functional capability for possible acceptance, if there is no other reason for rejection. The cost of such tests shall be borne by the Contractor; and the nature, tester, extent and supervision of the tests will be as determined by the Engineer. If the results of the tests indicate that the required functional capability of the work, equipment, or material was not impaired, consistent with the final general appearance of same, the work, equipment, or materials may be deemed acceptable. If the results of such tests reveal that the required functional capability of the questionable work, equipment, or materials has been impaired, then such work, equipment, or materials shall be deemed imperfect and shall be replaced. The Contractor may elect to replace the imperfect work, equipment, or material in lieu of performing the tests.

#### 1.03 INSPECTION AND TESTS

- A. The Contractor shall allow the Engineer ample time and opportunity for testing materials and equipment to be used in the work. He shall advise the Engineer promptly upon placing orders for material and equipment so that arrangements may be made, if desired, for inspection before shipment from the place of manufacture. The Contractor shall at all times furnish the Engineer and his representatives, facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship. The Contractor must anticipate possible delays that may be caused in the execution of his work due to the necessity of materials and equipment being inspected and accepted for use. The Contractor shall furnish, at his own expense, all samples of materials required by the Engineer for testing, and shall make his own arrangements for providing water, electric power, or fuel for the various inspections and tests of structures and equipment.



- B. Where other tests or analyses are specifically required in other Sections of these Specifications, the cost thereof shall be borne by the party (Owner or Contractor) so designated in such Sections. The Owner will bear the cost of all tests, inspections, or investigations undertaken by the order of the Engineer for the purpose of determining conformance with the Contract Documents if such tests, inspection, or investigations are not specifically required by the Contract Documents, and if conformance is ascertained thereby. Whenever nonconformance is determined by the Engineer as a result of such tests, inspections, or investigations, the Contractor shall bear the full cost thereof or shall reimburse the Owner for said cost. In this connection, the cost of any additional tests and investigations, which are ordered by the Engineer to ascertain subsequent conformance with the Contract Documents, shall be borne by the Contractor.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

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JEFFERSON COUNTY ENVIRONMENTAL SERVICES CAMPUS IMPROVEMENTS  
SHADES VALLEY, VILLAGE CREEK AND FIVE MILE  
S2HD PROJECT NO. 202123

SECTION 01 1450 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of building beyond areas in which the Work is indicated.
1. Limits: Contractor's specific project site and Work use limits are the interior and exterior of the building proper or as is indicated on the drawings.
  2. Coordinate with authorities having jurisdiction and provide for any site use environmental restrictions imposed by said Local, State and/or County authorities having jurisdiction, where not indicated on the drawings.
    - a. Schedule deliveries and debris removal to minimize trash over flow onto adjacent public roads, alley and streets.
    - b. Protect adjacent public streets; do not allow construction debris to enter adjacent storm sewers.
    - c. Protect adjacent devices, curbs, gutters and utilities outside site use limits.
    - d. Protect adjacent property, and property owner from damages caused by work of this contract. Contractor is responsible for providing for protection of general public and adjacent property.
    - e. Schedule deliveries to minimize space and time requirements for equipment on-site.
    - f. Provide for disposal of waste material off-site, do not burn waste material or debris on site. Unless otherwise indicated, comply with requirements in Division I Section "Executing Requirements" for disposal of waste material from the construction process.
  3. Existing Facilities: Protect existing site, utilities and building structures that are to remain.
  4. Coordinate with Owner on any unknown or unforeseen "items" buried/hidden within site-use limit and discovered during site work progress. Removal and relocation shall be in strict accord with specific owner and local authority guidelines, with no exceptions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1450

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SECTION 01 1455  
LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Laws to be Observed
- B. Permits, Licenses, and Taxes
- C. Patented Devices, Materials, and Processes
- D. Responsibility for Safety
- E. Sanitary, Health, and Safety Precautions
- F. Public Convenience and Safety
- G. Protection and Restoration of Property
- H. Responsibility for Damage Claims
- I. Third Party Beneficiary Clause
- J. Use of a Section or Portion of the Work
- K. Privileges of the Contractor in Streets, Alleys, and Rights-of-Way
- L. Railway and Highway Crossings
- M. Personal Liability of Public Officials
- N. No Waiver of Legal Rights
- O. Environmental Protection
- P. Archeological and Historical Findings

1.02 RELATED SECTIONS

- A. Section 01560 – Temporary Environmental Controls
- B. Section 01570 – Traffic Regulations

C. Section 31 32 00 – Slope Protection and Erosion Control

1.03 LAWS TO BE OBSERVED

- A. The Contractor shall be and remain fully informed of all federal and state laws, all local laws, ordinances, regulations, and all orders and decrees of bodies or tribunals having any jurisdiction or authority which in any manner affect those engaged or employed in the Work, or which in anyway affect the conduct of the Work. He shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees and shall protect and indemnify the Owner and all his officers, agents, or servants against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or his employees.

1.04 PERMITS, LICENSES, AND TAXES

- A. The Contractor shall procure all permits and licenses, including those permits required by the Owner, pay all charges or fees, as applicable, and give all notices necessary and incident to the due and lawful prosecution of the Work. There shall be no charge for building permits obtained from the Owner when the Contractor is building a structure for the Owner.

1.05 PATENTED DEVICES, MATERIALS, AND PROCESSES

- A. The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Owner, unless otherwise specifically stipulated in the Contract Documents.
- B. If the Contractor uses any design, device, or materials covered by letters, patent, or copyright, he shall provide for such use by suitable agreement with the owner of such patented or copyrighted design, device, or material. It is mutually agreed and understood that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device, or materials in any way involved in the Work. The Contractor and/or his sureties shall indemnify and save harmless the Owner from any and all claims for infringement by reason of the use of such patented or copyrighted design, device, or materials or any trademark or copyright in connection with Work agreed to be performed under this Contract and shall indemnify the Owner for any cost, expense, or damage which it may be obligated to pay by reason of such infringement at any time during the prosecution of the Work or after completion of the Work.

1.06 RESPONSIBILITY FOR SAFETY

- A. The Contractor, in the prosecution of his Work under this Contract, is bound by

the requirements of "Safety and Health Regulations for Construction" of OSHA, the U.S. Government Department of Labor, and of other authorities having jurisdiction in safety matters.

- B. Under the terms and conditions of this Contract, the Engineer and/or the Owner shall not act as safety engineer or safety supervisor since such responsibility remains solely with the Contractor. The Engineer and/or the Owner shall not be responsible for establishing safety practices or for prescribing safety measures for the Contractor.
- C. The Contractor is solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the Work, and this requirement is not limited in application to normal working hours, but applies continuously twenty-four (24) hours per day until acceptance of the Work by the Engineer, and thereafter shall be subject to the terms and conditions of the Guaranty.
- D. The duty of the Owner and the Engineer to review the Work in order to determine its acceptability in accordance with the Specifications and to conduct construction review of the Contractor's performance for the benefit of the Owner shall not be construed as a duty to review the adequacy of the Contractor's safety measures on or near the construction site and/or to direct the actions of the Contractor's employees in the performance of the Work as such a duty is not included in the responsibilities of the Owner and the Engineer.

#### 1.07 SANITARY, HEALTH, AND SAFETY PRECAUTIONS

- A. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees as may be necessary to comply with the requirements of the State and Local Board of Health or of other bodies or tribunals having jurisdiction. These accommodations shall be properly secluded from public observation. The Contractor is reminded that the guidelines set forth by OSHA shall be the minimum that will govern working conditions during construction.
- B. Attention is directed to federal, state, and local laws, rules, and regulations concerning construction safety and health standards. The Contractor shall not require any worker to work in surroundings or under conditions which are unsanitary, hazardous, or dangerous to his health or safety.
- C. All chemicals used during construction of the Project or furnished for Project operation, whether herbicide, pesticide, disinfectant, polymer, reagent, or of other classification, must show approval by the EPA, USDA, or FDA according to the purpose for such chemicals. The disposal of residues therefrom are subject to the instructions of the manufacturers of the respective chemicals.

#### 1.08 PUBLIC CONVENIENCE AND SAFETY

- A. The Contractor shall control his operations and those of his subcontractors and all suppliers to assure the least inconvenience to the traveling public. Under all

circumstances, safety shall be the most important consideration.

- B. Where the Work is located in or near streets, alleys, or highway right-of-ways, the Contractor shall store construction materials and perform the Work in such a manner as will provide adequate and satisfactory convenience for the general public and residents along the Work.
- C. The Contractor shall contact all utilities affected by his Work and coordinate with them such that fire, police, sanitation services, etc. will not be adversely affected.
- D. Storage of materials and the Work shall be arranged so that there shall be free access to all fire hydrants, valves, manholes, and other utility appurtenances.
- E. The Contractor shall take such precautionary measures in the performance of the Work as will give maximum protection at all times to persons and property near the Work.

#### 1.09 PROTECTION AND RESTORATION OF PROPERTY

- A. The Contractor shall not enter upon private property except right-of-way easements for any purpose without first obtaining written permission from its owner and lessees, and he shall be responsible for the preservation of, and shall use every precaution necessary to prevent damage to, all trees, shrubbery, fences, culverts, bridges, pavement, driveways, sidewalks, etc.; all water, sewer, gas, telephone, electric lines, and other utilities thereof; and all other public or private property along or adjacent to the Work. The Contractor shall notify the proper representatives of any public service corporation, any company, or any individual not less than twenty-four (24) hours in advance of any work which might damage or interfere with the operation of their property along or adjacent to the Work. The Contractor shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in the manner or method of executing the Work or due to his non-execution of the Work or at any time due to defective work or materials.
  - B. The Contractor shall be responsible for the preservation of all public and private property, shall carefully protect all land monuments and property marks from disturbance or damage until the Engineer has witnessed or otherwise referenced their location, and shall not move these monuments and marks until directed by the Engineer.
  - C. When and where any direct or indirect damage or injury is done to public or private property on account of any act, omission, neglect, or misconduct in the execution of the Work or in consequence of the non-execution thereof on the part of the Contractor, he shall immediately restore, at his expense, such property to a condition equal to or better than that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise restoring as may be directed by the Engineer, or the Contractor shall make good such damage or injury in a manner acceptable to the injured property owner.
- RESPONSIBILITY FOR DAMAGE CLAIMS



- A. The Contractor shall indemnify and save harmless the Engineer and the Owner and their officers and employees from all suits, actions, or claims of any character brought because of any injuries or damage received or sustained by any person, persons, or property on account of the operations of the Contractor; or on account of or in consequence of any neglect in safeguarding the Work; or through use of unacceptable materials in constructing the Work; or because of any act, omission, neglect, or misconduct of said Contractor; or because of any claims or amounts recovered from any infringements of patent, trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act", or any other law, ordinance, order, or decree. Money due the Contractor under and by virtue of this Contract as may be considered necessary by the Owner for such purpose may be retained for the use of the Owner or, in case no money is due, his surety may be held until such suit or suits, action or actions, or claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Owner, except that money due the Contractor will not be withheld when the Contractor produces satisfactory evidence that he is adequately protected by public liability and property damage insurance.
- B. The Owner shall not be liable to the Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties, except that time will not be charged during such delays, as provided in Section 01015 – Prosecution and Progress.

#### 1.10 THIRD PARTY BENEFICIARY CLAUSE

- A. It is specifically agreed between the parties executing the Contract that it is not intended by any of the provisions of any part of the Contract to create the public or any member thereof as a third party beneficiary or to authorize anyone not a party to the Contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of the Contract.

#### 1.11 USE OF A SECTION OR PORTION OF THE WORK

- A. Whenever, in the opinion of the Engineer, any portion of the Work or structure is in suitable condition, it may be put into use upon the written order of the Engineer, and such usage shall not be held to be in any way an acceptance of the Work or structure or any part thereof as a waiver of any of the provisions of these Specifications or Contract. Pending completion and Final Acceptance of the Work, all necessary repairs and renewals of any section of the Work so put into use due to defective material or workmanship, to natural causes other than ordinary wear and tear, or to the operation of the Contractor shall be performed by, and at the expense of, the Contractor. Warranty on equipment and structures shall begin on the date of Final Acceptance of the Work by the Owner; use or occupancy by the Owner will not constitute a waiver of this requirement.

1.12 PRIVILEGES OF THE CONTRACTOR IN STREETS, ALLEYS, AND RIGHTS-OF-WAY

- A. For the performance of the Contract, the Contractor will be permitted to occupy such portions of the public property as will not unduly restrict traffic or endanger the public. The Contractor will ensure that such occupancy of public property shall be in accordance with traffic control plans developed for the Project.

1.13 RAILWAY AND HIGHWAY CROSSINGS

- A. Where the Work encroaches upon the right-of-way of any railway, public highway, or other public utility, the Owner will obtain all easements or authority necessary to enter upon such right-of-way for the prosecution and completion of the Work, but the Contractor shall make all arrangements with the owner of the right-of-way for the actual construction work, shall perform the work on or across the right-of-way in the manner and at the times agreed upon with the right-of-way owner, and shall pay the costs thereof, including the costs, if any, of temporary construction performed by the right-of-way owner as a means of providing safe and continuous operation of its facilities during the construction period. The Contractor shall take extra precautions for the safety of the Work, the right-of-way facilities, and the general public as may be necessary by sheeting, bracing, and thoroughly supporting the sides of any excavation and supporting and protecting any adjacent structures.
- B. Where required by any railway or highway owner, the Contractor shall post with the Owner thereof such bonds or insurance as may be required to guarantee the satisfactory replacement or repair of materials, paving, or grading within the right-of-way thereof.

1.14 PERSONAL LIABILITY OF PUBLIC OFFICIALS

- A. In carrying out any of the Contract provisions or in exercising any power or authority granted to him by this Contract, there shall be no liability upon the Engineer, his authorized representatives, or any official of the Owner, either personally or as an official of the Owner. It is understood that in such matters they act solely as agents and representatives of the Owner.

1.15 NO WAIVER OF LEGAL RIGHTS

- A. Upon completion of the Work, the Owner will expeditiously make a final inspection and notify the Contractor of Final Acceptance. Such Final Acceptance, however, shall not preclude the Owner from correcting any measurement, estimate, or certificate made before or after completion of the Work, nor shall the Owner be precluded from recovering from the Contractor or his surety, or both, such overpayment as may be sustained by failure on the part of the Contractor to fulfill his obligations under the Contract. A waiver on the part of the Owner of any breach of any part of the Contract shall not be held to be a waiver of any other or subsequent breach.

- B. The Contractor, without prejudice to the terms of the Contract, shall be liable to the Owner for latent defects, fraud, or such gross mistakes as may amount to fraud, or as regards to the Owner's rights under any warranty or guaranty.

#### 1.16 ENVIRONMENTAL PROTECTION

- A. The Contractor shall comply with all Federal, State, and Local laws and regulations controlling pollution of the environment. He shall take necessary precautions to prevent pollution of streams, lakes, ponds, and reservoirs with fuels, oils, bitumens, chemicals, or other harmful materials and pollution of the atmosphere from particulate and gaseous matter.

#### 1.17 ARCHAEOLOGICAL AND HISTORICAL FINDINGS

- A. Should the Contractor encounter, during his operations, any building, part of a building, structure, or object which appears to be of historical or archaeological significance, he shall immediately cease operations in that location and notify the Engineer. The Engineer will immediately investigate the Contractor's finding and will direct the Contractor to either resume his operations or to suspend operations as directed.
- B. Should the Engineer order suspension of the Contractor's operations in order to protect an archaeological or historical finding or order the Contractor to perform extra work, such shall be covered by an appropriate Contract modification (Change Order) as provided in Section 01028 – Change Order Procedures. If appropriate, the Contract modification shall include an extension of Contract Time in accordance with the requirements of Section 01015 – Prosecution and Progress.

### PART 2 - PRODUCTS

(NOT USED)

### PART 3 - EXECUTION

(NOT USED)

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SECTION 01 1505  
MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. Mobilization shall include the obtaining of all permits, moving equipment onto the site, furnishing and erecting temporary buildings and other construction facilities if required, fees, insurance, and bonds, all as required for the proper performance and completion of the Work. Mobilization shall include the following principal items:
1. Moving on to the site all of Contractor's equipment, materials, tools, etc. required for operations
  2. Arranging for and erection of Contractor's work and storage area
  3. Obtaining all required permits and licenses
  4. Having all OSHA required notices and establishment of safety programs
  5. Having the Contractor's superintendent at the job site full time
  6. All special scheduling necessary to complete the Work in an orderly manner
  7. Moving materials, equipment, tools, and labor throughout the project site due to space restrictions
- B. Demobilization shall include the removal of personnel, equipment, supplies, and incidentals from the Project site; the removal of all buildings and other facilities that were necessary for work on the Project; and the performance of other work or costs incurred after acceptable completion of construction operations on the Project.

1.02 PAYMENT FOR MOBILIZATION AND DEMOBILIZATION

- A. The Contractor's attention is directed to the condition that no payment for mobilization or any part thereof will be approved for payment under the Contract until all mobilization items previously listed herein have been completed as specified.
- B. As soon as practicable after receipt of the Notice to Proceed, the Contractor shall submit a breakdown to the Engineer for approval, which shall show the estimated value of each major component of standard mobilization.

- C. The lump sum price bid for mobilization and demobilization shall be limited to 5 percent of the total Contract amount. Any amount that exceeds 5 percent of the total Contract amount shall be included with other items of the Work.
- D. Partial payment for mobilization and demobilization shall be made on the following basis:
  - 1. Mobilization shall constitute 60 percent of the total lump sum bid for Bid Item No. 1 – Mobilization and Demobilization. Partial payments will be made in two equal or approximately equal payments as follows:
    - a. The first payment will be made on the first Application for Payment as long as the work performed to date on other Contract pay items exceeds \$50,000.00.
    - b. The second payment will be made on the first Application for Payment after the Contractor has earned five (5) percent or more of the total Contract amount for other pay items. Both payments will be simultaneously made when the requirements listed in both Article 1.02, Paragraph D, Item 1, Sub-paragraphs a and b are met at the same time.
  - 2. Demobilization shall constitute 40 percent of the total lump sum bid for Bid Item No. 1 – Mobilization and Demobilization. Payment for demobilization will only be authorized after Final Acceptance of the Project.
- E. Partial payment for bonds, insurance, and permit fees is not subject to the limitations previously specified herein.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01 1510  
TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. The Contractor shall provide temporary light and power, water, and sanitary facilities as required for his operations at the Project site. The temporary services shall be provided for use throughout the construction period.
- B. The Contractor shall coordinate and install all temporary services in accordance with the requirements of the utility companies having jurisdiction and as required by applicable codes and regulations. All temporary systems shall comply with and meet the approval of the local authorities having jurisdiction.
- C. At the completion of the work, or when the temporary services are no longer required, the facilities shall be restored to their original conditions.
- D. All costs in connection with the temporary services including, but not limited to, installation, utility company service charges, maintenance, relocation, and removal shall be borne by the Contractor at no additional cost to the Owner.
- E. Some temporary facilities that may be required may be indicated on the Drawings; however, the Drawings do not necessarily show any or all of the temporary facilities that the Contractor ultimately uses to complete the work.
- F. At all times during performance of the Work, the Contractor shall be held entirely responsible for the security of all temporary utilities used for his operations at the Project site.
- G. Temporary Light and Power
  - 1. The temporary general lighting and small power requirements shall be serviced by 120/240 V, 1 phase, 3 wire temporary systems furnished and installed by the Contractor. This service shall be furnished complete with main disconnect, overcurrent protection, meter outlet, branch circuit breakers, and wiring as required; including branch circuit breakers and wiring as required for furnishing temporary power, all in accordance with the requirements of the servicing power company and applicable standards and codes. The meter for the temporary 120/240 V service for construction purposes shall be registered in the name of the Contractor and all energy charges for furnishing this temporary electric power shall be borne by the Contractor. Any Contractor with a need for power other than the 120/240 V, 1 phase, 3 wire shall provide such power at his own expense.

2. The Contractor shall make all necessary arrangements, and pay for all permits, inspections, and power company charges for all temporary service installations. All temporary systems shall comply with and meet the approval of the local authorities having jurisdiction. All temporary electrical systems shall consist of wiring, switches, necessary insulated supports, poles, fixtures, sockets, receptacles, lamps, guards, cutouts, and fuses as required to complete such installations. The Contractor shall furnish lamps and fuses for all temporary systems furnished by him and shall be responsible for replacing broken and burned out lamps, blown fuses, damaged wiring, etc. as required to maintain these systems in adequate and safe operating condition. All such temporary light and power systems shall be installed without interfering with the work of any other contractors working at the site of the Project at that time.
3. When it is necessary during the progress of construction that a temporary electrical facility installed under this Division interferes with construction operations, the Contractor shall relocate the temporary electrical facilities to maintain temporary power as required at no additional cost to the Owner. The Contractor shall be responsible at all times for any damage or injury to equipment, materials, or personnel caused by improperly protected, maintained, or installed temporary installations and equipment during performance of the Work.
4. The various subcontractors doing the work at the site shall be permitted to connect into the temporary general lighting system small hand tools, such as drills, hammers, and grinders, provided that:
  - a. Equipment and tools are suitable for 120 V, 1 phase, 60 Hz operation and operating input does not exceed 1,500 volt-amperes.
  - b. Tools are connected to outlets of the system with only one (1) unit connected to a single outlet.
  - c. In case of overloading of circuits, the Contractor will restrict use of equipment and tools as required for correct loading.
5. The Contractor shall keep the temporary general lighting and power systems energized fifteen minutes before the time that the earliest trade starts in the morning and de-energized fifteen minutes after the time the latest trade stops. This applies to all weekdays, Monday through Friday, inclusive, which are established as regular working days.
6. Any Contractor requiring temporary light and power before or after the hours set forth hereinbefore, or on a Saturday, Sunday, or holiday, shall pay for the additional cost of keeping the system energized and repaired. If it is necessary for the Contractor or his employees to be in any structure after regular working hours and the temporary general lighting system is not required for illumination, that Contractor



shall provide such illumination required by means of flashlights, electric lanterns, or other devices not requiring use of electricity from the temporary general lighting system.

7. Each subcontractor requiring additional power and lighting other than that specified herein (including power for temporary heating equipment to be provided by the Contractor) shall furnish his own service complete with all fuses, cutouts, wiring and other material and equipment necessary for a complete system between the service point and the additional power consumers and shall install his own metering equipment in accordance with the requirements of the servicing power company.
8. Upon completion of the Work, but prior to acceptance by the Owner, the Contractor shall remove all temporary services, security lighting systems, temporary general lighting systems, and all temporary electrical work from the premises.

#### H. Temporary Sanitary Service

1. Sanitary conveniences, in sufficient numbers, for the use of all persons employed on the work and properly screened from public observation, shall be provided and maintained at suitable locations by the Contractor, all as prescribed by State Labor Regulations and local ordinances. The contents of same shall be removed and disposed of in a manner consistent with local and state regulations, as the occasion requires. Contractor shall rigorously prohibit the committing of nuisances within, on, or about the work. Sanitary facilities shall be removed from the site when no longer required.

#### I. Temporary Water

1. The Contractor shall provide temporary water for construction purposes, sanitary facilities, fire protection, cleaning, flushing, testing, etc. The Contractor shall make all arrangements for connections to the potable water system at the Project site. The Contractor shall comply with all requirements of the individual utility companies having local jurisdiction over the potable water system in the areas where the Project is located and as required by applicable codes and regulations, including requirements for backflow prevention.
2. The Contractor shall be responsible for contacting and coordinating with each individual utility company to obtain a fire hydrant meter for measuring the amount of water used during performance of the work. The Contractor shall pay all charges associated with the connection and all charges assessed by the utility companies for potable water used under this Contract.
3. The Contractor shall supply potable water for his employees either by portable containers or drinking fountains.
4. An adequate number of hose bibbs, hoses, and watertight barrels shall be provided

for the distribution of water.

5. Water service shall be protected from freezing and the service shall be extended and relocated as necessary to meet temporary water requirements.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01 1520  
WORKING AROUND EXISTING UTILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Working Around Existing Utilities

1.02 RELATED SECTIONS

- A. Division 31 – Earthwork

1.03 WORKING AROUND EXISTING UTILITIES

- A. Gas lines for the transmission or distribution of natural, manufactured, or liquefied petroleum gas are dangerous to work around. Accidents can be caused by direct damage to these gas mains or service lines during construction or by settlement in the trenches or settlement of structures after construction is completed. The Contractor shall take every possible precaution to minimize the hazards of working in proximity to gas lines and shall be solely responsible for any damage to them or for any injury to persons or damage to property arising from or caused by his operations.
- B. No excavation or other work shall be done by the Contractor within a gas pipeline right-of-way or within ten feet of a gas transmission line until the owner of the gas line has been notified not less than 48 hours in advance of such work and until the gas line has been exposed by the Contractor sufficiently to determine its exact horizontal and vertical location. In addition, the owner of the gas line shall be allowed to keep a qualified representative present while any construction work that could damage such line is being done. Methods of excavation specified by the owner of the utility must be adhered to by the Contractor.
- C. Where work is to be done in areas served by medium- and low-pressure gas distribution systems, the owner of such system shall be notified by the Contractor not less than 24 hours in advance before such work is started, and such owner shall be given the opportunity to keep a representative present during this construction work or to locate and stake out all gas lines. In such case, the Contractor shall cooperate with the representative of the owner of the gas lines to avoid damage to them.
- D. Should any gas main or service line or other gas facility be damaged during the construction Work, the following minimum precautions shall be taken by the Contractor:
  - 1. Stop all construction work that could cause any further damage to the gas facilities or hazards to other personal property.

2. Give adequate warning to any persons who could be injured or owners of any property that could be damaged and take other necessary safety precautions.
  3. Immediately notify the owner of the gas facility of the nature and location of such damage.
  4. Permanent repairs shall be made by the owner of the gas facility or by the Contractor to the owner's satisfaction and approval. Any repairs made by the Contractor shall be in accordance with ASME B31.8 "Gas Transmission and Distribution Piping Systems", latest edition. The inspector or representative of the Engineer does not have the responsibility or authority to supervise or inspect repairs to damaged gas facilities.
- E. No structure shall be constructed over or immediately adjacent to a gas pipeline or gas facility or within the gas line easement. Gas pipelines shall not pass through manholes or other sewer structures. When sanitary sewer lines cross over gas lines, the minimum cover, which is the vertical distance between the outside top and outside bottom of the two pipelines, shall be as specified by the owner of the gas line. In both cases, this cover space shall be carefully backfilled with thoroughly compacted selected material as required by the property owner. Where gas lines cross pipe trenches, the excavated space below such gas lines shall also be carefully backfilled with thoroughly compacted crushed stone.
- F. Other utilities such as water lines, steam lines, electrical lines, telephone lines, television cable, and telegraph lines, whether overhead or underground, shall be carefully preserved by the Contractor.
- G. In the event that interference with any existing utilities is imminent, the Contractor shall so notify the owner of the utility 48 hours in advance of any construction activities so that service may be relocated or otherwise preserved and protected.
- H. The Contractor shall fully cooperate with the representative of the utility company to the extent necessary to satisfactorily accomplish the Work.

## PART 2 - PRODUCTS

(NOT USED)

## PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01 1525  
WORKING WITHIN THE RIGHTS-OF-WAY OF HIGHWAYS, RAILWAYS, OR STREETS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Working Within the Rights-of-Way of Highways, Railways, or Streets
- B. Special Construction

1.02 RELATED SECTIONS

- A. Section 01 1570 – Traffic Regulation
- B. Division 31 – Earthwork

1.03 WORKING WITHIN THE RIGHTS-OF-WAY OF HIGHWAYS, RAILWAYS, OR STREETS

- A. In the event a sewer or manhole to be replaced crosses, runs parallel to, or runs alongside any highway, county road, city street, or railroad right-of-way, the Contractor shall obtain a utility permit from the governing body affected. The Owner's utility permit provisions are printed below:

- 1. The applicant named hereon is responsible for adequately and properly protecting the public from loss or injury due to the work permitted. The following shall constitute proper protection:
  - a. The applicant must comply with the Alabama Manual on Uniform Traffic Control Devices. All devices must be in place prior to start of construction and shall be properly maintained by applicant during construction.
  - b. The applicant shall assume all liability, protect, and save harmless the Owner and its employees or agents from any and all claims originating from this work and from any and all liability or claims arising from its use or occupancy of said area covered in this revocable permit. Whenever any person or corporation making any excavation in the street, highway, or alley fails to backfill in the proper manner as required by these Specifications, then the local governing body shall cause the work to be done and the cost thereof shall be charged against the bond as required by these Specifications.

2. If the work contemplated requires a road to be temporarily closed, an inspection on the ground by the Engineer or his duly authorized representative will be necessary before a permit is issued.
3. Public or private service corporations shall furnish a map 8-1/2 inches by 11 inches or multiples thereof in duplicate showing location of utility to be installed. No map is required on individual services.
4. This permit may be revoked at any time by the Owner, either during the progress of the Work or at any time after the completion of the Work, if the provisions under which this permit was issued are not complied with or the provisions of any applicable ordinance are not complied with. The Contractor also agrees that he will remove any part or all of any installation made under this permit at no cost to the Owner if such removal is ordered by the Owner.
5. A bond, as required by the right-of-way owner and/or Plumbing, Gas, or Electrical Code, may be required of any applicant for a permit to excavate in any public easement or right-of-way.
6. The permit is limited to the interests and rights of the Owner in and to the area involved without warranty.
7. This permit, if granted, shall constitute an agreement and warranty on the applicant that all work required will be done in a good and workmanlike manner to be approved by the Owner and at the sole expense of the applicant. Where the valuation of any work proposed under this permit does not exceed \$3,000.00, the work shall commence within thirty (30) calendar days, otherwise the permit shall become void.
8. The applicant shall be responsible for any and all drainage problems resulting from the work done hereto, shall be obligated to promptly complete the work in the area covered by this permit subject to the approval of the Engineer, and shall restore the land and easements in as good of a condition as before the work was commenced.
9. All excavations shall be as small in area as practical. Ditches shall be neatly cut with the sides kept vertical. Ample shoring shall be furnished and maintained where necessary. Material for backfilling shall be placed in six (6)-inch horizontal layers. Each layer shall be carefully tamped until completely compacted before adding the next layer. Incompressible backfill material (sand, slag, crushed stone, or gravel) will be required in all cuts that are made in pavement. In addition, permanent patch of a minimum of two (2) inches of plant mix will be required immediately after backfilling is completed. If municipality requires more than two (2) inches of plant mix, Contractor shall provide additional plant mix at no additional cost to the Owner. In cuts that are within three (3) feet of the edge of pavement, if, in the opinion of the Engineer, the

excavated materials are unsuitable for tamping, suitable materials shall be provided by the Contractor to backfill, and all unsuitable material shall be disposed of by the Contractor. Upon completion of backfilling, trenches shall be inspected by the Engineer before the workmen leave the job. At least 24 hours notice shall be given to the Engineer prior to the time such inspection is desired. In all cuts made in concrete, the applicant shall backfill as provided above and shall repair or replace with new concrete of the same thickness as that of the existing concrete, but not less than four (4) inches minimum thickness.

10. This utility permit must be kept on the job while work is in progress.

#### 1.04 SPECIAL CONSTRUCTION

- A. Where the Work requires special stream or railroad crossings or any other extraordinary conditions, or where alternate types of construction are used that are not covered by these Specifications, the materials and construction methods shall be as shown on the Drawings and as specified in the Special Conditions.

#### PART 2 - PRODUCTS

(NOT USED)

#### PART 3 - EXECUTION

(NOT USED)

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SECTION 01 1530  
PROTECTION OF EXISTING FACILITIES

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this Contract. Any damage or injury occurring on account of any act, omission, or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.
- B. Contractor shall comply promptly with such safety regulations as may be prescribed by the Owner or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, his employees. In the event of the Contractor's failure to comply, the Owner may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.
- C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at his own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

- A. During the progress of the Work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract.
- B. All work and materials shall be protected against damage, injury, or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at his own expense. Protection measures shall be subject to the approval of the Engineer.

1.03 BARRICADES, WARNING SIGNS, AND LIGHTS

- A. Contractor shall provide, erect, and maintain as necessary, strong and suitable barricades, danger signs, and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to ensure safety to the public. All barricades and obstructions along public roads shall be illuminated at night, and all lights for this purpose shall be kept burning from sunset to sunrise.
- B. Contractor shall provide and maintain such other warning signs, lights, and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, the Owner's operating personnel, or those visiting the site.

#### 1.04 EXISTING UTILITIES AND STRUCTURES

- A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.
- B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.
- C. Prior to beginning any excavation work, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that an interference exists, he shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. In the event the Contractor fails to bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the Owner.
- D. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to insure uninterrupted of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at his own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their

own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

- E. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over such work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Engineer may, at his discretion, have the respective authority to provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the Contractor.

## PART 2 - PRODUCTS

(NOT USED)

## PART 3 - EXECUTION

(NOT USED)

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SECTION 01 1540  
DEMOLITION AND REMOVAL OF EXISTING STRUCTURES AND EQUIPMENT

PART 1 - GENERAL

1.01 THE REQUIREMENT

- A. This Section covers the demolition, removal, and disposal of existing structures, pavement, curbs, sidewalk, manholes, and piping and removal and disposal of asbestos materials required during performance of the Work as indicated on the Drawings and as specified hereinafter. The Contractor shall furnish all labor, materials, and equipment to demolish structures and to remove anchors, supports, piping, and accessories designated to be removed on the Drawings or as directed by the Engineer.

1.02 TITLE TO EQUIPMENT AND MATERIALS

- A. Contractor shall have no right or title to any of the equipment, materials, or other items to be removed from the Project site unless and until said equipment, materials, and other items have been removed from the premises. The Contractor shall not sell or assign, or attempt to sell or assign any interest in, the said equipment, materials, or other items until the said equipment, materials, or other items have been removed.
- B. Contractor shall have no claim against the Owner because of the absence of such materials.

1.03 CONDITION OF STRUCTURES AND EQUIPMENT

- A. The Owner does not assume responsibility for the actual condition of structures and equipment to be demolished and removed.
- B. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner so far as practicable.
- C. The information regarding the existing structures and equipment shown on the Drawings is based on visual inspection and a walk-through survey only. Neither the Engineer nor the Owner will be responsible for interpretations or conclusions drawn therefrom by the Contractor.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION AND REMOVALS

- A. The removal of all equipment and all materials from the demolition of structures shall, when released

by the Owner and Engineer, be performed by the Contractor, and these items shall become the Contractor's property, unless otherwise noted, for disposition in any manner not contrary to the Contract requirements and shall be removed from the site to the Contractor's own place of disposal.

- B. Any equipment, piping, and appurtenances removed without proper authorization which are necessary for the operation of the existing sanitary sewer collection system shall be replaced to the satisfaction of the Engineer at no cost to the Owner.
- C. Excavation caused by demolitions shall be backfilled with fill free from rubbish and debris.

### 3.02 PROTECTION

- A. Demolition and removal work shall be performed by competent experienced workmen for the various type of demolition and removal work and shall be carried out through to completion with due regard to the safety of Owner employees, workmen onsite, and the public. The work shall be performed with as little nuisance as possible.
- B. The work shall comply with the applicable provisions and recommendation of ANSI A10.2, Safety Code for Building Construction, all governing codes, and as hereinafter specified.
- C. The Contractor shall make such investigations, explorations, and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. The Contractor shall give particular attention to shoring and bracing requirements so as to prevent any damage to new or existing construction.
- D. The Contractor shall provide, erect, and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the public, workmen engaged in demolition operations, and adjacent construction.
- E. The Contractor shall provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.
- F. The Contractor shall provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work is being done, connections made, materials handled, or equipment moved.
- G. The Contractor shall take necessary precautions to prevent dust from rising by wetting demolished masonry, concrete, plaster, and similar debris.
- H. The Contractor shall provide adequate fire protection in accordance with local Fire Department requirements.
- I. The Contractor shall not close or obstruct walkways, passageways, or stairways and shall not store or place materials in passageways, stairs, or other means of egress. The Contractor shall conduct operations with minimum traffic interference.
- J. The Contractor shall be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.

### 3.03 WORKMANSHIP

- A. The demolition and removal work shall be performed as described in the Contract Documents. The work required shall be done with care, and shall include all required shoring, bracing, etc. The Contractor shall be responsible for any damage which may be caused by demolition and removal work to any part or parts of existing structures or items designated for reuse or to remain. The Contractor shall perform patching, restoration, and new work in accordance with applicable Technical Sections of the Specifications and in accordance with the details shown on the Drawings. Prior to starting of work, the Contractor shall provide a detailed description of methods and equipment to be used for each operation and the sequence thereof for review by the Engineer.
- B. All openings in concrete shall be closed in a manner meeting the requirements of the appropriate Sections of these Specifications, as shown on the Drawings, and as directed and approved by the Engineer.
- C. Materials or items designated to remain the property of the Owner shall be as hereinafter tabulated. Such items shall be removed with care and stored at a location to be designated by the Owner.
- D. Material or items damaged during removal shall be replaced with similar new material or items. Any equipment that is removed without proper authorization and is required for sanitary sewer collection system operation shall be replaced at no cost to the Owner.
- E. Materials or items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the property and legally disposed of.
- F. The Contractor shall execute the work in a careful and orderly manner, with the least possible disturbance to the public.
- G. In general, masonry shall be demolished in small sections, and where necessary to prevent collapse of any construction, the Contractor shall install temporary shores, struts, and bracing.
- H. Where alterations occur, or new and old work join, the Contractor shall cut, remove, patch, repair, or refinish the adjacent surfaces to the extent required by the construction conditions, so as to leave the altered work in as good a condition as existed prior to the start of the work. The materials and workmanship employed in the alterations, unless otherwise shown on the Drawings or specified, shall comply with that of the various respective trades which normally perform the particular items or work.
- I. The Contractor shall finish adjacent existing surfaces to new work to match the specified finish for new work. The Contractor shall clean existing surfaces of dirt, grease, loose paint, etc., before refinishing.
- J. The Contractor shall cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
- K. The Contractor shall remove temporary work, such as enclosures, signs, guards, and the like

when such temporary work is no longer required or when directed at the completion of the work.

### 3.04 MAINTENANCE

- A. The Contractor shall maintain the structures and public properties free from accumulations of waste, debris, and rubbish caused by the demolition and removal operations.
- B. The Contractor shall provide on-site dump containers for collection of waste materials, debris, and rubbish, and he shall wet down dry materials to lay down and prevent blowing dust.
- C. At reasonable intervals during the progress of the demolition and removal work or as directed by the Engineer, the Contractor shall clean the site and properties, and dispose of waste materials, debris, and rubbish.

### 3.05 EQUIPMENT AND MATERIALS TO BE RETAINED BY OWNER

- A. The following equipment and materials will be retained by the Owner:
  - 1. All manhole frames and covers removed by the Contractor but not reinstalled.
- B. The previously-listed equipment and materials shall be moved by the Contractor to storage areas to be designated by the Owner.

- END OF SECTION -



SECTION 01 1550  
SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Access Roads

1. The Contractor shall construct and maintain such temporary access roads as required to perform the work of this Contract.
2. Access roads shall be located within the property lines or existing permanent easements of the Owner unless the Contractor independently secures easements for his use and convenience. Contractor shall submit written documentation to the Engineer for any Contractor-secured easements across privately-held property. Easement agreement shall specify terms and conditions of use and provisions for site restoration. A written release from the property owner certifying that all terms of the easement agreement have been completed by the Contractor shall be furnished to the Engineer prior to final payment.
3. Existing access roads used by the Contractor shall be suitably maintained by the Contractor at his expense during construction. Contractor shall not be permitted to restrict Owner access to existing facilities. Engineer may direct Contractor to perform maintenance of existing access roads when Engineer determines that such work is required to insure all-weather access by the Owner.
4. The Contractor shall obtain and pay all costs associated with any bonds required by the Alabama Department of Transportation for the use of State-maintained roads.

B. Parking Areas

1. The Contractor shall be responsible for constructing and maintaining suitable parking areas for his construction personnel on the Project site where approved by the Engineer and the Owner.

C. Restoration

1. At the completion of the Work, the surfaces of land used for access roads and parking areas shall be restored by Contractor to its original condition and to the satisfaction of the Engineer. At a minimum, such restoration shall include establishment of a permanent ground cover adequate to restrain erosion for all disturbed areas.

D. Traffic Regulations

1. Contractor shall obey all traffic laws and comply with all the requirements, rules, and regulations of the Alabama Department of Transportation and other local authorities having jurisdiction to maintain adequate warning signs, lights, barriers, etc., for the protection of traffic on public roadways.

E. Storage of Equipment and Materials

1. Contractor shall store his equipment and materials at the Project site in accordance with the requirements of the General Conditions, the Special Conditions, and as hereinafter specified. All equipment and materials shall be stored in accordance with manufacturer's recommendations and as directed by the Owner or Engineer, and in conformity to applicable statutes, ordinances, regulations, and rulings of the public authority having jurisdiction.
2. Contractor shall enforce the instructions of Owner and Engineer regarding the posting of regulatory signs for loadings on structures, fire safety, and smoking areas.
3. Contractor shall not store materials or encroach upon private property without the written consent of the owners of such private property.
4. Contractor shall not store unnecessary materials or equipment on the Project site, and shall take care to prevent any structure from being loaded with a weight which will endanger its security or the safety of persons.
5. Materials shall not be placed within ten (10) feet of fire hydrants. Gutters, drainage channels, and inlets shall be kept unobstructed at all times.
6. Contractor shall provide adequate temporary storage buildings/facilities, if required, to protect materials or equipment on the job site.
7. At all times during performance of the Work, Contractor shall be held entirely responsible for the security of all Contractor-provided equipment, materials, etc. being temporarily stored or staged.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

SECTION 01 1560  
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. Dust Control

1. Contractor shall take all necessary measures to control dust from his operations and to prevent spillage of excavated materials on public roads.
2. Contractor shall remove all spillage of excavated materials, debris, or dust from public roads by methods approved by the Engineer.
3. Contractor shall sprinkle water at locations and in such quantities and at such frequencies as may be required by the Engineer to control dust and prevent it from becoming a nuisance to the surrounding area.
4. Dust control and cleaning measures shall be provided at no additional cost to the Owner.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

(NOT USED)

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SECTION 01 1580  
PROJECT IDENTIFICATION SIGNS

B.

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Quality Assurance
- B. Submittals
- C. Sign Material
- D. Project Informational Signs
- E. Installation
- F. Maintenance
- G. Removal

1.02 RELATED SECTIONS

- A. Section 00 0821 – Detail: Project Sign for required layout of sign and additional requirements
- B. Section 01 1010 – Summary of the Work
- C. Section 01 1300 – Submittals
- D. Section 01 1560 – Temporary Environmental Controls<sup>1</sup>
- E. Section 01 1570 – Traffic Regulation

1.03 QUALITY ASSURANCE

- A. All signs and structures shall be designed to withstand a wind velocity of 60 miles perhour.
- B. Sign painters shall have a minimum of 3 years of experience.
- C. Sign finishes shall be adequate to withstand weathering, fading, and chipping for the duration of construction.

1.04 SUBMITTALS

- A. The Contractor shall submit sign layout showing content, lettering, color, foundation, structure, sizes, and grades of members.

## PART 2 – PRODUCTS

### 2.01 SIGN MATERIAL

- A. Structure and framing shall be structurally adequate.
- B. Sign surfaces shall be exterior grade plywood with medium density overlay, minimum 3/4-inch thick. Standard large sizes shall be used to minimize joints.
- C. Rough hardware shall be galvanized.
- D. Paint and primers shall be of exterior quality, with two coats and sign background of selected color.
- E. Lettering shall be exterior quality paint with contrasting colors.

### 2.02 PROJECT INFORMATIONAL SIGNS

- A. Lettering and colors of painted informational signs shall be in accordance with Series C of Standard Alphabet for Highway Signs. Lettering shall be sized to provide legibility at a distance of 100 feet.
- B. The Contractor shall provide directional signs to direct traffic into and around the site. Signs shall be relocated as required by the progress of the Work.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. The Contractor shall erect supports and framing on a secure foundation, rigidly braced and framed to resist wind loadings.
- B. The Contractor shall install sign surface plumb and level, with butt joints.
- C. The Contractor shall paint exposed surfaces of sign, supports, and framing.

### 3.02 MAINTENANCE

- A. The Contractor shall clean and maintain signs and supports and repair deterioration and damage.

### 3.03 REMOVAL

- A. The Contractor shall remove signs, framing, supports, and foundations at the completion of the Project and shall restore the area to original or better condition.

END OF SECTION

SECTION 01 1600  
MATERIALS AND EQUIPMENT

PART 1 -- GENERAL

1.01 THE REQUIREMENT

A. Furnish and Install

1. Where the words "furnish", "provide", "supply", "replace", or "install" are used, whether singularly or in combination, they shall mean to furnish and install, unless specifically stated otherwise.
2. In the interest of brevity, the explicit direction "to furnish and install" has sometimes been omitted in specifying materials and/or equipment herein. Unless specifically noted otherwise, it shall be understood that all equipment and/or materials specified or shown on the Drawings shall be furnished and installed under the Contract as designated on the Drawings.

1.02 MATERIALS AND EQUIPMENT

- A. All equipment, materials, or devices incorporated in this project shall be new and unused, unless indicated otherwise in the Contract Documents. Equipment and materials to be incorporated into the work shall be delivered sufficiently in advance of their installation and use to prevent delay in the execution of the work, and they shall be delivered as nearly as feasible in the order required for executing the work.
- B. The Contractor shall protect all equipment and materials from deterioration and damage, including provisions for temporary storage buildings as needed and as specified in Section 01550 – Site Access and Storage. Storage of equipment and materials shall be in locations completely protected from flooding, standing water, excessive dust, falling rock, brush fire, etc. Storage areas shall be located sufficiently distant from all construction activities and the movement of construction vehicles to minimize the potential for accidental damage. Any equipment or materials of whatever kind which may have become damaged or deteriorated from any cause shall be removed and replaced by good and satisfactory items at the Contractor's expense for both labor and materials.

1.03 INSTALLATION OF MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be installed in accordance with the requirements of the General Conditions, Special Conditions, and the respective Specification Sections.

1.04 SUBSTITUTIONS

- A. Requests for substitutions of equipment or materials shall conform to the requirements of the General Conditions, Special Conditions, and as hereinafter specified.

1. Contractor shall submit for each proposed substitution sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Owner and Engineer to determine if the proposed substitution is equal.
  2. Contractor shall submit certified tests, where applicable, by an independent laboratory attesting that the proposed substitution is equal.
  3. A list of installations where the proposed substitution is equal.
  4. Requests for substitutions shall include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the Owner.
- B. Where the approval of a substitution requires revision or redesign of any part of the work, including that of other Contracts, all such revision and redesign, and all new drawings and details therefore, shall be provided by the Contractor at his own cost and expense, and shall be subject to the approval of the Owner and Engineer.
- C. In the event that the Engineer is required to provide additional engineering services, then the Engineer's charges for such additional services shall be charged to the Contractor by the Owner in accordance with the requirements of the General Conditions, and the Special Conditions.
- D. In all cases the Owner and Engineer shall be the judge as to whether a proposed substitution is to be approved. The Contractor shall abide by their decision when proposed substitute items are judged to be unacceptable and shall in such instances furnish the item specified or indicated. No substitute items shall be used in the work without written approval of the Owner and Engineer.
- E. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Engineer in considering a substitution proposed by the Contractor or by reason of the failure of the Engineer to approve a substitution proposed by the Contractor.
- F. Acceptance of any proposed substitution shall in no way release the Contractor from any of the provisions of the Contract Documents.

## PART 2 -- PRODUCTS

(NOT USED)

## PART 3 -- EXECUTION

(NOT USED)

- END OF SECTION -

01 1600-2

CI SV-VC-FM

JCES CAMPUS IMPROVEMENTS - SHADES VALLEY, VILLAGE CREEK AND FIVE MILE



SECTION 01 1700  
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Contractor's Responsibility for the Work
- B. Closeout Procedures
- C. Contract Completion
- D. Contractor's Advertisement of Completion
- E. Project Record Documents
- F. Final Cleaning

1.02 RELATED SECTIONS

- A. Section 01 1710 – Cleaning
- B. Section 01 1740 - Warranties

1.03 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

- A. Until Final Acceptance by the Engineer as provided for in these Specifications, the Work shall be under the charge and care of the Contractor, and he shall take every necessary precaution to prevent injury or damage to the Work or any part thereof by the action of the elements or from any other cause whatsoever, whether arising from the execution or from the non-execution of the Work. The Contractor shall rebuild, repair, restore, and make good, at his own expense, all injuries or damage to any portion of the Work occasioned by any of the causes previously named herein before acceptance.

1.04 CLOSEOUT PROCEDURES

- A. The Contractor shall submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work has been completed in accordance with the Contract Documents and ready for the Engineer's review.
- B. The Contractor shall provide submittals to the Engineer as required by governing or other

authorities.

- C. The Contractor shall submit a statement of final accounting of MBE/DBE participation for the completed project, in conformance with the Owner's MBE/DBE Program.
- D. The Contractor shall submit final Application for Payment.

#### 1.05 CONTRACT COMPLETION

- A. The Contract will be considered fulfilled, except as provided in any bond or by law, and the warranty specified in individual sections when all the Work has been completed, the final inspection made, and Final Acceptance and final payment have been made by the Owner.
- B. After final inspection and upon receipt of satisfactory evidence of payment for all labor and materials used in the Work, the Engineer will notify the Owner, in writing, of his acceptance of the Work performed under the Contract and of his recommendations in respect to final payment to the Contractor.

#### 1.06 CONTRACTOR'S ADVERTISEMENT OF COMPLETION

- A. The Contractor, immediately after being notified that all other requirements of his Contract have been completed, shall give notice of said completion by an advertisement for a period of four (4) successive weeks in some newspaper of general circulation published within Jefferson County. Proof of publication of said notice shall be made by the Contractor to the Owner by affidavit of the publisher and a printed copy of the published notice.

#### 1.07 PROJECT RECORD DOCUMENTS

- A. Refer to Section 01 1720 – Project Record Documents

### PART 2 - PRODUCTS

(NOT USED)

### PART 3 - EXECUTION

(NOT USED)

- END OF SECTION -

SECTION 01 1710 – CLEANING

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 and form a part of this Section.

1.2 DESCRIPTION

- A. Execute cleaning during progress of the work, and at completion of the work, as required by General Conditions.
- B. Related requirements in other parts of the Specifications: Section 0700 - General Conditions.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and antipollution laws.

PART 2 - PRODUCT

2.1 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by cleaning material manufacturer.
- C. Use cleaning material only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the work, site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site.

3.2 FINAL CLEANING

- A. Employ workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels and other foreign materials from sight-exposed exterior surfaces.
- C. Scratched, marred or other disfigured aluminum or other finished metals shall be replaced.
- D. Prior to final completion, Contractor shall conduct an inspection of sight-exposed surfaces and all work areas to verify that the entire work is clean.
- E. Upon completion of final cleaning, cleaning equipment, materials and debris shall be removed from the construction site and the premises left clean.

END OF SECTION 01 1710

SECTION 01 1720  
PROJECT RECORD DOCUMENTS

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Maintenance of Documents
- B. Marking Devices
- C. Recording
- D. Submittals

1.02 RELATED SECTIONS

- A. Section 01300 – Submittals
- B. Section 01700 – Contract Closeout

1.03 MAINTENANCE OF DOCUMENTS

- A. The Contractor shall obtain from the Engineer one (1) full-size set of the Contract Drawings. These Drawings shall be kept and maintained in good condition at the project site, and a qualified representative of the Contractor shall enter upon these prints, from day-to-day, the actual “as-built” record of the construction progress. Entries and notations shall be made in a neat and legible manner, and these prints shall be delivered to the Engineer upon completion of the construction. Approval of each Application for Payment and approval for final payment will be contingent upon compliance with this provision.
- B. The Contractor shall maintain a record copy of the following items at the site for the Engineer's review:
  - 1. Drawings (modified to suit as-built conditions)
  - 2. Specifications and schedules (with modifications noted)
  - 3. Addenda
  - 4. Change Orders and other documents which modify the original documents

5. Approved Shop Drawings, product data, and samples, including documentation of all submittal transmittals
  6. Records of all changes made during construction
  7. Field test records
  8. Manufacturers' certificates
  9. Inspection certificates
- C. The Contractor shall maintain documents in a clean, dry, and legible condition.
- D. The Contractor shall not use record documents for construction purposes.
- E. The Contractor shall make documents available at all times for inspection by the Engineer.

#### 1.04 MARKING DEVICES

- A. The Contractor shall provide a colored pencil or felt-tip marking pen for all marking.

#### 1.05 RECORDING

- A. The Contractor shall label each document "PR".
- B. The Contractor shall keep record information current with construction progress.
- C. The Contractor shall not permanently conceal any work until required information has been recorded.
- D. Contract Drawings and Shop Drawings shall have each item legibly marked to record actual construction including the following:
1. Actual elevations
  2. Actual horizontal and vertical location of piping, utilities, corners, etc., both above-ground and below-ground. Reference to building exterior lines or other permanent objects. The Contractor shall show direction of flow in pipe and elevation.
  3. Field change of dimensions and detail
  4. Changes made by Contract modification
  5. Added details not on the original Contract

- E. Each Section of the Specifications and Addenda shall be legibly marked to record the following:
  - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed
  - 2. Other matters not originally specified
- F. Shop Drawings shall be maintained as record documents and legibly annotated to record changes made after review.

#### 1.06 SUBMITTALS

- A. At Contract Closeout, the Contractor shall deliver Project Record Documents and Samples, including Record “As-Built” Drawings, to the Engineer.
- B. Project Record Documents and Samples shall be accompanied by transmittal letter, in duplicate, containing the following:
  - 1. Date
  - 2. Project title and number
  - 3. Contractor’s name and address
  - 4. Title and number of each record document
  - 5. Certification that each document as submitted is complete and accurate
  - 6. Signature of Contractor or authorized representative
  - 7. Other documents as directed by the Engineer

PART 2 -- PRODUCTS (Not Used)

PART 3 -- EXECUTION (Not Used)

- END OF SECTION -

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SECTION 01 1740  
WARRANTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. One Year Warranty
- B. Form of Submittals
- C. Preparation of Submittals
- D. Time of Submittals

1.02 RELATED SECTIONS

- A. Section 01700 – Contract Closeout
- B. Individual Specification Sections: Warranties required for specific products of Work

1.03 ONE-YEAR WARRANTY

- A. Unless specified otherwise by individual Specification Sections, the Contractor shall warrant the fitness and soundness of all Work done and materials and equipment put in place under the Contract for a period of one (1) year after the completion of the Contract, and neither the payment of the final estimate nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of Work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy all defects in the Work and pay for any damage to other work resulting therefrom which shall appear within a period of one (1) year from the date of Final Acceptance of the Work, unless a longer period is specified in individual Sections. The Owner will give notice of observed defects with reasonable promptness. The accepted date of the beginning of the one (1)-year warranty shall be the date of final estimate payment to the Contractor by the Owner.

1.04 FORM OF SUBMITTALS

- A. Warranties shall be bound in commercial quality 8-1/2-inch x 11-inch, three D side ring binders with durable plastic covers.
- B. Identify each binder with typed title WARRANTIES; title of project; name, address, and telephone number of Contractor; name, address, and telephone number of equipment supplier; and name of responsible company principal.

- C. Table of Contents shall be neatly typed with each item identified with the number and title of the Specification Section in which the item is specified and the name of the product or Work item.
- D. Each warranty shall be separated with index tab sheets keyed to the Table of Contents listing. The Contractor shall provide full information, using separate typed sheets as necessary. The Contractor shall list subcontractor, supplier, manufacturer, and name, address, and telephone number of responsible principal.

#### 1.05 PREPARATION OF SUBMITTALS

- A. The Contractor shall obtain warranties executed in duplicate by responsible subcontractors, suppliers, and manufacturers within ten (10) days after completion of the applicable item of Work. Except for items put into use with Owner's permission, the Contractor shall leave date of beginning of time of warranty until the Date of Completion is determined.
- B. The Contractor shall verify that documents are in proper form, contain full information, and are notarized.
- C. The Contractor shall co-execute submittals when required.
- D. The Contractor shall retain warranties until time specified for submittal.

#### 1.06 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, the Contractor shall submit documents within ten (10) days after acceptance.
- B. The Contractor shall make other submittals within ten (10) days after date of Substantial Completion, prior to final Application for Payment.
- C. For items of Work for which acceptance is delayed beyond date of Substantial Completion, the Contractor shall submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.
- D. Retainage withheld for this project will not be released until all specified warranties are received by the Owner.

PART 2 - PRODUCTS  
(NOT USED)

PART 3 - EXECUTION  
(NOT USED)

- END OF SECTION -

SECTION 01 2000 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment. This section provides payment procedure direction in addition to the Owner Contractor Agreement, the Agency Agreement in sections 630 and 631 and the General Conditions of the Contract. If there is any conflict between these documents the Owner Contractor Agreement, sections 630, 631 and the General Conditions take precedent over language in this section.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Schedule of Values should include any approved contract changes added since the previous pay application submittal.
  - 1. Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Construction Progress Schedule.
    - c. Submittal schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date but no later than fourteen (14) days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Submit a Construction Progress Schedule of Values with each Application for Payment, showing progress chart of the work based on percentage of work completed of the Schedule of Values and payment to date of contract amount.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.

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- b. Name of Architect.
  - c. Architect's project number.
  - d. Contractor's name and address.
  - e. Date of submittal.
  
2. Arrange schedule of values in tabular form with separate columns to indicate the following for each item listed:
  - a. Related Specification Section or Division.
  - b. Description of the Work.
  - c. Name of subcontractor.
  - d. Name of manufacturer or fabricator.
  - e. Name of supplier.
  - f. Change Orders (numbers) that affect value.
  - g. Dollar value, (percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent).
  
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts where necessary.
  
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing.
  
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
  
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
  
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

- a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the schedule of values as general overhead expense unless otherwise indicated by the Owner.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

### 1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner. Each application shall also include the Owner's tax exempt requirements.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use indicated AIA Forms and Continuation Sheets as form for Applications for Payment.
  1. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will not certify incomplete form. Owner will return incomplete applications without action.
  2. Entries shall match data on the Schedule of Values, the Construction Schedule and Contractor's Progress Schedule. Use updated schedules if revisions were made.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Items stored off-site and requested for payment, shall be stored in a bonded warehouse, insured 100% in favor of the Owner, with evidence of same attached to pay request.
- D. Transmittal: Submit six (6) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. Each copy shall include original copy of waivers of lien and similar attachments if required.
  1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- E. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, vendors and suppliers for construction period related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, before deduction for retainage, on each item.
  2. When an application shows completion of an item, submit final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Waivers: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
    - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner. AIA Document G706A "Contractor's Affidavit of Release of Liens", (as provided in Division B – Contract Forms) is an acceptable form to Owner and ABC and should be submitted with Application for Payment.
- F. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. List of unit prices (if applicable).
  5. Submittal schedule (preliminary if not final).
  6. List of Contractor's staff assignments.
  7. List of Contractor's principal consultants.
  8. Copies of building permits.
  9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  10. Initial progress report.
  11. Report of preconstruction conference.
  12. Certificates of insurance and insurance policies.
- G. 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. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- H. 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. Updated final statement, accounting for final changes to the Contract Sum.
  4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  6. AIA Document G707, "Consent of Surety to Final Payment."
  7. Evidence that claims have been settled.
  8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  9. Final liquidated damages settlement statement.
- I. An original copy of AIA forms: AIA Document G706, G706A and AIA Document G707 may be purchased at the Office of the Birmingham Chapter American Institute of Architect's, located at 107 21<sup>st</sup> Street South, Birmingham, Alabama 35233. These are copy-righted forms and original forms must be used, each with original signatures. No Exceptions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2000

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SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUBSTITUTION PROCEDURES

- A. Substitutions include changes in listed or approved manufacturers, products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by General Contractor/Bidder during the bidding process.
  - 1. Substitution requests submitted directly by suppliers and subcontractors will not be acknowledged or reviewed.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use Section 12 2501 Substitution Request Form.
  - 2. Submit requests within 10 days before bid opening date. No response to substitutions will be issued after this date.
  - 3. Identify product to be replaced and show compliance with requirements for substitutions. Include a detailed comparison of significant qualities of proposed substitution with those of the Work specified, a list of changes needed to other components of the Work, including Work by the General Contractor or other subcontractors, required to accommodate proposed substitution, and any proposed changes in the Contract Sum or the Contract Time should the substitution be accepted.
- C. Architect will review proposed substitutions and notify Contractor/Bidder of their acceptance or rejection. If necessary, Architect will request additional information or documentation for evaluation.
  - 1. Architect will notify General Contractor/Bidder of acceptance or rejection of proposed substitution before project bid proposal response date. No substitutions are allowed after project award. Should the Owner and Architect elect to accept a product after the bid the Architect will record all time required in evaluating substitutions proposed by the Contractor and in making any change in the Plans or Specifications occasioned thereby.
  - 2. Whether or not the Architect accepts a proposed substitute, the Contractor will reimburse the Owner for the actual cost of the Architect for the evaluating any proposed substitute which either does not meet the requirements of the Plans and Specifications, or the acceptance of which would require change to the other portions of the Work.
  - 3. The Contractor shall reimburse the Owner for all associated architectural/engineering costs, including redesign, additional shop drawing reviews, investigations, consultant fees, and revision of the Contract Document required because of the substitute.

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- D. Do not submit unapproved substitutions on Shop Drawings or other submittals.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

SECTION 01 2600 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time in accordance with AIA General Condition requirements.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 5 days, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - b. Include costs of labor, overhead and profit and supervision directly attributable to the change.
    - c. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Owner through the Architect.
  - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor, overhead and profit and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.4 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Form G701.

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Owner, through the Architect may issue a Construction Change Directive to the Construction Manager on AIA Form to comply. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2600

SECTION 01 3000 – ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 PROJECT MANAGEMENT AND COORDINATION

- A. Subcontract List: Submit a written summary identifying individuals or firms proposed for each portion of the Work within 48 hours of submitting your bid. Use CSI Form 1.5A or a similar format for your submittal.
- B. Key Personnel Names: Within 7 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. List e-mail addresses and telephone numbers.
- C. Requests for Information (RFIs): On discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI. Use AIA Document G716.
- D. Project Web Site: **Use Owner's** Project Web site for purposes of hosting and managing project communication and documentation until Final Completion.
- E. Schedule and conduct progress meetings at Project site at weekly intervals. Notify Owner and Architect of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved in planning, coordination, or performance of future activities. Architect, Project Manager and Owner Representative will attend progress meetings every other week.
  - 1. Contractor will record minutes of all meeting and distribute to everyone concerned, including Owner and Architect.
- F. Contractor's Construction Schedule Submittal Procedure:
  - 1. Submit required submittals in the following format:
    - a. Working electronic copy of schedule file, where indicated.
    - b. PDF electronic file and/or
    - c. Three (3) paper copies.
  - 2. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 3. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, progress reports, payment requests, and other required schedules and reports.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal Gantt-chart-type schedule within fourteen (14) days of date established for the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
- C. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- D. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment to achieve compliance, and indicate date by which recovery will be accomplished.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled Owner, Architect and Contractor (OAC) progress meeting.
  - 1. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribute copies of approved schedule to Owner, Architect, subcontractors, testing and inspecting agencies, and parties identified by Contractor with a need-to-know schedule responsibility. When revisions are made, distribute updated schedules to the same parties.

END OF SECTION 01 3000

SECTION 01 4000 – QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- B. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to Architect for a decision.
- C. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum. The actual installation may exceed the minimum within reasonable limits. Indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision.
- D. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- E. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.
- F. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, notices, receipts for fee payments, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
  - G. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.
  - H. Testing Agency Qualifications: An independent agency with the experience and capability to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - I. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
  - J. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
    1. Notify Architect and Contractor of irregularities or deficiencies in the Work observed during performance of its services.
    2. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
    3. Do not perform any duties of Contractor.
  - K. Associated Services: Cooperate with testing agencies and provide reasonable auxiliary services as requested. Provide the following:
    1. Access to the Work.
    2. Incidental labor and facilities necessary to facilitate tests and inspections.
    3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    4. Facilities for storage and field curing of test samples.
    5. Security and protection for samples and for testing and inspecting equipment.
  - L. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
    1. Schedule times for tests, inspections, obtaining samples, and similar activities.



- M. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction, as assigned as a General Contractor responsibility in the Statement of Special Inspections attached to this Section.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

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SECTION 01 5000 – TEMPORARY FACILITIES & CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
  - 1. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
  - 2. Electric power service.
  - 3. Lighting.
  - 4. Telephone Service.
- C. Support facilities include, but are not limited to, the following:
  - 1. Project Identification Sign.
  - 2. Waste disposal facilities.
  - 3. Field offices.
  - 4. Storage sheds.
  - 5. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
  - 1. Security enclosure and lockup.
- E. Related Sections include the following:
  - 1. Division 1 Section “Submittal Procedures” for procedures for submitting copies of implementation and termination schedule and utility reports.

1.2 USE CHARGES

- A. General: Contractor shall have use of the existing facility. Installation and removal of and use charges for temporary facilities shall not be included in the Contract Sum. Allow other entities to use existing temporary services and facilities without cost, including, but not limited to Architect, testing agencies, and authorities having jurisdiction.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary, staging areas, and parking areas for construction personnel.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## PART 2 - PRODUCTS

### 2.1 EQUIPMENT

- A. Field Offices: The existing facility may be used as an office with lockable entrances, serviceable finishes; heated and air conditioned. Provide layout table and storage for field use documents required for construction of the project.
- B. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- C. Toilets: An existing Single-occupant toilet room may be use as a temporary toilet. Toilet must be vented, illuminated and clean at all times. Provide supplies required including tissue, soap and towels. Provide portable toilet facilities once removable of existing toilet room is required for construction in that area.
- D. Drinking-Water Fixtures: bottled-water including paper cup supply.
- E. 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.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Select an office and toilet location within the building where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  - 1. Call Before you Dig: In accord with current law, Contractor shall verify exact location of all underground utilities before you dig. Contact the line location center at ALABAMA ONE-CALL, dial 1-800-292-8525.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Maintain existing utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water and Electric Service: Contractor shall have use of all existing utilities necessary to perform the work.

- D. Lighting: where required provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- E. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel.
  - 1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Architect's office.
    - e. Engineers' offices.
    - f. Owner's office.
    - g. Principal subcontractors' field and home offices.
  - 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- B. Project Signs: Provide Project signs as Contractor deems necessary to complete the project. Unauthorized signs are not permitted.
  - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touchup signs so they are legible at all times.
- C. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

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- B. Security Enclosure and Lockup: Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Facilities proposed in the public Right-of-Way must be approved by the City of Birmingham including temporary barricading at streets, alleys and designated bus stops.
- E. Location of temporary facilities for lay-down areas, storage of construction materials, portable toilets or parking for workers, or other facilities on private property in the vicinity of the project site require agreements outside the scope of this contract between the General Contractor and adjacent property owners.
- F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  - 4. 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.
  - 5. Maintain existing fire sprinkler system in service until work is required on modifications to the system which required shut-down.
- G. Use of Owner's Elevator for transport of personnel and materials: At the Village Creek Water Tower Building, the Contractor may use the existing elevator.
  - 1. Review elevator operation with Owner's representative and note any existing damage or noticable deficiencies in operation of the elevator.
  - 2. Provide floor and wall protection for elevator cab.
  - 3. Repair any damaged caused by use during construction.
  - 4. Limitations on elevator size for moving materials.
    - a. Approximate size of elevator: 8 ft by 10 ft, 2500 lbs weight limit.
    - b. Elevator entry door: 3'-5" wide by 7'-0" height.
    - c. Elevator inside cab dimensions: 7'-4" high by 4'-5" deep by 6'-9" wide.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, or no later than Substantial Completion.
  - 1. Owner reserves right to take possession of Project identification signs.
  - 2. At Substantial Completion, comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 01 5000





## SECTION 01 6000 – PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Section:
  - 1. Division 0 Section "Substitution Procedures" for requests for substitutions.

#### 1.2 DEFINITIONS

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

#### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed

comparable product request within seven (7) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
- b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

#### 1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

#### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

## 1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. Refer to Division 2. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
  - 6. Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 1 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  3. Evidence that proposed product provides specified warranty.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

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SECTION 01 7419 – CONSTRUCTION WASTE MANAGEMENT & DISPOSAL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Action Submittals:

1. Waste Management Plan: Submit plan within seven (7) days of date established for commencement of the Work.

B. Informational Submittals:

1. Waste Reduction Progress Reports: Submit concurrent with each Application for Payment. Include total quantity of waste, total quantity of waste salvaged and recycled, and percentage of total waste salvaged and recycled.
2. Records of Donations and Sales: Receipts for salvageable waste donated or sold to individuals and organizations. . Indicate whether organization is tax exempt.
3. Recycling and Processing Facility Records: Manifests, weight tickets, receipts, and invoices.
4. Landfill and Incinerator Disposal Records: Manifests, weight tickets, receipts, and invoices.
5. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations.

C. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013000 "Administrative Requirements." Review methods and procedures related to waste management.

E. Waste Management Plan: Develop a waste management plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

1. Salvaged Materials for Reuse: Identify materials that will be salvaged and reused.
2. Salvaged Materials for Sale: Identify materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: Identify materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.

4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total nonhazardous solid waste generated by the Work.

## PART 3 - EXECUTION

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
  1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Clean salvaged items and install salvaged items to comply with installation requirements for new materials and equipment.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use: Clean salvaged items and store in a secure area until delivery to Owner.

### 3.3 RECYCLING WASTE

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Packaging:



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1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  2. Polystyrene Packaging: Separate and bag materials.
  3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- C. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- D. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- E. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
- F. Wood Materials:
1. Sort and stack reusable members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
  2. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  3. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- G. Metals: Separate metals by type.
- H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- J. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.4 DISPOSAL OF WASTE

- A. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
- B. Do not burn waste materials.

END OF SECTION 01 7419

SECTION 01 7700 – PROJECT CLOSEOUT

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 and form a part of this Section.

1.2 SCOPE

- A. The Work under this Section consists of, but is not limited to, Submittals, Requirements and Procedures for Project Closeout.

1.3 RELATED SECTIONS

- A. Section 01 3000 – Submittals
- B. Section 01 7100 – Cleaning

1.4 SUBMITTALS

- A. Construction Completion Requests
  - 1. Certificate of Substantial Completion
  - 2. Certificate of Final Inspection
- B. Closeout Submittals: Three (3) copies of closeout submittals of which receipt and acceptance are prerequisites for payment shall include, but not necessarily be limited to, the following:
  - 1. Project "As-Built" Drawings
  - 2. Guarantees and Bond.
  - 3. Evidence of Compliance with Governing Authorities
    - a. Certificate of Inspection
    - b. Certificate of Occupancy
  - 4. Affidavit of "Advertisement of Completion"
  - 5. Evidence of Payment, and Release of Liens
  - 6. General Contractor's "One Year Guarantee"
  - 7. Final Application For Payment
  - 8. List of names of DBE/MBE Contractors used on the Project.

1.5 GUARANTEES AND BONDS

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- A. Contractor shall submit to Architect before final acceptance all warranties, guarantees, and surety bonds. All such documents shall show the name and the location of the Project and the name of the Owner.

1.6 ADVERTISEMENT OF COMPLETION

- A. Contractors performing contracts of fifty thousand dollars (\$50,000.00) or more shall immediately after the completion of the Contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the City or County in which the work was done, once a week for four (4) consecutive weeks.
- B. In no case will a final settlement be made upon the Contract until the expiration of thirty (30) days after the completion of the notice.
- C. Proof of publication of this notice shall be submitted by the General Contractor to the Architect by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the County, the notice must be posted at the courthouse for thirty (30) days and proof shall be made by the Probate Judge, Sheriff and the Contractor.
- D. Contractors performing contracts of less than fifty thousand dollars (\$50,000.00), shall immediately after completion of the Contract, give notice of the completion by an advertisement in a newspaper of general circulation published within the City or County in which the work was done for one (1) week. The Contractor shall furnish the Purchasing Department by affidavit of the publisher a printed copy of the notice published for posting on their bulletin board for one week. The Contractor shall certify under oath that all bids have been paid in full. Final payment with the Contractor will be made after the notice has been posted for one entire week.

1.7 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Submit Contractor's Affidavit of Payment of Debts and Claims: AIA G706, or approved equal.
- B. Submit Contractor's Affidavit of Release of Liens: AIA G706A, or approved equal, with:
  - 1. Consent of Surety to Final Payment: AIA G707, or approved equal.
  - 2. Contractor's Release or Waiver of Liens.
  - 3. Separate Release of Waivers of Liens for Subcontractors, suppliers and others with lien rights against property of Owner, together with Lien rights against property of Owner, together with a list of those parties.
- C. All submittals shall be duly executed before delivery to Architect.

1.8 FINAL INSPECTION

- A. Certification: Contractor shall submit written certification that: Contract Documents have been reviewed; Project has been inspected for compliance with Contract Documents; Work has been completed in accordance with Contract Documents; Project is completed and ready for final inspection.
- B. Inspection: Architect will make final inspection of the project within a reasonable time after receipt of certification. Should Architect consider that Work is in fact complete in accord with requirements of Contract Documents, he will request Contractor to make project closeout submittals. Should Architect consider Work is not complete, he will notify contractor, in writing, stating reasons. Contractor shall take immediate steps to remedy stated deficiencies and send written notice to Architect certifying that Work is complete. Architect will re-inspect the Work.

#### 1.9 AS-BUILT DRAWINGS

- A. A complete and separate set of blue-line prints of the Contract Drawings showing the Work under this contract shall be maintained at the job at all times, on which shall be marked clearly, neatly, accurately, and promptly the progress of the work including:
  - 1. Changes to be made, whether resulting from formal change orders or other instructions issued by the Architect.
  - 2. The daily progress, by coloring the various stages of Work exactly as they are erected. This progress shall incorporate both the changes noted above and all other deviations from the original drawings, whether resulting from job conditions encountered or from any other causes. Principal dimensions of concealed work shall be recorded.
- B. The marked-up and colored prints will be used as a guide for determining the progress of the work installed. They will be inspected monthly by the Architect and they shall be corrected immediately if found either inaccurate or incomplete.
- C. At the completion of the job, the marked prints shall be submitted to the Architect for final review, comment and approval. The prints will be returned with appropriate comments and recommendations, and then a complete set of record "mylar" reproducible sheets or an electronic version shall be prepared by the General Contractor incorporating all of the changes and added data noted on the approved marked-up prints. The record "mylar" sheets or electronic version shall be given to the Architect upon completion and as a requirement prior to the issuance of the "Final" Certificate of Payment.
- D. "Mylar" reproducible sheets of the original drawings shall be obtained from the Architect with respective cost of reproduction and mailing being borne and paid by the General Contractor involved in making the record drawings.

#### 1.10 GUARANTEES AND BONDS

- A. Contractor shall submit to Architect before final acceptance all warranties, guarantees, and surety bonds. All such documents shall show the name and location of the Project and the name of the Owner.

1.11 GENERAL CONTRACTOR ONE-YEAR GUARANTEE

- A. The General Contractor shall submit in addition to any other expressed guarantees and/or warranties, a guarantee of all work under this Contract for a period of one year from date of final acceptance.

1.12 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of accounting to Architect. Statement shall reflect all adjustments, including, but not necessarily limited to, the following:

1. Original Contract Sum
2. Additions and Deductions resulting from:
  - a. Previous change orders
  - b. Cash Allowances
  - c. Unit Prices
  - d. Other Adjustments
  - e. Deductions for Uncorrected Work
  - f. Penalties and Bonuses
  - g. Deductions for Liquidated Damages
  - h. Deductions for Re-inspection Payments
3. Total Contract Sum, as adjusted
4. Previous Payments
5. Sum remaining due

- B. Architect will prepare final change order, reflecting approved adjustments to Contract sum not previously made by change orders.

1.13 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit final application in accord with requirements of General and/or Supplementary Conditions.

1.14 DBE/MBE CONTRACTORS

- A. After job closeout and before the General Contractor receives the final payment of retainage, the General Contractor will submit to BCIA names of DBE/MBE contractors used on the job along with the net dollar amount paid to each such contractor.

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1.15 YEAR END INSPECTION

- A. Twenty (20) days prior to expiration of one year from date of "Final Acceptance", Contractor shall notify Architect in writing of Year End Inspection. Architect will make visual inspection of the Project in company with Owner and Contractor to determine whether correction of work is required, in accord with provisions of General Conditions. For guarantees beyond one year, Architect will make inspections at request of Owner, after notification to Contractor. Architect will promptly notify Contractor in writing of any observed deficiencies.

END OF SECTION 01 7700

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SECTION 01 7810 – PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings
  - 2. Record Specifications.
- B. Related Sections include the following:
  - 1. Bidding and Contract requirements “Article 7” section for liquidated damages.
  - 2. Division 1 Section “Payment Procedures” for review requirements.
  - 3. Division 1 Section “Closeout Procedures” for general closeout procedures.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one (1) set of marked-up Record Prints.
  - 2. Number of Copies: Submit copies of Record Drawings as follows:
    - a. Final Submittal: Submit one set of marked-up Record Prints and one copy printed from Record Set. Print each Drawing, whether or not changes and additional information were recorded.
    - b. Two (2) CD (PDF format) copies of Record Drawings plus Revisions (PDF format) as noted in Division 1 Section “Closeout Procedures”.

PART 2 - PRODUCTS

- 2.1 RECORD DRAWING: Paragraph below contains normal recording procedures regardless of requirements for final output.
  - A. Record Prints: Maintain one set black-line on white prints of the Contract Drawings. Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Architect. When authorized, prepare a full set of corrected Contract Drawings. Incorporate uncovered original construction that is remaining including

changes and additional information previously marked on Record Prints. Erase, redraw, and add details and notations where applicable.

1. Preparation: Mark Record Prints to show the actual conditions of existing installations that are remaining after the demolition and abatement is complete. The contractor or his/her authorized representative are to prepare the marked-up Record Prints.
    - a. Give particular attention to information on in ground and concealed elements that would be difficult to identify or measure and record later.
    - b. Existing conditions overhead shall be recorded showing distance above existing floor to the bottom of the existing condition.
    - c. Accurately record information in an understandable drawing technique.
    - d. Record data as soon as possible after obtaining it. Record and check the markup before submission.
  2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Locations and depths of existing underground utilities, structural wall, beams, columns, foundation walls and plumbing piping.
  3. Mark the Contract Drawings to show actual physical conditions, completely and accurately.
  4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
  5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location
1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Record Compact Disk for electronic media. That is compatible to the Owner's software.
  3. Identification: As follows:

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- a. Project name.
- b. Date.
- c. Designation "PROJECT RECORD DRAWINGS."
- d. Name of Architect.
- e. Name of Contractor.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours and at time of Pay Request Verification.

END OF SECTION 01 7810



SECTION 02 4119 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS.

- A. Drawings and general provisions of Contract, including General and Supplementary conditions and Division 01 Specification Sections apply to work specified in this section.

1.2 SUMMARY

- A. Demolition and removal of buildings and site improvements.
- B. Abandoning in-place.
- C. Removing below-grade construction.
- D. Disconnecting, capping or sealing, and abandoning in-place, removing site utilities.
- E. Extent of building demolition work includes the removals from existing building components as indicated on the drawings and/or described herein.
- F. Items to be removed as indicated but not limited to:
  - 1. Building and slab
  - 2. Building enclosure elements.
  - 3. Roofing.
  - 4. Interior components.
  - 5. Plumbing items.
  - 6. Mechanical items
  - 7. Electrical items.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 FIELD CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.

- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
  - 1. Provide not less than **72** hours' notice of activities that will affect operations of adjacent occupied buildings.
  - 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
    - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- F. Storage or sale of removed items or materials on-site is not permitted.
- G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- H. Maintain fire-protection facilities in service during selective demolition operations.
- I. No water shall be used in demolition operations.
- J. Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and similar and matching materials.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Section 01 1000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Locate, identify, shut off, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. No Ducts to Be Abandoned in Place.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.
- D. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- E. Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
- F. Provide temporary weather protection to prevent water leakage and damage to structure and interior areas.

3.3 POLLUTION CONTROLS

- A. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3.4 DEMOLITION

- A. General: Demolish indicated buildings and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
  - 2. Maintain fire watch during and for at least two hours after flame-cutting operations.
  - 3. Maintain adequate ventilation when using cutting torches.
  - 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.
  - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
- C. Explosives: Use of explosives is not permitted.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 02 4119



**SECTION 04 2000 - MASONRY**

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. See Section 05 5000 "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
- B. Submittals:
  - 1. Material Certificates: For each type of product indicated. Include statements of material properties indicating compliance with requirements.

PART 2 - PRODUCTS

2.1 UNIT MASONRY

- A. Comply with TMS 602/ACI 530.1/ASCE 6.

2.2 MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90; Density Classification, Lightweight.
  - 1. All Concrete Masonry Units shall be provided from a single manufacturing plant.
  - 2. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
  - 3. Bullnose units for outside wall corners where CMU is finished wall, unless otherwise indicated.

2.3 MORTAR AND GROUT

- A. Mortar: ASTM C 270, proportion specification.
- B. Grout: ASTM C 476 with a slump of 8 to 11 inches.

2.4 REINFORCEMENT, TIES, AND ANCHORS

- A. Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.
- B. Joint Reinforcement: ASTM A 951/A 951M.
  - 1. Wire Size for Side Rods: 0.148-inch diameter.
  - 2. Wire Size for Cross Rods: 0.148-inch diameter.
  - 3. For single-wythe masonry, provide ladder design.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Pre-molded strips complying with ASTM D 1056, Grade 2A1.
- B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
- B. Do not install units with chips or other appearance defects.
- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- D. Stopping and Resuming Work: Step back units; do not tooth.
- E. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- F. Build nonload-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- G. Tool exposed joints slightly concave when thumbprint hard unless otherwise indicated.

3.2 LINTELS

- A. Install lintels where indicated.
- B. Minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.3 CLEANING

- A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

END OF SECTION 04 2000

SECTION 06 1053 – MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes wood blocking. Cants, miscellaneous framing equipment backboards, and nailers.

1.2 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
  - 1. Preservative-treated wood.
  - 2. Fire-retardant-treated wood.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS GENERAL

- A. Lumber: DOS PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber certified by the ALSC Board of Review and acceptable authorities having jurisdiction.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX).
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat miscellaneous carpentry in the following conditions:

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1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

2.3 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  1. Blocking.
  2. Backing.
  3. Nailers.
  4. Cants.
- B. For dimensioned lumber and concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
  1. Mixed southern pine, No. 1 grade; SPIB.
- C. Provide dimensional lumber as indicated for stair framing and other framed conditions.

2.4 FASTENERS

- A. General: Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide hot-dip galvanized fasteners.
- B. Power-Driven Fasteners: NES NER-272.
- C. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit.
- B. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

- C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- D. Do not splice structural members between supports, unless otherwise indicated.
- E. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.

### 3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Do not enclose wood that has been allowed to become wet. Dry wood or replace completely before enclosing.

END OF SECTION 06 1053

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## SECTION 06 4020 – ARCHITECTURAL WOODWORK

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes plastic laminate cabinets and countertops, and solid surface countertops where scheduled or indicated.
- B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation and other miscellaneous wood products.

#### 1.2 SUBMITTALS

- A. Product Data: For cabinet hardware and accessories and finishing materials and processes.
- B. Shop drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
  - 1. Plastic-laminates, for each type, color, pattern, and surface finish.
  - 2. Solid surface material for each type, color, pattern, and surface finish.

#### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."
- C. ANSI/AWI 1236-22 Countertop Standard.

#### 1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers of Plastic Laminate Materials: Scheduled Design Basis products are Wilsonart HD Type HGP 376, AEON Enhanced Scratch and Scuff Resistant laminates. Scheduled colors listed are by Wilsonart and shall be matched by other listed

manufacturers. Subject to conformance with Specification Requirements, provide the Design Basis product or products of

1. Formica.
2. Nevamar.
3. Pionite.

B. Manufacturers of Solid Surface Materials: Scheduled Design Basis products are Corian by DuPont. Subject to conformance with Specification Requirements, provide the Design Basis product or products of

1. Formica.
2. Wilsonart.

## 2.2 PRODUCTS

A. Wood Products:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
4. Softwood Plywood: DOC PS 1.

B. Standing and Running Trim:

1. Grade: Custom.
2. Wood Species and Cut for Transparent Finish: Red oak.
3. Wood Species for Opaque Finish: Any closed-grain hardwood.

C. Thermoset Decorative Panels: Plywood, particleboard or medium-density fiberboard substrate as indicated finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

D. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGP at both vertical and horizontal surfaces.

E. Solid Surfacing Material:

1. Design Basis Products as scheduled on Finish Legend, or prior approved equal.
2. Thicknesses: 1/2-inch.
3. Where Solid Surface material is indicated to be bent to a radius, provide in ¼" thickness or thickness as recommended by fabricated for radius indicated.

F. Colors and Patterns: As indicated on drawings. The product of one manufacturer is listed but matching colors and patterns by other manufacturers are acceptable.

## 2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork.



- B. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch thick metal, and as follows:
  - 1. Semi-concealed Hinges for Flush Doors: BHMA A156.9, B01361.
  - 2. Semi-concealed Hinges for Overlay Doors: BHMA A156.9, B01521.
- C. Back-Mounted Pulls: BHMA A156.9, B02011.
- D. Wire Pulls: Back mounted, solid metal, 4 inches long.
- E. Catches: Magnetic catches, BHMA A156.9.
- F. Drawer Slides: BHMA A156.9, B05091.
  - 1. Heavy Duty (Grade 1HD-100 and Grade 1HD-200): Side mounted; full-extension type; zinc-plated steel ball-bearing slides.
  - 2. Box Drawer Slides: Grade 1HD-100; for drawers not more than 6 inches high and 24 inches wide.
- G. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
  - 1. Satin Stainless Steel: BHMA 630.
- H. Countertop Brackets:
  - 1. 18" x 2" x 18" low profile bracket with curved decorative gusset.
  - 2. Finish: 301 Stainless Steel.
  - 3. Manufacturer: Federal Brace or equal.

#### 2.4 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, fire-retardant treated where required, kiln-dried to less than 15 percent moisture content.
- B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
- C. Plywood for Solid Surface Countertops: Exterior softwood plywood complying with DOC PS 1, Grade C-c Plugged, touch sanded.

#### 2.5 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
  - 1. Interior Woodwork Grade: Custom
  - 2. Shop cut openings to maximum extent possible. Sand edges of cutouts to remove splinters and burrs. Seal edges of openings in countertops with a coat of varnish.

- B. Plastic-Laminate Cabinets:
  - 1. AWI Type of Cabinet Construction: Flush overlay on face frame or as detailed.
  - 2. Reveal Dimension: 1/2 inch.
  - 3. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate as follows:
    - a. Horizontal Surfaces Other Than Tops: Grade HGS. Thickness 0.048 inches.
    - b. Edges: Grade HGS. Thickness: 0.048 inches.
    - c. Toe Kick at Cabinet Bases: Grade HGS. Thickness: 0.048 inches.
    - d. Vertical Toe-kick at Bases: Grade HGS Thickness: 0.048 inches.
  
- C. Materials for Semi-exposed Surfaces Other Than Drawer Bodies: High pressure decorative laminate, Grade VGS.
  - 1. Drawer Sides and Backs: Solid-hardwood lumber.
  - 2. Drawer Bottoms: Hardwood plywood.
  - 3. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range.
  - 4. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
  
- D. Plastic-Laminate Countertops:
  - 1. High-Pressure Decorative Laminate Grade: HGS.
  - 2. Colors, Patterns, and Finishes: As selected by Architect from laminate manufacturer's full range.
  - 3. Edge Treatment: 1.5" vertical leg covered in plastic laminate (non-post-formed).
  - 4. Back and side splashes: Formed Separately from countertop. Plastic laminate on exterior-grade plywood substrate.
  - 5. Back and side splashes: Formed Separately from countertop. Plastic laminate on exterior-grade plywood substrate.
  
- E. Solid Surface for Countertops:
  - 1. 1/2" inch thickness for horizontal installation over 3/4" plywood substrate.
  - 2. Backsplashes and sidesplashes integral with countertop material unless detailed otherwise.
  - 3. Edge detail as indicated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

- B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
  - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips; No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish; or toggle bolts through metal backing or metal framing behind wall finish.
- G. Standing and Running Trim: make standing trim single lengths, running trim in longest lengths possible. Miter cut running joints tight and flush on exposed faces and edges. Miter or cope inside corner joints; miter outside corners. Miter and return exposed ends, returns less than 1" longer than thickness, drilled, glued and nailed.

### 3.2 INSTALLATION OF COUNTERTOPS

- A. Countertops and Subtops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."
  - 1. Follow solid surface manufacturer's recommendations for configuration of subtops to provide proper support of solid surface materials.
  - 2. Secure solid surface countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.
- B. Field Jointing: Where possible, make in same manner as shop-made joints using dowels, splines, fasteners, adhesives, and sealants recommended by manufacturer. Prepare edges in shop for field-made joints.
  - 1. Use concealed clamping devices for field-made joints in plastic-laminate countertops. Locate clamping devices within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a uniform heavy pressure at joints.

- C. Fastening: Secure countertops to cabinets with Z-type fasteners or equivalent, using two or more fasteners at each cabinet front, end, and back.
- D. Countertops installed at locations without base cabinets are installed with specified brackets. Coordinate blocking in walls as required to secure mount vertical leg of bracket.
- E. Seal unfinished edges and cutouts in plastic-laminate countertops with heavy coat of polyurethane varnish.
- F. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- G. Coordinate plumbing service fitting requirements with Plumbing requirements.

END OF SECTION 06 4020

SECTION 07 8413 - PENETRATION FIRESTOPPING

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. Penetrations in fire-resistance-rated walls.
  - 2. Penetrations in horizontal assemblies.
  - 3. Penetrations in smoke barriers.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Include as agenda item at conference at Project site for Tornado Shelter Construction.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
  - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

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1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.9 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
  - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
  - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
    - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
      - 1) UL in its "Fire Resistance Directory."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. 3M Fire Protection Products.
    - b. Construction Solutions.

- c. Grabber Construction Products.
  - d. Hilti, Inc.
  - e. HOLDRITE.
  - f. USG.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
- 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
  - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
  - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
- 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E 84.
- F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
- 1. Permanent forming/damming/backing materials.
  - 2. Substrate primers.
  - 3. Collars.
  - 4. Steel sleeves.
- 2.3 FILL MATERIALS
- A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

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- C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

## 2.4 MIXING

- A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.



### 3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

### 3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
  - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 IDENTIFICATION

- A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
  - 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet from end of wall and at intervals not exceeding 30 feet.
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels

with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

### 3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E 2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 8400

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and color Samples.
- B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

- A. Low-Emitting Materials: Sealants shall comply with the following limits for VOC content"
  - 1. Architectural Sealants: 250 g/L.
  - 2. Other Sealants: 420 g/L.
  - 3. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 4. Sealant Primers for Porous Substrates: 775 g/L.
  - 5. Other Sealant Primers: 750 g/L.
  - 6. Interior sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.
- C. Sealant for Use in Building Expansion Joints and General Exterior Use:
  - 1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 100/50; for Use NT.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) GE Construction Sealants; Momentive Performance Materials Inc.
      - 2) Pecora Corporation.
      - 3) Sika Corporation; Joint Sealants.
      - 4) Tremco Incorporated.
- D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:

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1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use T.
  - a. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - 1) BASF Corporation; Construction Systems.
    - 2) Sika Corporation.
    - 3) Tremco Incorporated.
  
- E. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:
  1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; for Use T.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) BASF Corporation; Construction Systems.
      - 2) Pecora Corporation.
      - 3) Sika Corporation.
      - 4) Tremco Incorporated.
      - 5) W.R. Meadows, Inc.
  
- F. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and around Plumbing Fixtures:
  1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; for Use NT; formulated with fungicide.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Dow Corning Corporation.
      - 2) GE Construction Sealants; Momentive Performance Materials Inc.
      - 3) Tremco Incorporated.
  
- G. Sealant for Interior Use at Perimeters of Door and Window Frames:
  1. Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) BASF Corporation; Construction Systems.
      - 2) Pecora Corporation.
      - 3) Tremco Incorporated.
  
- H. Acoustical Sealant:
  1. Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission as demonstrated by testing according to ASTM E 90.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) GE Construction Sealants; Momentive Performance Materials Inc.
      - 2) Pecora Corporation.
      - 3) Tremco Incorporated.
      - 4) United States Gypsum Company.

## 2.2 MISCELLANEOUS MATERIALS

- A. Provide sealant backings of materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.
  - 1. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean concrete, masonry, unglazed surfaces of ceramic tile, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
    - a. Remove laitance and form release agents from concrete.

3. Clean metal, glass, porcelain enamel, glazed surfaces of ceramic tile, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacturer based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's recommendations. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION

- A. Comply with ASTM C 1193.
- B. Provide single sealant joints at the following exterior locations:
  1. All horizontal joints beneath copings and wall caps.
  2. All horizontal joints at brick shelf angles.
  3. All vertical joints, i.e. expansion and control joints. Exception: vertical joints of copings and wall caps are to be double sealant joints.
- C. Provide double sealant joints at the following exterior locations:
  1. All horizontal surfaces. Note: turn down the sealant a minimum of two (2) inches over the front edge of the horizontal surface.
  2. All joints at coping and wall caps.
  3. All vertical joints at large entablatures and cornice trim of precast, stone, etc.
- D. Install sealant backings to support sealants during application and to produce cross-sectional shapes and depths of installed sealants that allow optimum sealant movement capability.
- E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- F. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal perimeters, control joints, openings, and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions. Comply with ASTM C 919.

END OF SECTION 07 9200

SECTION 08 1113 – HOLLOW METAL DOORS AND FRAMES

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. Standard hollow metal doors and frames.
- B. Related Sections:
  - 1. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
  - 2. Division 09 Sections for field painting hollow metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, temperature-rise ratings, and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of each door design.
  - 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
  - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of each different wall opening condition.
  - 6. Details of anchorages, joints, field splices, and connections.
  - 7. Details of accessories.
  - 8. Details of moldings, removable stops, glazing, and louvers.
  - 9. Details of conduit and preparations for power, signal, and control systems.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252.
- C. Smoke-Control Door Assemblies: Comply with NFPA 105.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.
  - 1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Amweld Building Products, LLC.
  - 2. Ceco Door Products; an Assa Abloy Group company.
  - 3. Curries Company; an Assa Abloy Group company.



4. Steelcraft, an Ingersoll-Rand Company.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.
  - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: Comply with requirements in Division 08 Section "Glazing."

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
  - 1. Design: Flush panel.
  - 2. Core Construction: Manufacturer's standard, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
  - 3. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
  - 4. Vertical Edges for Double-Acting Doors: Round vertical edges with 2-1/8-inch (54-mm) radius.
  - 5. Top and Bottom Edges: Closed with flush 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.

6. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  1. Level 3 Performance Level - Extra Heavy Duty, Model 2 (Seamless).
    - a. Width: 1-3/4 inches (44.5 mm).
    - b. Face sheet thickness: 0.053" (1.3mm)
- C. Interior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
  1. Level 2 Performance Level - Heavy Duty, Model 2 (Seamless).
    - a. Width: 1-3/4 inches (44.5 mm).
    - b. Face sheet thickness: 0.042" (1.0 mm)
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
- E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

#### 2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
  1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames as full profile welded unless otherwise indicated.
  3. Frames for SDI Extra Heavy Steel Doors: 0.067-inch- (1.7-mm-) thick steel sheet.
  4. Throat Width: Minimum 5/4".
- C. Interior Frames: Fabricated from cold-rolled steel sheet.
  1. Fabricate frames with mitered or coped corners.
  2. Fabricate frames as full profile welded unless otherwise indicated.
  3. Frames for SDI Heavy Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
  4. Throat Width: Minimum 5/4" unless noted otherwise.
- D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

#### 2.5 FRAME ANCHORS

- A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
  2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:
1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
  2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

## 2.6 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

## 2.7 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117 ANSI/NAAMM-HMMA 861.
- C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
  5. Jamb Anchors: Provide number and spacing of anchors as follows:

- a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches (1524 mm) high.
    - 2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
    - 3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
    - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
  - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
    - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
    - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
    - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
    - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
    - 5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.
  - c. Compression Type: Not less than two anchors in each jamb.
  - d. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.
6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
- a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to.
  2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.
- G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.

2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

## 2.8 STEEL FINISHES

- A. Prime Finish for Doors to be Field Painted: Apply manufacturer's standard primer immediately after cleaning and pretreating.
  1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 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 embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:
  1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. At fire-protection-rated openings, install frames according to NFPA 80.
    - b. Install frames with removable glazing stops located on secure side of opening.
    - c. Install door silencers in frames before grouting.
    - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - e. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
  2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
  3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
    - 1. Non-Fire-Rated Standard Steel Doors:
      - a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
      - b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
      - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
      - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).
    - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
    - 3. Smoke-Control Doors: Install doors according to NFPA 105.
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
  - B. Remove grout and other bonding material from hollow metal work immediately after installation.
  - C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
  - D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

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SECTION 08 3323 – OVERHEAD COILING SERVICE DOORS

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.
- B. Section 13 3419 - Metal Building Systems: Support framing and framed opening.

1.2 SUMMARY

- A. This Section includes Overhead Coiling Service Doors, electric operation.

1.3 REFERENCES

- A. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- C. NEMA MG 1 - Motors and Generators.

1.4 PERFORMANCE REQUIREMENTS

- A. Overhead coiling service doors:
  - 1. Wind Loads: Design door assembly to withstand wind/suction load of 20 psf (958 Pa) without damage to door or assembly components.
  - 2. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.
- B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

1.5 SUBMITTALS

- A. Submit the following in accordance with Conditions of Contract and Division Specifications sections.

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- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Details of construction and fabrication.
  - 4. Installation instructions.
- C. Shop Drawings: Include detailed plans, elevations, details of framing members, anchoring methods, required clearances, hardware, and accessories. Include relationship with adjacent construction.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) long, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Data: Submit lubrication requirements and frequency, and periodic adjustments required.
- H. Colors: submit samples from manufacturer's full line of color options.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001:2015 registered and specializing in performing Work of this section with a minimum of five years' experience in the fabrication and installation of security closures.
- B. Installer Qualifications: Installer Qualifications: Company specializing in performing Work of this section with minimum three years and approved by manufacturer.
- C. Uniformity: Provide metal lockers that are standard products of single manufacturer, with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.

1.7 DELIVERY STORAGE AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Protect materials from exposure to moisture. Do not deliver coiling door until after wet work is complete and dry.
- C. Store materials in a dry, warm, ventilated weathertight location.

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1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.9 WARRANTY

- A. Warranty: Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever occurs first.
- B. Warranty: Manufacturer's limited door warranty for 2 years for all parts and components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design is Model ESD10 by Cornell Cookson, Inc.
- B. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
  - 1. C.H.I. Overhead Doors.
  - 2. Overhead Door Corporation.
  - 3. Raynor Corporation.

2.2 MATERIALS

- A. Industrial Doors:
  - 1. Curtain: Interlocking roll-formed slats as specified following. Endlocks shall be attached to each end of alternate slats to prevent lateral movement.
    - a. Slats selected from manufacturer's standard flat or curved profiles.
      - 1) 22 gauge galvanized steel.
  - 2. Finish:
    - a. Galvanized Steel: Slats and hood galvanized in accordance with ASTM A 653 and receive rust-inhibitive, roll coating process, including 0.2 mils thick baked-on prime paint, and 0.6 mils thick baked-on polyester enamel top coat.
      - 1) Powder coat: Weather resistant polyester enamel powder coat finish as selected by Architect from manufacturer's standard color line including a minimum of four colors.

- 2) Non-galvanized exposed ferrous surfaces shall receive one coat of rust-inhibitive primer.
3. Weatherseals:
  - a. Bottom Bar: Sensing weather edge within neoprene astragal extending full width of door.
  - b. Guides: Vinyl strip seals against fascia side of curtain.
  - c. Hood: Neoprene/rayon baffle to impede air flow above coil.
  - d. Lintel Seal: Nylon brush seal fitted at door header to pimpled air flow.
4. Bottom Bar: Powder coat finish double steel angle bottom bar assembly.
5. Guides: Powder coat finish double steel angle bottom bar assembly.  
Finish: Zinc Finish for guides and head plate.
6. Brackets: Galvanized steel to support counterbalance, curtain and hood.
7. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
8. Hood: 24 gauge galvanized steel with intermediate supports as required.
9. Electric Motor Operation: Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
  - a. Sensing Edge Protection:
    - 1) Electric eye sensing edge.
  - b. Operator Controls:
    - 2) Push-button operated control stations with open, close, and stop buttons.
    - 3) Controls for interior location.
    - 4) Controls surface mounted.
  - d. Emergency Operation: Emergency manual chain hoist that safely cuts operator power when engaged. A disconnect chain shall not be required to engage release the manual chain hoist.
  - e. Motor Voltage: 115/230 single phase, 60 Hz.
10. Windload Design: Standard windload shall be 20 PSF.
11. Locking: Interior slide bolt lock for electric operation with interlock switch.
12. Wall Mounting Condition: Face-of-wall mounting to steel framing at interior of door jambs.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify opening sizes, tolerances and conditions are acceptable.
- B. Examine conditions of substrates, supports, and other conditions under which this work is to be performed. Coordinate with pre-engineered metal building components.

- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- A. Install coiling door at locations shown in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Installation of electrical service will be provided by the Owner. After electrical service to doors has been completed, installer to complete adjustment of door operators.
- F. Install perimeter trim and closures.
- G. Instruct Owner's personnel in proper operating procedures and maintenance schedule.

### 3.4 ADJUSTING CLEANING AND PROTECTION

- A. After electrical service to doors has been completed by Owner, test for proper operation and adjust as necessary to provide proper operation without binding or distortion.
- B. Adjust hardware and operating assemblies for smooth and noiseless operation.
- C. Clean curtain and components using non-abrasive materials and methods recommended by manufacturer.
- D. Remove labels and visible markings.
- E. Touch-up, repair or replace damaged products before Substantial Completion.
- F. Protect installed products until completion of project.

END OF SECTION 10 500

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## SECTION 08 5113 ALUMINUM WINDOWS

### 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. Refer to Section 00 0300 Bid Proposal for Unit Prices & Allowances Form. Replacement windows at Shades Valley Building 1299 Sewer Line Maintenance shall be bid on a unit cost basis for removal of existing windows and providing new windows at locations to be determined during construction. See Detail

#### 1.2 Summary

- A. Section includes Architectural Aluminum Windows including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of window units.
  1. Types of aluminum windows include:
    - a. Fixed Thermal Windows
    - b. 3-1/4" (82.5 mm) frame depth
    - c. AW-PG80-FW
- B. Related Sections:
  1. 07 9200 "Joint Sealants"

#### 1.3 Definitions

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

#### 1.4 Performance Requirements

- A. General Performance: Aluminum-framed window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Window Performance Requirements:
  1. Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
    - a. Performance Class and Grade: AW-PG80-FW.
  2. Air Infiltration: after the AAMA 910 life cycle test, meet AAMA 101 standard of maximum 0.10 cfm/ft<sup>2</sup> when tested per ASTM E 283 at a static air pressure differential of 6.24 psf (300 PA).
  3. Water Penetration: after the AAMA 910 life cycle test, no uncontrolled water leakage when tested per ASTM E 547 and ASTM E 331 at a static air pressure differential of 15 psf (720 PA).
  4. Uniform Deflection: no more than L/175 when tested per ASTM E 330 at a static air pressure differential of 80 psf (3840 PA).

5. Uniform Structural: window to be operable, and maximum .2% permanent deformation per member when tested per ASTM E 330 at a static air pressure differential of 120 psf (5748 PA).
6. Component Testing: Window components shall be tested in accordance with procedures described in ANSI AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
7. Energy Efficiency:
  - a. Thermal Transmittance Test (U-Factor): When tested to AAMA specification 1503, AAMA specification 507 or NFRC100 the thermal transmittance (U-Factor) shall not be more than:
    - 1) 1/2" insulating glass with low-e coating: U-Factor not more than 0.32 BTU/hr/sf/°F per AAMA 507 or NFRC100, Solar Heat Gain Coefficient 0.16-0.20.
8. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.
9. Thermal Barrier Tests: Testing shall be in general accordance with AAMA 505 Dry Shrinkage and Composite Thermal Cycling test procedure, AAMA TIR-A8, Structural Performance of Composite Thermal Barrier systems.

#### 1.5 Submittals

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other work, operational clearances and installation details.
- C. Samples for Initial Selection: For units with factory-applied color finishes including samples of hardware and accessories involving color selection.
- D. Samples for Verification: For aluminum windows and components required.
- E. Product Schedule: For aluminum windows. Use same designations indicated on Drawings.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency for each type, class, grade, and size of aluminum window. Test results based on use of downsized test units will not be accepted.

#### 1.6 Quality Assurance

- A. Installer Qualifications: An installer which has had successful experiences with installation of the same or similar units required for this project and other projects of similar size and scope.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion of test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.



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1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Comply with requirements in Division 01 Section "Project Management and Coordination."

#### 1.7 Project Conditions

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.8 Warranty

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  1. Warranty Period: Two (2) years from Date of Substantial Completion of the project provided however that the Limited Warranty shall begin in no event later than six months from date of shipment by manufacturer.
- B. Insulating Glass: Warranted to be free from defects (excluding breakage) for a period of ten (10) years.

### PART 2 - PRODUCTS

#### 2.1 Manufacturers

- A. Basis-of-Design Product:
  1. Kawneer Series AA®4325 Ultra Thermal Windows - Fixed
  2. 3-1/4" (82.5 mm) frame depth
  3. AW-PG80-FW
- B. Subject to compliance with requirements, provide a comparable product by the following:
  1. Coral Architectural Products.
  2. Old Castle Building Envelope.
  3. C.R. Laurence Co., Inc.
  4. YKK AP America, Inc.
- C. Substitutions: Refer to Substitutions Section for procedures and submission requirements.
  1. Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.
  2. Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid window installation and construction delays.
  3. Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.
  4. Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for window system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum windows for a period of not less than ten (10) years. (Company Name)
  5. Test Reports: Submit test reports verifying compliance with each test requirement required by the project.
  6. Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

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- D. Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal change order signed by the Owner and Contractor.

## 2.2 Materials

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish.
- B. Thermal Barrier: Structural thermal break made with glass-reinforced nylon strips, (closed cell PVC foam strips) installed by the window manufacturer in the frame and vent members.
- C. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.
- D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- E. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
- F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

## 2.3 Glazing

- A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.
- B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer's standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

## 2.4 Hardware

- A. General: None required.

## 2.5 Accessories

- A. General: None required.

## 2.6 Fabrication

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  1. Profiles that are sharp, straight, and free of defects or deformations.
  2. Accurately fit joints; make joints flush, hairline and weatherproof.
  3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  4. Physical and thermal isolation of glazing from framing members.

5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  6. Provisions for field replacement of glazing.
  7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Frame: All members double tubular; corners mitered, double gusset reinforced, factory-sealed with sealant conforming to AAMA 800, and crimped.
- C. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- D. Fabricate aluminum windows that are re-glazable without dismantling framing.
- E. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093-inch (2.4-mm) thick extruded aluminum. Miter or cope corners and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.
- F. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
- G. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match frame.

## 2.7 Aluminum Finishes

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  1. AA-M10C21A44, AAMA 611, Architectural Class I Color Anodic Coating (Color Dark Bronze).

## PART 3 - EXECUTION

### 3.1 Examination

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weather tight window installation.
  1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
  2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inches (76.2 mm) of opening.
  3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.
  4. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 Installation

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install aluminum-framed window system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum-framed window system and components to drain condensation, water penetrating joints, and moisture migrating within system to the exterior.
- E. Separate aluminum from dissimilar materials to prevent corrosion or electrolytic action at points of contact.

### 3.3 Field Quality Control

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
  - 1. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Testing Services: Testing and inspecting of installed windows shall take place as follows:
  - 1. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Infiltration Test and ASTM E 1105 for Water Penetration Test.
    - a. Air Infiltration Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 1.57 psf (75 Pa) for CW or 6.24 psf (300 Pa) for AW. The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
    - b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
  - 2. Testing Extent: Architect shall select window units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
  - 3. Test Reports: Shall be prepared according to AAMA 502.

### 3.4 Adjusting, Cleaning, And Protection

- A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

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- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

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SECTION 09 2216 – NON-STRUCTURAL METAL FRAMING

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. Non-load-bearing steel framing systems for interior gypsum board assemblies including furring channels.
  - 2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
- B. Related Requirements:
  - 1. Division 09 Section: "Gypsum Board".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
  - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
  - 2. Protective Coating: ASTM A 653/A 653M, G40 (Z120) Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
- B. Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners.
  - 1. Steel Studs and Runners:
    - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
    - b. Depth: As indicated on Drawings.
- C. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: As indicated on Drawings.
  - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

## 2.2 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- C. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
  - 1. Depth: 2-1/2 inches (64 mm).
- D. Furring Channels (Furring Members):
  - 1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
  - 2. Steel Studs and Runners: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
    - b. Depth: As indicated on Drawings.
  - 3. Dimpled Steel Studs and Runners: ASTM C 645.
    - a. Minimum Base-Metal Thickness: 0.015 inch (0.38 mm).
    - b. Depth: As indicated on Drawings.
  - 4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
    - a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
  - 5. Resilient Furring Channels: 3/4-inch- (13-mm-) deep members designed to reduce sound transmission.
    - a. Configuration: hat shaped.
- E. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
    - b. Chicago Metallic Corporation; Drywall Grid System.
    - c. USG Corporation; Drywall Suspension System.

## 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
  - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.



### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

#### 3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
  - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

#### 3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
  2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
    - a. Install two studs at each jamb unless otherwise indicated.
    - b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
  3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

### 3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
  1. Hangers: 48 inches (1219 mm) o.c.
  2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
  3. Furring Channels (Furring Members): 16 inches (406 mm) o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
  1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
  3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
  4. Do not attach hangers to steel roof deck.
  5. Do not connect or suspend steel framing from ducts, pipes, or conduit.

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- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

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SECTION 09 2900 – GYPSUM BOARD

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. Interior gypsum board.
- B. Related Requirements:
  - 1. Division 09 Section “Non-Structural Metal Framing” for non-structural framing and suspension systems that support gypsum board panels.

1.3 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation and other potential causes of damage.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Gypsum.
  2. CertainTeed Corp.
  3. Continental Building Products.
  4. Georgia-Pacific Gypsum LLC.
  5. National Gypsum Company.
  6. USG Corporation.
- B. Gypsum Wallboard: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch Type X.
  2. Long Edges: Tapered for prefilling.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
1. Thickness: 5/8 inch Type X..
  2. Long Edges: Tapered.
- D. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces. Use at Toilets and Janitor Closet.
1. Core: 5/8 inch.
  2. Long Edges: Tapered.
  3. Mold Resistance: ASTM D 3273, score of 10.
- E. Cementitious Backer Board: Meet the following requirements; ASTM C 473/C 1396M/C 1325/C 947/E 84/E 96.
1. Thickness: 5/8 inch.
  2. Long Edges: Round.
  3. Mold Resistance: ASTM D 3273, score of 10.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
  2. Shapes: Cornerbead.
    - a. L-Bead: L-shaped; exposed long flange receives joint compound.
  3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

## 2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, all-purpose compound.
  - 3. Fill Coat: For second coat, use all-purpose compound.
  - 4. Finish Coat: For third coat, use all-purpose compound.

## 2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
- D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc., except in chases braced internally).
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8 inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide ¼ to ½ inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Single-Layer Application:



1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Double-Layer Application:

1. Apply first layer as specified above.
2. Stagger joints in second layer over joints in first layer.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Provide trim accessories indicated.
- C. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- D. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- E. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  1. Level 2: At walls to receive fabric wall covering system.
  2. Level 4: At wall panel surface that will be exposed to view, unless otherwise indicated.
  3. Level 5: At ceiling panel surfaces exposed to view, unless otherwise indicated.

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

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- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
  
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 2900

SECTION 09 3013 – TILING

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. Porcelain tile.
  - 2. Metal edge strips.

1.3 SUBMITTAL

- A. Product Data: for each type of product indicated.
- B. Samples for Initial Selection: For each type of tile and grout indicated. Include samples of accessories involving color selection.
- C. Samples for Verification:
  - 1. Full-Size unit of each type and composition of tile and for each color and finish required.
  - 2. Grout colors
  - 3. Metal edge strips in 6-inch lengths.
- D. Qualification Data: For qualified installer.
- E. Material Test Reports: For each tile-setting and grouting product.

1.4 QUALITY ASSURANCE

- A. Contractor Qualification: Tile contractor must have been in business a minimum of 5 years, operating under the same name and regularly perform tile installations of similar scope and complexity. The work is to be performed by a craftsman who are normally employed by the contractor.
- B. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties.
- C. Source Limitation for Other Products: Obtain each of the following products specified in this section from a single manufacturer for each product:
  - 1. Joint sealant
  - 2. Metal edge strips

1.5 DELIVERY, STORAGE AND HANDLING

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- A. Deliver and store packaged material in original container with seal unbroken and labels intact until time of use. comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious material on elevated platforms, under cover and in a dry location.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in reference standards and manufacturer's written instructions.

1.7 EXTRA MATERIAL

- A. Furnish extra materials that match and are from same production runs as product installed and that are packaged with protective covering for storage and identified with labels describing content. Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern and size indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standards: provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated.
  - 1. Provide tile complying with standard grade requirements unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: for tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.2 TILE PRODUCTS

- A. Wall Tile: "WT-1". Basis of Design is Daltile, Chord Collection, Colorbody Porcelain.
  - 1. Composition: Impervious porcelain.
  - 2. Modular Size: 12" x 24".
  - 3. Thickness: 3/8 inch.
  - 4. Tile Color: Canon Gray CH22, Light Polished Finish, Rectangle Shape.
  - 5. Grout Color: As selected from MAPEI full range or approved equal.
  - 6. Grout Joint Size: 1/8 inch.
  - 7. Mortar: As selected from MAPEI or approved equal.

- B. Wall Tile: "WT-2". Basis of Design is Daltile, Chord Collection, Colorbody Porcelain.
  - 1. Composition: Impervious porcelain.
  - 2. Modular Size: 11 5/8" x 14 1/2".
  - 3. Thickness: 3/8 inch.
  - 4. Tile Color: Canon Gray CH22, Light Polished Finish, Rectangle Shape.
  - 5. Grout Color: As selected from MAPEI full range or approved equal.
  - 6. Grout Joint Size: 1/8 inch.
  - 7. Mortar: As selected from MAPEI or approved equal.
  
- C. Floor Tile: "FT-1": Basis of Design is Daltile, Chord Collection, Colorbody Porcelain.
  - 1. Composition: Impervious porcelain.
  - 2. Modular Size Sheet: 11 5/8" x 14 1/2".
  - 3. Thickness: 3/8 inch.
  - 4. Tile Color: Canon Gray CH22, Matte Finish, Rectangular Shape.
  - 5. Grout Color: As selected from MAPEI full range or approved equal.
  - 6. Grout Joint Size: 1/8 inch.
  - 7. Mortar: As selected from MAPEI or approved equal.
  
- D. Floor Tile at Showers: "FT-2": Basis of Design is Daltile, Chord Collection, Colorbody Porcelain.
  - 1. Composition: Impervious porcelain.
  - 2. Mosaic Tile: Triangular shape, matte finish, mesh mounted on modular size sheet.
  - 3. Modular Size Sheet: 11 5/8" x 14 1/2".
  - 4. Thickness: 3/8 inch.
  - 5. Tile Color: Canon Gray CH22.
  - 6. Grout Color: As selected from MAPEI full range or approved equal.
  - 7. Grout Joint Size: 1/8 inch.
  - 8. Mortar: As selected from MAPEI or approved equal.

### 2.3 MISCELLANEOUS MATERIAL

- A. Metal Edge Strips: L and SQ-shape, height to match tile and setting-bed thickness. Material to be extruded aluminum unless otherwise indicated.
  
- B. Portland Cement Mortar for Thickset Installation Materials: ANSI A108.02.
  
- C. Tile Cleaners: a neutral cleaner capable of removing soil, residue, and grate haze without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  - 1. Install tile backing panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use modified dry-set mortar for bonding material unless otherwise directed in manufacturer's written instructions.
  - 2. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

#### 3.3 CLEANING AND PROTECTING

- A. Cleaning: on completion of placement and grouting, clean all tile surfaces so they are free of forging matter.
  - 1. Remove latex-portland cement mortar or epoxy grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surface with clean water before and after cleaning.
- B. Protect installed tile work to prevent staining and damage.
  - 1. Before final inspection buff tile surface.

END OF SECTION 09 3013

SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data and Samples.

1.2 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
  2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS

- A. Design Basis Product: Armstrong World Industries School Zone Fine Fissured. Subject to compliance with requirements, products by the following manufacturers are acceptable:
1. Armstrong World Industries.
  2. CertainTeed Corporation.
  3. United States Gypsum Company.
- B. ACT-1 Classification: Design Basis Product: Armstrong World Industries School Zone Fine Fissured. Per ASTM E 1264:
1. Type and Form: Type III, Form 2.
  2. Pattern: CE (perforated small holes and lightly textured).
  3. LRC: Not less than 0.85.
  4. NRC: Not less than 0.55.
  5. CAC: Not less than 33.
  6. Surface-Burning Characteristics: Class A.
- C. Color: White.
- D. Edge Detail: Square.
- E. Thickness: 5/8 inch.
- F. Modular Size: 24 by 24 inches.
- G. ACT-2 Classification: Design Basis Product: United States Gypsum Sheet Rock Brand Lay-in Ceiling Panels, vinyl faced with sealed back and edges, Per ASTM E 1264:
1. Type and Form: Type XX.
  2. Pattern: G.

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3. Surface-Burning Characteristics: Class A.
4. Color: White.
5. Edge Detail: Square.
6. Thickness: 1/2 inch.
7. Modular Size: 24 by 24 inches.

## 2.2 CEILING SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Armstrong World Industries, Inc.
  2. CertainTeed, Saint-Gobain
  3. Chicago Metallic Corporation.
  4. United States Gypsum Company.
- B. Ceiling Suspension System: Wide-face, direct-hung system; ASTM C 635, intermediate-duty structural classification.
  1. Face Design: Flat, flush.
  2. Face Finish:
    - a. At ACT-1 & ACT-2: White.
  3. At ACT-2 provide environmental grid with hot-dipped galvanized Main Beam and Cross Tees.
- C. Attachment Devices: Sized for 5 times the design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
  1. Size: Provide yield strength at least 3 times the hanger design load (ASTM C 635, Table 1, Direct Hung), but not less than 0.106-inch- diameter wire.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install acoustical ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
- C. Arrange directionally patterned acoustical units with pattern parallel to short axis of space.

END OF SECTION 09 5113



SECTION 09 6513 – RESILIENT WALL BASE & ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
  - 1. Resilient wall base.
- B. Related Sections: Division 9 Sections “Resilient Flooring”, “Carpet Tile”, and “Sheet Carpeting” contain requirements that relate to this Section.

1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Samples for initial selection purposes of manufacturer's standard sample sets in form of pieces cut from each type of product specified, showing full range of colors and patterns available.
- D. Samples for verification purposes in manufacturer's standard sizes, but not less than 12 inches long, of each different color and pattern of product specified.

1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to Project site in original manufacturer's unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Move products into spaces where they will be installed at least 48 hours in advance of installation.

1.5 PROJECT CONDITIONS

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- A. Maintain a minimum temperature of 70 deg F (21 deg C) in spaces to receive products specified in this Section for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 deg F (13 deg C).
- B. Do not install products until they are at the same temperature as that of the space where they are to be installed. Close spaces to traffic during installation of products specified in this Section.

1.6 SEQUENCING AND SCHEDULING

- A. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.

1.7 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage, and identified with labels clearly describing contents. Furnish not less than 10 linear feet for each 500 linear feet or fraction thereof of each different type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide Resilient Wall Basis and Accessories by one of the following manufacturers:
  - 1. Flexco
  - 2. Johnsite
  - 3. Roppe
  - 4. Basis of Design products in this Section are by Roppe. Any substitutions must be approved by Architect's interior designer prior to bid date.
- B. Basis of Design for Wall Base: Roppe, Pinnacle Rubber Base.
  - 1. Rubber Wall Base: ASTM F 1861
  - 2. See FINISH SCHEDULE for colors.
  - 3. Style: Cove (with top-set toe).
  - 4. Minimum Nominal Thickness: 1/8 inch.
  - 5. Height: 4 inches.
  - 6. Lengths: Continuous coils in lengths standard with manufacturer, but not less than 100 feet. Place order in sufficient time to obtain lengths desired.
  - 7. Outside Corners: Stretched only - No pre-molded corners.
  - 8. Interior Corners: Job-formed only.
  - 9. Surface: Smooth.

2.2 RESILIENT ACCESSORIES

### 2.3 INSTALLATION ACCESSORIES

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by resilient product manufacturers for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient flooring product and substrate conditions indicated.
  - 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
    - a. Cove Base Adhesives: 50 g/L.
    - b. Rubber Floor Adhesives: 60 g/L.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas where installation of products specified in this Section will occur, with Installer present, to verify that substrates and conditions are satisfactory for installation and comply with manufacturer's requirements and those specified in this Section.

### 3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications for preparing substrates indicated to receive products indicated.
- B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes, and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Broom or vacuum clean substrates to be covered immediately before installing products specified in this Section. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

### 3.3 INSTALLATION

- A. General: Install products specified in this Section using methods indicated according to manufacturer's installation directions.
- B. Apply resilient wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms and areas where base is required. Install wall base in lengths as long

as practicable. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

1. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
  2. Do not stretch wall base during installation.
  3. Install base and accessories to minimize joints. Install base with joints as far from corners as practical.
  4. Form inside corners on job from straight pieces of maximum lengths possible by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base to produce snug fit to substrate.
  5. Form outside corners on job from straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
- C. Place resilient accessories so they are butted to adjacent materials of type indicated and bond to substrates with adhesive. Install reducer strips at edges of flooring that otherwise would be exposed.
- D. Install stair treads in one piece per tread. Install risers in one piece per riser.

#### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing installation:
1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers of resilient product involved.
  2. Sweep or vacuum floor thoroughly.
  3. Do not wash surfaces until after time period recommended by manufacturer.
  4. Damp-mop resilient accessories to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by manufacturer of resilient product involved.
1. Cover resilient accessories on floors with undyed, untreated building paper until inspection for Substantial Completion.
- C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.

END OF SECTION 09 6513

SECTION 09 6519 – RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes resilient tile flooring categorized as “Resilient Vinyl Tile”.

1.2 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each type of product specified.
- C. Samples for verification purposes: 9-inch by 48-inch product sample.
- D. Maintenance data for resilient floor tile, to include in Operating and Maintenance Manual specified in Division 1.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 deg F (10 deg C) and 90 deg F (32 deg C).
- C. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.4 PROJECT CONDITIONS

- A. Do not install tiles until they are at the same temperature as the space where they are to be installed. Close spaces to traffic during tile installation.

1.5 EXTRA MATERIALS

- A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to full conformance with Specification requirements, provide products by the following:
  - 1. Armstrong Flooring
  - 2. J+J Flooring Group, LLC
  - 3. Tandus Centiva
  
- B. Resilient Vinyl Tile Basis of Design: J+J Flooring Group, Classics II Luxury Vinyl Tile. Color selection from 10 standard colors.
  - 1. Submit products of other approved manufacturers for approval of style and similar colors (8 colors minimum).
  
- C. Vinyl Composition Floor Tile: Products complying with ASTM F 1066, Composition 1 (nonasbestos formulated), ASTM F 1700, Class III printed film vinyl plank, Type B embossed surface and with the following requirements.
  - 1. Wearing Layer Thickness: 20 mil.
  - 2. Thickness: 3 mm
  - 3. Nominal Dimensions Inches: 9" by 48" plank
  - 4. Finish and Coating: Protective UV cured Urethane with ceramic beads.
  - 5. Edges: Micro beveled.
  - 6. Installation Method: High-strength acrylic latex-based carpet adhesive.
  - 7. Slip Resistance: ASTM D2047, Passes >0.5, ADA Compliant.
  - 8. Flammability: NFPA Class 1.
  - 9. Antimicrobial: Zinc Pyrithione additive.
  - 10. Indoor Air Quality: Floor Score Certification.

## 2.2 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
  
- B. Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by floor manufacturer for applications indicated.
  
- C. Adhesives: Design Basis Product is Commercialon Premium Modular Adhesive.
  - 1. Antimicrobial.
  - 2. Meets CRI Low-VOC Emission Criteria.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. General: Examine areas where installation of tiles will occur, with Installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with tile manufacturer's requirements and those specified in this Section.
  
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with manufacturer's installation specifications to prepare substrates indicated to receive tile.
- B. Use trowelable leveling and patching compounds per tile manufacturer's directions to fill cracks, holes, and depressions in substrates. Level to 1/8" in 10'-0" tolerance.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before tile installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

### 3.3 INSTALLATION

- A. General: Comply with tile manufacturer's installation directions and other requirements indicated that are applicable to each type of tile installation included in Project.
- B. Installer shall test slabs to receive tile for moisture content and provide test results before proceeding with tile installation. Modular adhesive shall be type required based on moisture content of the slab.
- C. Install tile with tight joints. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings.
- D. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.
- E. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.

### 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after completing tile installation:
  - 1. Remove visible adhesive and other surface blemishes, using cleaner recommended by tile manufacturers.
  - 2. Do not scrub floor with steel wool pads, wire brushes, aggressive floor cleaners or cleansers.
  - 3. Sweep or vacuum floor thoroughly.

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4. Do not wash floor until after time period recommended by resilient floor tile manufacturer.
  5. Damp-mop tile to remove black marks, soil and blemishes.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.
1. Cover tiles with Ram Board Temporary Floor Protection until Substantial Completion.
  2. Do not move heavy and sharp objects directly over tiles. Place plywood or hardboard panels over tiles and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09 6519



SECTION 09 9123 - INTERIOR AND EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Surface preparation and application of paint systems on following substrates:
  - 1. Wood – Interior
  - 2. Gypsum board
  - 3. Concrete Masonry Units (CMUs)
  - 4. Steel and Iron
  - 5. Aluminum
  - 6. Precast Concrete
  
- B. Paint exposed surfaces whether or not colors are designated in schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. NOTE: Exposed conduit and piping located in rooms to be painted will be painted to match wall color unless directed otherwise by architect. If color or finish is not designated, the UA Designer will select from standard colors or finishes available.

1.2 SUBMITTALS

- A. Product Data: For each paint system indicated, including block fillers and primers.
  
- B. Samples for Verification: Two (2) for each paint system and each color and gloss of topcoat indicated.
  - 1. Submit Samples on rigid backing, 8 inches square, with texture to simulate actual conditions.
  - 2. Step coats on Samples to show each coat required for system.
  - 3. Label each coat of each Sample.
  - 4. Label each Sample for location and application area.
  
- C. Product List: For each product indicated, include:
  - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in Schedules.
  - 2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with proposed product highlighted.
  - 3. Provide manufacturer's technical information including label analysis and instructions for handling, storage and application for each material proposed for use.

1.3 QUALITY ASSURANCE

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- A. MPI Standards:
  - 1. Products: Per MPI standards indicated and listed in "MPI Approved Products List."
  - 2. Preparation and Workmanship: per requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.
- B. Applicator Qualifications: Engage an experienced applicator who has completed painting systems applications similar in material and extent to those indicated for the Project that have resulted in a construction record of successful in-service performance.
- C. Single-Source Responsibility: Provide block fillers, primers, and undercoat paint produced by the same manufacturer as the finish coats.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacturer.
  - 4. Thinning instructions.
  - 5. Application instructions.
  - 6. Color name and number.
  - 7. VOC content.
- B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
  - 1. Maintain clean containers, free of foreign materials and residue.
  - 2. Protect from freezing.
  - 3. Remove rags and waste from storage areas daily.
  - 4. Keep storage area neat and orderly.
  - 5. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing and application.

1.5 PROJECT CONDITIONS

- A. Apply paints only when temperature of surface to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above dew point; or to damp or wet surfaces.

1.6 EXTRA MATERIALS

- A. Furnish extra materials described below from same production run as materials applied; package for storage and identify with labels describing contents.

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1. Quantity: Furnish an additional one (1) gallon minimum of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Basis of Design: PPG Paints
- B. Subject to compliance with requirements and approval by the architect, products that may be incorporated into the work include products by the following manufacturers:
  1. PPG Paints
  2. Benjamin Moore.
  3. Sherwin Williams Co.Note: Any proposed substitutions must be approved prior to Bid date.

2.2 PAINT Materials, GENERAL

- A. Material Compatibility:
  1. Provide materials within each paint system compatible with one another and substrate, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  2. For each coat in paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  1. Proprietary Names: Use of manufacturer's proprietary product names to designated colors or material is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions. Any proposed substitutions must be approved prior to Bid date.
- C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products per the following limits for VOC content, exclusive of colorants added to tint base, when calculated per 40 CFR 59, Subpart D (EPA Method 24); requirements do not apply to coatings applied in fabrication shop:
  1. Flat Paints, Coatings, and Primers: VOC content not more than 50 g/L.
  2. Nonflat Paints, Coatings, and Primers: VOC content not more than 150 g/L.
  3. Anti-Corrosive/ Anti-Rust Paints Applied to Ferrous Metal: VOC not more than 250 g/L.
  4. Flat Topcoat Paints: VOC content not more than 50 g/L.
  5. Nonflat Topcoat Paints: VOC content not more than 150 g/L.
  6. Primers, Sealers, and Undercoaters: VOC content not more than 200 g/L.
  7. Dry-Fog Coatings: VOC content not more than 400 g/L.

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8. Zinc-Rich Industrial Maintenance Primers: VOC content not more than 340 g/L.
  9. Pre-Treatment Wash Primers: VOC content not more than 420 g/L.
- D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide paints applied to ferrous metals per following; requirements do not apply to coatings applied in fabrication shop:
1. Aromatic Compounds: Not more than 1.0 percent by weight.
  2. Restricted Components: None allowed:
    1. Acrolein.
    2. Acrylonitrile.
    3. Antimony.
    4. Benzene.
    5. Butyl benzyl phthalate.
    6. Cadmium.
    7. Di (2-ethylhexyl) phthalate.
    8. Di-n-butyl phthalate.
    9. Di-n-octyl phthalate.
    10. 1,2-dichlorobenzene.
    11. Diethyl phthalate.
    12. Dimethyl phthalate.
    13. Ethylbenzene.
    14. Formaldehyde.
    15. Hexavalent chromium.
    16. Isophorone.
    17. Lead.
    18. Mercury.
    19. Methyl ethyl ketone.
    20. Methyl isobutyl ketone.
    21. Methylene chloride.
    22. Naphthalene.
    23. Toluene (methylbenzene).
    24. 1,1,1-trichloroethane.
    25. Vinyl chloride.
- E. All colors as selected by architect on Finish Schedule. Schedule of surfaces to be painted include, but are not limited to:
1. Walls: Latex, Eggshell Finish.
  2. Door frames: Alkyd Enamel, Semi-Gloss Finish.
  3. Hard ceilings in Offices: Latex, Flat Finish.
  4. Restroom walls and ceilings: Epoxy, Eggshell Finish.
  5. Wood handrails: Interior Water Based Polyurethane, Clear Satin Finish.
  6. Miscellaneous Items: Refer to Finish Schedule or notes on drawings.

### 2.3 PRIMERS/SEALERS

- A. Interior Latex Primer/Sealer: MPI #50, for use on all exposed interior gypsum board surfaces.
1. VOC Content: E Range of E2.

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2. Environmental Performance Rating: EPR 2.
3. PPG Seal Grip Universal Acrylic Primer #17-921.

2.4 METAL PRIMERS

- A. Quick-Drying Alkyd Metal Primer: MPI #76 for exposed metals.
1. VOC Content: E Range of E2.
  2. PPG Pitt-Tech Plus #4020 PF.

2.5 Exposed Ferrous Metal Painting Schedule

- A. Minimum acceptable dry film thickness (DFT) in mils is noted for each system.
- B. Exterior Surfaces – **Two finish coats over a primer.**
1. Ferrous Metals, Alkyd Enamel (6 mils DFT):
    1. Primer: PPG Multi-prime #4160 Tank + Structural Primer.
    2. First coat: PPG HPC Industrial Alkyd Enamel #4308.
    3. Topcoat: PPG HPC Industrial Alkyd Enamel #4308.
- C. Interior Surfaces – **Two finish coats over a primer.**
1. Ferrous Metals (5 mils DFT):
    1. Primer: PPG Multiprime #4160 Tank +Structural Primer @ 2.0 mils DFT.
    2. First coat: SPEEDHIDE Interior Semi-Gloss Oil #6-110XI @ 1.7 mils DFT.
    3. Topcoat: SPEEDHIDE Interior Semi-Gloss Oil #6-110XI @ 1.7 mils DFT.

2.6 LATEX PAINTS

- A. Interior Surfaces: Institutional Low-Odor/VOC Latex (Eggshell): MPI #145 (Gloss Level 3) - **Two finish coats over a primer.**
1. VOC Content: E Range of E3.
  2. Primer: PPG #17-921 Seal Grip Interior Exterior Universal Acrylic Primer @ 1.6 mils DFT.
  3. First Coat: PPG SPEEDHIDE Interior Zero VOC Latex Eggshell #6-4310XI @ 1.5 mils DFT.
  4. Topcoat: PPG SPEEDHIDE Interior Zero VOC Latex Eggshell #6-4310XI @ 1.5 mils DFT.
- B. High-Performance Architectural Latex (Semigloss): MPI #141 (Gloss Level 5) for equipment pads, domestic cold and hot water piping, fuel piping, engine air piping, expansion tanks and fire standpipes – **Two finish coats over a primer.**
1. VOC Content: E Range of E3.
  2. Environmental Performance Rating: EPR 6.
  3. PPG Pitt-Tech Plus #4216 HP.
- C. Professional Grade Zero-VOC Interior Latex (Flat) – **Two finish coats over a primer.**
1. VOC Content: 0 g/L (0 lbs./gal.)
  2. Primer: PPG #17-921 Series Seal Grip Interior/Exterior Universal Acrylic Primer/Sealer @ 1.6 mils DFT.

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3. First Coat: PPG SPEEDHIDE Zero Interior Zero-VOC Latex Flat 6-4110XI @ 1.3 mils DFT.
4. Topcoat Coat: PPG SPEEDHIDE Zero Interior Zero-VOC Latex Flat 6-4110XI @ 1.3 mils DFT.

2.7 CLEAR VARNISH

- A. Factory-Formulated Interior Polyurethane Water Based Acrylic – **Two finish coats.**
  1. VOC compliant in all regulated areas.
  2. First Coat: PPG Deft Interior Water Based Polyurethane Clear Finish #DFT 159 Satin @ 0.8 mils DFT.
  3. Topcoat: PPG Deft Interior Water Based Polyurethane Clear Finish #DFT 159 Satin @ 0.8 mils DFT.

2.8 EPOXY

- A. Water-Borne Acrylic Epoxy – **Two finish coats over a primer.**
  1. Primer: PPG #17-921 Series Seal Grip Interior/Exterior Acrylic Universal Acrylic Primer/Sealer @ 1.6 mils DFT.
  2. First coat: PPG Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310 Series @1.5 mils DFT.
  3. Topcoat: PPG Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310 Series @ 1.5 mils DFT.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions for compliance with requirements affecting performance of work.
- B. Maximum Moisture Content of Substrates: When measured with electronic moisture meter:
  1. Concrete (if applicable): 12 percent.
  2. Wood: 15 percent.
  3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including compatibility with existing finishes and primers.
- D. Begin coating only after unsatisfactory conditions are corrected and surfaces are dry. Start of painting shall be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

3.2 GENERAL: PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

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- B. Remove hardware and hardware accessories, interior signage, plates, machined surfaces, lighting fixtures, adhesives, adhesive tape, nails, screws, brackets, hangers, and similar items already installed that are not to be painted; or if removal is impractical because of size or weight of the item, protect before surface preparation and painting.
  - 1. After completing painting, use workers skilled in trades involved to reinstall items that were removed. Remove surface-applied protection, if any.
- C. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- D. Cleaning: Clean substrates of substances that could impair paint bond.
  - 1. Remove incompatible primers and re-prime to produce paint systems indicated.
  - 2. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- E. Gypsum Board: Begin application after finishing compound is dry and sanded.
- F. Steel: Remove rust and mill scale; clean as recommended in writing by paint manufacturer.
- G. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, rust and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).
  - 1. Existing painting steel surfaces shall be cleaned as recommended by the paint system manufacturer and according to requirements of SSPC specification SSPC-SP 3 (Power Tool Cleaning).
  - 2. Touch-up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by the paint manufacturer, and touch-up with the same primer as the shop coat.
- H. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- I. Surface preparation of previously painted surfaces:
  - 1. Paint only clean, dry surfaces.
  - 2. Remove all surface contaminants to include mold, mildew, dirt, dust, oil, grease, mill scale, wax, chalk or oxidation, efflorescence, rust, mortar, and any other foreign matter or contaminants existing on the surface.
  - 3. Scrape or use appropriate methods to remove all loose, peeling, flaking, or marginally adhering paint from the surface.
  - 4. Remove incompatible primers and re-prime to produce paint systems indicated.
  - 5. Feather sand edges as necessary.
  - 6. Repair or replace caulking where needed.
  - 7. After cleaning, glossy surfaces shall be dulled by sanding.
  - 8. Remove all sanding dust from the surface after sanding has taken place.

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9. Prepare bare areas as new surfaces, and spot prime or fill those bare areas with the appropriate primer or filler.
10. Patch or repair any cracks or voids with the appropriate patching compound and sand smooth as necessary. Patch existing nail holes and other imperfections.
11. Spot prime any patched areas with the appropriate primer prior to finishing. If after cleaning chalky surfaces chalk residue is still present, prime the entire surface with the proper bonding primer to ensure good adhesion of the topcoat to the substrate.
12. Follow any additional surface preparation guidelines on technical data sheets.

Primer: Previously painted walls, including but not limited to those previously painted with aged alkyd paint - PPG Paints  
Apply one coat of PPG #17-921 Series Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer @ 1.6 mils DFT.

First coat: PPG Paints  
Apply one coat of 6-4310XI Series SPEEDHIDE Zero-Interior Zero-VOC Latex Eggshell Finish @ 1.5 mils DFT.

Topcoat: PPG Paints  
Apply one coat of 6-4310XI Series SPEEDHIDE Zero-Interior Zero-VOC Latex Eggshell Finish @ 1.5 mils DFT.

- J. Surface preparation of previously varnished wood surfaces:
1. Remove any dirt, dust, oil, grease, glue and adhesive residue, mold, mildew and any other residue, foreign matter or contaminants from the surface.
  2. Sand varnished wood surfaces to dull the surface and promote adhesion.
  3. Remove sanding dust prior to recoating.
  4. If any varnished areas are worn down or have peeled down to bare stained wood, the wood surfaces may have to be completely stripped down to bare wood and refinished.
  5. Apply finish coats to edges, ends, faces, undersides, and backsides of wood
  6. Follow any additional surface preparation guidelines on technical data sheets.

First Coat: PPG Paints  
Apply one coat of: PPG Deft Interior Water Based Polyurethane Clear Finish #DFT 159 Satin @ 0.8 mils DFT.

Topcoat Coat: PPG Paints  
Apply one coat of: PPG Deft Interior Water Based Polyurethane Clear Finish #DFT 159 Satin @ 0.8 mils DFT.

- K. Surface preparation of gypsum drywall (previously painted) - interior restroom walls and ceilings:
1. Surface must be clean, dry and free from dirt, loose paint, oil, grease, wax, chalk, efflorescence, mold, mildew, dust, and any residue, foreign matter or other contamination.



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2. Any damaged areas shall be repaired prior to priming and painting. Patch or repair any cracks or voids with the appropriate patching compound and sand smooth as necessary. Patch existing nail holes and other imperfections.
3. If glossy, painted surfaces shall be sanded to dull existing gloss.
4. If sanding has occurred, remove all sanding dust from surface.
5. Any bare areas or patched areas shall be spot primed prior to full priming.
6. Follow any additional surface preparation guidelines on technical data sheets.

Primer: PPG Paints

Apply one coat of PPG #17-921 Series Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer @ 1.6 mils DFT.

First coat: PPG Paints

Apply one coat of PPG Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310 Series @1.5 mils DFT.

Topcoat: PPG Paints

Apply one coat of PPG Pitt-Glaze WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-310 Series @ 1.5 mils DFT.

- L. Surface preparation of previously painted gypsum drywall:
1. Surface must be clean, dry and free from dirt, loose paint, oil, grease, wax, chalk, efflorescence, mold, mildew, dust, and any other contamination.
  2. Any damaged areas shall be repaired prior to priming and painting. Patch or repair any cracks or voids with the appropriate patching compound and sand smooth as necessary. Patch existing nail holes and other imperfections.
  3. If glossy, painted surfaces shall be sanded to dull existing gloss
  4. If sanding has occurred, remove all sanding dust from surface.
  5. Any bare areas or patched areas shall be spot primed prior to full priming.
  6. Follow any additional surface preparation guidelines on technical data sheets.

Primer: (if previously painted with aged alkyd paint) - PPG Paints

Apply one coat of PPG #17-921 Series Seal Grip Interior/Exterior Acrylic Universal Primer/Sealer @ 1.6 mils DFT.

First coat: PPG Paints

Apply one coat of 6-4110XI Series SPEEDHIDE Zero-Interior Zero-VOC Latex Flat Finish @ 1.3 mils DFT.

Topcoat: PPG Paints

Apply one coat of 6-4110XI Series SPEEDHIDE Zero-Interior Zero-VOC Latex Flat Finish @ 1.3 mils DFT.

- M. Surface preparation of exterior concrete (pre-painted) – soffits:
1. Surface must be clean, dry and free from dust, dirt, chalk, mildew, loose and marginally adhering paint, oil, grease, wax and any other contamination.
  2. Patch and caulk any voids or cracks using the appropriate compound.

3. If the surface is glossy, sand to dull the finish and remove sanding dusts.
4. Following scraping of loose and peeling paint, remove any remaining contaminants from the exposed bare surface.
5. Spot prime any bare concrete prior to full primer application.
6. Follow any additional surface preparation guidelines on technical data sheets

Primer: PPG Industries, Inc.

Apply one coat of: #17-921 Series Seal Grip Interior Exterior Universal Acrylic Primer @ 1.6 mils DFT.

First Coat: PPG Industries, Inc.

Apply one coat of: 6-610XI Series SPEEDHIDE Exterior 100% Acrylic Flat @ 1.5 mils DFT.

Topcoat: PPG Industries, Inc.

Apply one coat of: 6-610XI Series SPEEDHIDE Exterior 100% Acrylic Flat @ 1.5 mils DFT.

**NOTE:** Following surface preparation, the remaining existing coatings shall be tested for adhesion. IF existing coating gets lifted by the primer application, or if a large portion of the existing coating is peeling or found to be marginally adhering, the existing coating must be removed prior to priming.

### 3.2 APPLICATION

A. General: Apply paints per manufacturer's written instructions.

1. Paint colors, surface treatments and finishes are as indicated on the Finish Schedule.
2. Use applicators and techniques suited for paint and substrate indicated.
3. Paint surfaces behind movable equipment same as similar exposed surface. Before final installation, paint surface behind permanently fixed equipment with prime coat only.
4. Paint front and backsides of access panels and similar hinged items to match surface.
5. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
6. Provide finish coats that are compatible with primers used.
7. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
8. Paint interior surfaces of ducts with a flat, nonspectacular black paint where visible through registers or grilles.
9. Sand lightly between each succeeding enamel or varnish coat.
10. Paint HVAC wall diffusers with alkyd enamel to match wall color.
11. Paint items exposed in equipment rooms and occupied spaces including:
  1. Mechanical Work:
    - 1) Uninsulated metal piping.
    - 2) Uninsulated plastic piping.
    - 3) Mechanical equipment having factory-primed finish for field painting.
12. Electrical Work:

1. Electrical equipment indicated to have factory-primed finish for field painting.
- B. Minimum Coating Thickness: Apply materials no thinner than the manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
  - C. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
  - D. Materials Preparation: Carefully mix and prepare paint materials according to manufacturer's directions.
    1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
    2. Stir material before application to produce a mixture of uniform density; stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.
    3. Use only thinners approved by the paint manufacturer and only within recommended limits.
    4. Combine paint of the same color from multiple containers to ensure constant color consistency from one batch to the next.
  - E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
  - F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime-coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
  - G. Pigmented (Opaque) Finishes: Completely cover to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable. Cut in sharp lines and color breaks.
  - H. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
    1. Provide satin finish for final coats.
  - I. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practical after preparation and before subsequent surface deterioration.
    1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured, as recommended by manufacturer. Sand between applications where sanding is required to produce a smooth even surface according to the manufacturer's directions.

2. If undercoats, stains or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.
  3. Allow sufficient time between successive coats to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with specified requirements.

### 3.3 CLEANING AND PROTECTION

- A. At end of workday, remove rubbish, cans, rags, and other discarded materials from Project site.
- B. Protect work of other trades against damage from paint application; correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave undamaged.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
- D. At completion of activities of other trades, touch up and restore damaged or defaced surfaces.
- E. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

END OF SECTION 09 9123

SECTION 09 9600 – HIGH PERFORMANCE COATING

PART 1 - GENERAL

1.1 SUMMARY

This Section includes:

1. Work under this section consists of surface preparation, priming, painting, and finishing work necessary to complete Work indicated or reasonably implied on Drawings.
2. Use high performance coating systems specified in this section to finish water tank components, unless otherwise indicated. Without restricting volume or generality, work to be performed under this section may include, but is not limited to:
  - a. Exterior steel
  - b. Interior steel
  - c. Piping, hangers, and supports
  - d. Exposed bare pipes (including color coding)
3. Painting or finishing is not needed for following:
  - a. Surfaces or materials specifically scheduled or shown on Drawings to remain unfinished
  - b. Items provided with factory finish
  - c. Equipment nameplates, fire rating labels, and operating parts of equipment
4. Materials and products having factory-applied primer shall not be considered factory finished.

1.2 REFERENCES

- A. Publications listed herein are part of this specification to extent referenced.
- B. American Society for Testing and Materials:
  1. ASTM B117 Test Method for Salt Spray (fog) Testing
  2. ASTM D16 Terminology Relating to Paint, Varnish, Lacquer, and Related Products
  3. ASTM D522 Test Methods for Mandrel Bend Test of Attached Organic Coatings
  4. ASTM D870 Practice for Testing Water Resistance of Coatings Using Water Immersion
  5. ASTM D1014 Practice for Conducting Exterior Exposure Tests of Paints on Steel
  6. ASTM D1653 Test Methods for Water Vapor Transmission of Organic Coating Films
  7. ASTM D2794 Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
  8. ASTM D3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  9. ASTM D3359 Test Method for Measuring Adhesion by Tape Test
  10. ASTM ASTM D3363 Test for Film Hardness by Pencil Test
  11. ASTM D4060 Test Method for Abrasion of Organic Coatings by the Taber Abrader

12. ASTM D4141 Practice for Conducting Accelerated Outdoor Exposure Tests of Coatings
  13. ASTM D4541 Test Method for Pull-Out Strength of Coatings Using Portable Adhesion-Testers
  14. ASTM D4585 Practice for Testing the Water Resistance of Coatings Using Controlled Condensation
  15. ASTM E84 Test Methods for Surface Burning Characteristics of Building Materials
  16. ASTM G8 Test Methods for Cathodic Disbonding of Pipeline Coatings
  17. ASTM G53 Practice for Operating Light-and-Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials
- C. National Fire Protection Association:
1. NFPA 101 Life Safety Code
- D. Steel Structures Painting Council:
1. SSPC SP-1 Specification for Solvent Cleaning
  2. SSPC SP-2 Specification for Hand Tool Cleaning
  3. SSPC SP-3 Specification for Power Tool Cleaning
  4. SSPC SP-5 Specification for White Metal Blast Cleaning
  5. SSPC SP-6 Specification for Commercial Blast Cleaning
  6. SSPC SP-7 Specification for Brush-Off Blast Cleaning
  7. SSPC SP-10 Specification for Near White Metal Blast Cleaning
  8. SSPC SP-11 Specification for Power Tool Cleaning to Bare Metal
  9. SSPC PA-2 Painting Application Specification

### 1.3 DEFINITION

- A. Terms Paint or Painting shall in a general sense have reference to sealers, primers, oil, alkyd, latex, polyurethane, epoxy, and enamel type coatings and application of these materials.
- B. Dry Film Thickness (DFT): Thickness, measured in mils, of a coat of paint in cured state
- C. Conform to ASTM D16 for interpretation of terms used in this section.

### 1.4 SUBMITTALS

- A. Product Data:
1. Submit manufacturer's literature describing products to be provided, giving manufacturer's name, product name, and product line number for each material.
  2. Submit technical data sheets for each coating, giving descriptive data, curing times, mixing, thinning, and application requirements.
    - a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin and pigment.

3. Submit manufacturer's Material Safety Data Sheets (MSDS) and other safety requirements.
- B. Shop Drawings:
1. Submit a complete list of products proposed for use, including identifying product names and catalog numbers.
    - a. Arrange in same format as Schedule of Paint Finishes below.
    - b. Include applicable manufacturer's data and recommendations.
- C. Samples:
1. Selection Samples:
    - a. Submit color charts displaying manufacturer's full range of standard colors for initial selection by Engineer.
  2. Verification Samples:
    - a. Submit 3 samples of each coating and color selected, showing bare, prepared surface and each successive coat.
    - b. Samples shall be submitted on hardboard or metal as appropriate to coating system. Label samples on back, identifying manufacturer, product name, and color number.
- D. Quality Assurance Submittals:
1. Test Reports:
    - a. Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.
    - b. Provide side by side performance data comparison of proposed materials and those listed in the specifications.
  2. Certificates:
    - a. Coatings manufacturer shall certify that coating materials utilized are "non-lead" (less than 0.06% lead by weight in dried film) as defined in Part 1303 of Consumer Product Safety Act.
    - b. Provide certification that specialized equipment as may be required by manufacturer for proper application of coating materials shall be utilized for work of this Section.
    - c. Provide manufacturer's certification that products to be used comply with specified requirements and are suitable for intended application.
    - d. Submit listing of not less than 5 of applicator's most recent applications representing similar scope and complexity to Project requirements. List shall include information as follows:
      - i) Project name and address
      - ii) Name of owner
      - iii) Name of contractor
      - iv) Name of engineer
      - v) Date of completion
  3. Manufacturer's Instructions:

- a. Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

## 1.5 QUALITY ASSURANCE

### A. Qualifications:

1. Provide products from a company specializing in manufacture of high-performance coatings with a minimum of 10 years experience.
2. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 2 years successful experience in such application.
  - a. Maintain, throughout duration of application, a crew of painters who are fully qualified to satisfy specified qualifications.
3. Single Source Responsibility:
  - a. Materials shall be products of a single manufacturer or items standard with manufacturer of specified coating materials.
  - b. Provide secondary materials which are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system.

### B. Regulatory Requirements:

1. Conform to applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

### C. Pre-Installation Meetings:

1. Schedule a conference and inspection to be held on-site before field application of coating systems begins.
2. Conference shall be attended by Contractor, Owner's representative, Engineer, coating applicators, and a representative of coating material manufacturer.
3. Topics to be discussed at meeting shall include:
  - a. A review of Contract Documents and accepted shop drawings shall be made and deviations or differences shall be resolved.
  - b. Review items such as environmental conditions, surface conditions, surface preparation, application procedures, and protection following application.
  - c. Establish which areas on-site will be available for use as storage areas and working area
4. Pre-construction conference and inspection shall serve to clarify Contract Documents, application requirements and what work should be completed before coating application can begin.
5. Prepare and submit, to parties in attendance, a written report of pre-installation conference. Report shall be submitted within 3 days following conference.

### D. Field Samples:

1. Provide a full coating system to the required sheen, color, texture, and recommended coverage rates. Simulate finished lighting conditions for reviewing in-place work



2. The Engineer or Owners Representative will select one room, area, or combination of areas and surfaces and conditions for each type of coating and substrate to be coated. Apply coatings in this room, area, combination of areas and surfaces according to the schedule, or as specified. After finishes are accepted, this room, area or combination of areas and surfaces will serve as the standard of quality and for evaluation of coating systems of similar nature.
3. A manufacturer's representative shall be available upon request by the General Contractor or Painting subcontractor, to advise applicator on proper application technique and procedures.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

##### A. Packing, Shipping, Handling, and Unloading:

1. Deliver products in manufacturer's original unopened containers. Each container shall have manufacturer's label, intact and legible. Containers shall fully identify brand, type, grade, class, and other qualifying information used to describe contents.
2. Include on label for each container:
  - a. Manufacturer's name
  - b. Type of paint
  - c. Manufacturer's stock number
  - d. Color name and number
  - e. Instructions for thinning, where applicable

##### B. Storage and Protection:

1. Store materials in a protected area, away from construction activities. Restrict storage area to paint materials and related equipment.
2. Maintain temperature in area of storage between 40 degrees F (4 degrees C) and 110 degrees F (43 degrees C).
3. Comply with health and fire safety regulations.
4. Remove damaged materials from Site.

#### PROJECT CONDITIONS

##### B. Environmental Requirements:

1. Apply coating materials under conditions as follows:
  - a. Air temperature shall not be below 35 degrees F (2 degrees C) or above 110 degrees F (43 degrees C).
  - b. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 degrees F (15 degrees C) above dew point and in a rising mode.
  - c. Relative humidity shall be no higher than 85%.
  - d. For exterior spray application, wind velocity shall be less than 15 mph (25 kph).
  - e. Atmosphere shall be relatively free of airborne dust.
  - f.
- C. Do not install flooring until they are at the same temperature as the space where they are to be installed. Close spaces to traffic during tile installation.

## 1.7 SEQUENCING AND SCHEDULING

### A. Coordination:

1. Perform work in proper sequence with work of other trades to avoid damage to finished work.
2. Where coatings are scheduled to be applied over shop applied coatings, coordinate work of such shop applied products to ensure compatibility with field applied coating systems.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. To define requirements for materials, size, and design, this specification lists specific products manufactured by *Tnemec Company*, Inc. of Kansas City, Missouri and *Xypex Chemical Corporation*. Materials specified herein are cited as minimum standard of quality which will be acceptable.
- B. Other manufacturers whose products may be incorporated into the work subject to their conformance with the full specification requirements:
  1. Devoe High Performance Coatings, Akzo Nobel.
  2. Induron High Performance Coatings.
  3. PPG Protective and Marine Coatings.
  4. Sherwin Williams.
- C. Material Materials specified herein shall not preclude consideration of equivalent or superior materials. Suggested equivalent materials or other substitutions shall be submitted to Engineer for consideration in compliance with substitution procedures in Section 01600 of this Project Manual.
  1. Requests for substitution shall include evidence of satisfactory past performance on like structures.
  2. Substitutions will not be considered that change number of coats or do not meet specified total dry film thickness.
  3. Request for substitution shall be received by the Engineer, in writing, at least 14 days prior to the bid opening date.

### 2.2 SHOP FINISHING

#### A. Surface Preparation:

1. Clean surfaces of loose scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth and free from dust and foreign matter which will adversely affect adhesion or appearance.
2. Prior to application of primer, steel surfaces shall be prepared to receive coating system in compliance with Steel Structures Painting Council (SSPC) SP10 Near White Blast Cleaning or as indicated in Schedule of Coating Systems below.

B. Shop Applied Coating

1. Steel members shall be provided with one coat of primer as indicated in Schedule below.
2. Apply materials at film thickness specified by methods recommended by manufacturer in compliance with SSPC PA-2.
3. Allow each coat of paint to dry thoroughly before applying succeeding coats.
4. Make finish topcoats smooth, uniform in color, and free of laps, runs, dry spray, over-spray, and skipped or missed areas.
5. Environmental conditions shall be in compliance with coating manufacturer's printed instructions.

2.3 SOURCE QUALITY CONTROL

A. Testing Laboratory Services:

1. Documents:
  - a. Review Contract Documents and applicable sections of referenced standards.
2. Shop Painting Inspection:
  - a. Verify cleaning operations to surfaces are to condition specified.
  - b. Verify conformance of paint to specification.
  - c. Check for thickness of each coating, final thickness and holidays.
  - d. Check touchup for final finish.
3. Reports:
  - a. Submit written progress reports describing tests and inspections made and showing action taken to correct nonconforming work. Report uncorrected deviations from Contract Documents.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS

- A. Submit certification letter listing (5) jobs of similar in material and extent to those systems indicated for the project.

3.2 EXAMINATION

A. Site Verification of Conditions:

1. Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.
2. Correct conditions detrimental to timely and proper execution of Work.
3. Do not proceed until unsatisfactory conditions have been corrected.
4. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.3 PREPARATION

A. Protection:

1. Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove empty containers from Site.
  2. Place cotton waste, cloths and hazardous materials in containers, and remove from Site daily.
  3. Provide drop cloths, shields, and other protective equipment.
  4. Protect elements surrounding work of this section from damage or disfiguration.
  5. As Work proceeds, promptly remove spilled, splashed, or splattered materials from surfaces.
  6. During application of coating materials, post Wet Paint signs.
  7. During application of solvent-based materials, post No Smoking signs.
- B. Surface Preparation:
1. General Requirements:
    - a. Prior to application of primer, surfaces shall be prepared to receive specified coating system in compliance with manufacturer's recommendations and specifications of Steel Structures Painting Council as indicated in Schedule below.
    - b. Clean surfaces of residual deposits of grease, scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth and free from dust and foreign matter which will adversely affect adhesion or appearance.
  2. Ferrous Metal Surfaces:
    - a. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, and oil.
    - b. For shop primed surfaces, sand and scrape to remove loose primer and rust. Feather edges to make touchup patches inconspicuous. Field welds and touchups shall be prepared to conform to original surface preparation standards as indicated in Schedule of Coating Systems below.
    - c. Shop applied prime coatings which are damaged during transportation, construction or installation shall be thoroughly cleaned and touched up in field. Use repair procedures which insure complete protection of adjacent primer. Repair methods and equipment may include wire brushing, hand or power tool cleaning or dry air blast cleaning. Follow cleaning methods listed in the Coating Schedule Section of this specification. In order to prevent injury to surrounding painted areas, blast cleaning may necessitate use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive to touch-up, item shall be re-cleaned and coated or painted.
    - d. For surfaces not shop primed, surfaces shall be cleaned in compliance with specifications of Steel Structures Painting Council as indicated in Schedule of Coating Systems below.
  3. Galvanized Steel, Aluminum & Non-Ferrous Metal Surfaces:
    - a. Clean metal with a grease-cutting solvent, such as xylene, to remove contamination and oils in compliance with SSPC-SP1.
    - b. Sand clean and spot prime abraded areas.
    - c. Abrade surface by abrasive blasting in accordance with ASTM D 6386. Prepared surface shall have a minimum 1.0 mils anchor profile equal in density to an SSPC-SP 6 Commercial Blast Cleaned Surface.

### 3.4 APPLICATION

#### A. General Requirements:

1. Apply coating systems in compliance with manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to coated.
2. Apply primer, intermediate, and finish coats to comply with wet and dry film thickness and spreading rates for each type of material as recommended by manufacturer.
  - a. Application rates in excess of those recommended and fewer numbers of coats than specified shall not be accepted.
3. Number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application.
  - a. Closely adhere to re-coat times recommended by manufacturer. Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during drying phase.
4. Employ only application equipment that is clean, properly adjusted, and in good working order, and of type recommended by coating manufacturer.
5. After surface preparation, interior weld seams shall be brush applied.
6. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.

### 3.5 REPAIR/RESTORATION

#### A. At completion of Work, touchup and restore finishes where damaged.

#### B. Defects in Finished Surfaces:

1. When stain, dirt, or undercoats show through final coat, correct defects and cover with additional coats until coating is of uniform finish, color, appearance and coverage.

#### C. Touchup of minor damage shall be acceptable where result is not visibly different from surrounding surfaces. Where result is visibly different, either in color, sheen, or texture, re-coat entire surface.

### 3.6 FIELD QUALITY CONTROL

#### A. Testing Laboratory Services:

1. Documents:
  - a. Review Contract Documents and applicable sections of referenced standards.
2. Field Painting Inspection:
  - a. Verify cleaning operations to surfaces are to condition specified.
  - b. Verify conformance of paint to specification.
  - c. Check for thickness of each coating, final thickness and holidays.
  - d. Check touchup for final finish.
3. Reports:

- a. Submit written progress reports describing tests and inspections made and showing action taken to correct nonconforming work. Report uncorrected deviations from Contract Documents.

B. Manufacturer's Field Service:

1. Coatings manufacturer shall be available to provide on-site inspections, technical assistance, and guidance for application of coating system as needed.

3.7 CLEANING

- A. At completion of day's work, remove from Site rubbish and accumulated materials.
- B. Clean paint spots and other soiling from pre finished surfaces and surfaces with integral finish. Use solvents which will not damage finished surface.
- C. Leave storage area clean and in same condition indicated for equivalent spaces in Project.

3.8 PROTECTION

- A. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.

3.9 WASTE MANAGEMENT

A. General Requirements:

1. Place materials defined as hazardous or toxic waste in designated containers.
2. Return solvent and oil-soaked rags for contaminant recovery and laundering or for proper disposal.
3. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal.
4. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

B. Containment/Disposal Requirements:

1. Surface Preparation Debris Containment:
  - a. When required by federal, state or local regulation, entire structure shall be enclosed and surface preparation debris contained.
  - b. Refer to SSPC 61 Guide for Containing Debris Generated During Paint Removal Operations.
2. Disposal of Surface Preparation Debris:
  - a. Refer to SSPC 71 Guide for the Disposal of Lead-Contaminated Surface Preparation Debris.
  - b. Surface preparation debris shall be disposed of in compliance with applicable federal, state and local regulations.
3. Containment/Disposal Costs:
  - a. Painter shall be responsible for costs associated with containment and waste disposal that may result from execution of this Project.

3.10 SCHEDULE OF COATING SYSTEM FOR INTERIOR SERVICES

\*All coating thickness are expressed in dry film thickness (DFT.)

**A. Previously Painted, Interior Exposed, Non-Submerged Ferrous Metals & Ductile Iron:**

1. Surface Preparation: Clean all surfaces of all dirt, dust, chalk, and any other foreign matter that may interfere with the adhesion of the proposed coating system. Clean all corroded areas in accordance with SSPC-SP 3 Power Tool Cleaning. All areas cleaned to bare metal shall be cleaned in accordance with SSPC-SP 11 Power Tool Cleaning to Bare Metal. Feather Edges. Spot Prime all areas cleaned to bare metal.
2. Spot Prime: Series 1 Omnithane
  - a. Dry Film Thickness: 2.5 – 3.5 mils
3. Full Prime: Series 135 Chembuild
  - a. Dry Film Thickness: 2.0 – 3.0
4. Finish Coat: Series 1074 Endura-Shield II
  - a. Dry Film Thickness: 2.0 – 3.0 mils

**B. Interior Overhead Located in Dry Areas: (Steel, Galvanized)**

1. Surface Preparation: Abrasive blast, mechanically abrade, or other preparation method that will result in complete removal of all the existing coatings and will result in a surface profile (reference SSPC-SP 13, ICRI CSP 2-3).
2. Prime / Finish Coat: Series 115 Uni-Bond DF
  - a. Dry Film Thickness: Two Coats - 3.0 – 4.0 mils DFT per coat.

3.11 SCHEDULE OF SERVICES FOR EXTERIOR SERVICES

**A. Previously Painted Non-Submerged Ferrous Metals & Ductile Iron:**

1. Surface Preparation: Clean all surfaces of all dirt, dust, chalk, and any other foreign matter that may interfere with the adhesion of the proposed coating system. Clean all corroded areas in accordance with SSPC-SP 3 Power Tool Cleaning. Feather Edges. Spot Prime all areas cleaned to bare metal.
2. Spot Prime: Series 135 Chembuild
  - a. Dry Film Thickness: 3.0 – 5.0
3. Full Prime: Series 135 Chembuild
  - a. Dry Film Thickness: 2.0 – 3.0
4. Finish Coat: Series 740 UVX
  - a. Dry Film Thickness: 3.0 – 5.0 mils

END OF SECTION 09 9600

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SECTION 10 2113 – PHENOLIC-CORE TOILET COMPARTMENTS

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. Phenolic-core toilet compartments configured as toilet enclosures and urinal screens.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product:
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.
- B. Shop Drawings: For toilet compartments.
  - 1. Include plans, elevations, sections, details, and attachment details.
  - 2. Show locations of cutouts for compartment-mounted toilet accessories.
  - 3. Show locations of centerlines of toilet fixtures.
  - 4. Show locations of floor drains.
- C. Samples for Initial Selection: For each type of toilet compartment material indicated.
  - 1. Include Samples for material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
  - 1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch square Samples of same thickness and material indicated for Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of toilet compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 200 or less.
  - 2. Smoke-Developed Index: 450 or less.

2.2 PHENOLIC-CORE TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Accurate Partitions Corp.; ASI Group.
  - 2. Ampco Products, LLC.
  - 3. General Partitions Mfg. Corp.
  - 4. Global Partitions; ASI Group.
  - 5. Metpar Corp.
- B. Toilet-Enclosure Style: Floor anchored, over-head braced.
- C. Door, Panel, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch thick doors and pilasters and minimum 1/2-inch thick panels.
- D. Pilaster Shoes and Sleeves (Caps): Formed from stainless-steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.
- E. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, stainless steel.
- F. Phenolic-Panel Finish:
  - 1. Facing Sheet Finish: One color and pattern in each room.
  - 2. Color and Pattern: As selected by Architect from manufacturer's full range, with manufacturer's standard dark color core.
  - 3. Edge Color: Manufacturer's standard.

### 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
  - 1. Material: Stainless steel.
  - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
  - 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
  - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

### 2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless-Steel Castings: ASTM A 743/A 743M.
- G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

### 2.5 FABRICATION

- A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard toilet compartments and 36-inch wide out-swinging doors with a minimum 32-inch wide clear opening for compartments designated as accessible.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
  - 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
  - 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
    - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

- C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors return doors to fully closed position.

END OF SECTION 10 2113

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SECTION 10 2116.17 – PHENOLIC-CORE SHOWER AND DRESSING COMPARTMENTS

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. Solid, phenolic-core compartments.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product:
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for shower compartments.
- B. Shop Drawings: For shower compartments.
  - 1. Include plans, elevations, sections, details, and attachment details.
  - 2. Show locations of cutouts for compartment-mounted accessories.
  - 3. Show locations of floor drains.
- C. Samples for Initial Selection: For each type of shower compartment material indicated.
  - 1. Include Samples for material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
  - 1. Each type of material, color, and finish required for shower compartments, prepared on 6-inch square Samples of same thickness and material indicated for Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For each type of shower compartment.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For shower compartments to include in maintenance manuals.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of shower fixtures, walls, columns, ceilings, and other construction contiguous with shower compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 200 or less.
  - 2. Smoke-Developed Index: 450 or less.

2.2 PHENOLIC-CORE SHOWER COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Accurate Partitions Corp.; ASI Group.
  - 2. Ampco Products, LLC.
  - 3. General Partitions Mfg. Corp.
  - 4. Global Partitions; ASI Group.
  - 5. Metpar Corp.
- B. Shower -Enclosure Style: Flooranchored, over-head braced.
- C. Door, Panel, and Pilaster Construction: Solid phenolic-core panel material with melamine facing on both sides fused to substrate during panel manufacture (not separately laminated), and with eased and polished edges. Provide minimum 3/4-inch thick doors and pilasters and minimum 1/2-inch thick panels.
- D. Pilaster Shoes and Sleeves (Caps): Formed from stainless-steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.
- E. Brackets (Fittings):
  - 1. Stirrup Type: Ear or U-brackets, stainless steel.
- F. Phenolic-Panel Finish:
  - 1. Facing Sheet Finish: One color and pattern in each room.
  - 2. Color and Pattern: As selected by Architect from manufacturer's full range, with manufacturer's standard dark color core.
  - 3. Edge Color: Manufacturer's standard.



### 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
  - 1. Material: Stainless steel.
  - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
  - 3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
  - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
  - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Curtain Rod with Hooks: Manufacturer's standard, 1-inch diameter, stainless steel curtain rod with matching hooks.
- D. Curtain: Flame-resistant, polyester-reinforced vinyl fabric that is stain resistant, self-sanitizing, antistatic, antimicrobial, and launderable to a temperature of not less than 90 deg F (32 deg C).
  - 1. Flame Resistance: Passes NFPA 701 tests when tested by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Labeling: Identify fabrics with appropriate markings of applicable testing and inspecting agency.
  - 3. Length: Where curtain extends to a floor surface, size so that bottom hem clears finished floor by not more than 1 inch and not less than 1/2 inch above floor surface. Where curtains extend to a shower-receptor curb, size so that bottom hem hangs above curb line and clears curb line by not more than 1/2 inch (13 mm).
  - 4. Color and Pattern: As selected by Architect from manufacturer's full range of color and pattern.
- E. Soap Holder: Surface-mounted, seamless stainless steel soap dish.
- F. Seats: Manufacturer's standard, wall-mounted benches.
  - 1. Material: Solid phenolic.

2. Operation: Folding.
  3. Finish: As selected by Architect from manufacturer's full range of enclosure panels.
- G. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

## 2.4 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- F. Stainless-Steel Castings: ASTM A 743/A 743M.
- G. Zamac: ASTM B 86, commercial zinc-alloy die castings.

## 2.5 FABRICATION

- A. Fabrication, General: Fabricate shower compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition shower accessories where required for attachment of shower accessories.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.
- D. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard shower compartments and 36-inch wide out-swinging doors with a minimum 32-inch wide clear opening for compartments designated as accessible.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  1. Confirm location and adequacy of blocking and supports required for installation.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
  - 1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch.
    - b. Panels and Walls: 1 inch.
  - 2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
    - a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
  - 3. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
    - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
    - b. Align brackets at pilasters with brackets at walls.
- B. Curtains: Install curtains to specified length, and verify that they hang vertically without stress points of diagonal folds.
- C. Floor-Anchored Units: Set pilasters with anchors penetrating not less than 2 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Level, plumb, and tighten pilasters. Hang doors and adjust so tops of doors are level with tops of pilasters when doors are in closed position.

### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on in-swinging doors return doors to fully closed position.

END OF SECTION 10 2113

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SECTION 10 4413 - FIRE PROTECTION CABINETS & EXTINGUISHERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINETS

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. JL Industries, Inc.; a division of the Activar Construction Products Group.
2. Larsens Manufacturing Company.
3. Modern Metal Products, Division of Technico Inc.

- B. Cabinet Construction: Nonrated.

- C. Cabinet Material: Steel sheet.

1. Trim Style: Rolled trim.
2. Trim Material: Steel.

- D. Door Material: Steel.

1. Door Style: Flush opaque frameless.

- E. Accessories: Mounting brackets, Identification lettering in red vertical style.

- F. Hardware: Brushed aluminum pull and roller catch.

- G. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
  - a. Exterior of cabinet, door, and trim.
  - b. Interior of cabinet and door.

- I. Steel: Baked enamel or powder coat.

## 2.2 FIRE EXTINGUISHERS

- A. Portable Fire Extinguishers: NFPA 10, listed and labeled for the type, rating, and classification of extinguisher.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. JL Industries, Inc.; a division of the Activar Construction Products Group.
    - c. Larsens Manufacturing Company.
  - 2. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb nominal capacity, in enameled-steel container.
- B. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, or size required for fire extinguishers indicated, with plated or baked-enamel finish.
- C. Hardware: Standard zinc pull and roller latch.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install cabinets, at locations indicated, at **48** inches above finished floor to top of cabinet.
- B. Identification: Apply vinyl lettering to cabinets at locations indicated.
- C. Install mounting brackets in locations indicated at **48** inches above finished floor to top of fire extinguisher.
- D. Install fire extinguishers in mounting brackets and cabinets where indicated.

END OF SECTION 10 4400

SECTION 10 5000 – METAL LOCKERS

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.
- B. Section 03 3000 Cast-in-Place Concrete for 4-inch high raised pad base for locker installation.

1.2 SUMMARY

- A. This Section includes metal lockers and related equipment as indicated on drawings.
- B. Types of products in this section include double-tier units 12" W x 18" D x 72" H and 18" x 18" single-tier standard wardrobe lockers as indicated. Lockers are installed in single banks at walled alcoves and in double banks in locations where lockers are installed back to back.

1.3 SUBMITTALS

- A. Submit the following in accordance with Conditions of Contract and Division Specifications sections.
- B. Product data and installation instructions for metal locker units.
- C. Color Samples on squares of same metal to be used for fabrication of lockers.
- D. Shop Drawings that show metal lockers in dimensioned relation to adjacent surfaces. Show lockers in detail, method of installation, fillers, trim, base, and accessories. Include locker numbering sequence information.

1.4 QUALITY ASSURANCE

- A. Uniformity: Provide metal lockers that are standard products of single manufacturer, with interchangeable like parts. Include necessary mounting accessories, fittings, and fastenings.
- B. Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage, and installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
1. Art Metal Products, Inc.
  2. Interior/Medart.
  3. List Industries, Inc.
  4. Lyon Workspace Products.
  5. Penco Products Inc.
  6. Republic Storage Systems Co., Inc.

### 2.2 MATERIALS

- A. Sheet Steel: Mild cold-rolled and leveled furniture steel, free from buckle, scale, and surface imperfections.
- B. Fasteners: Cadmium, zinc, or nickel-plated steel; exposed bolt heads, slotless type; self-locking nuts or lock washers for nuts on moving parts.
- C. Equipment: Hooks and hang rods of cadmium-plated or zinc-plated steel.

### 2.3 FABRICATION, GENERAL

- A. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch. Weld frame members together to form rigid, one-piece structure. Weld, bolt, or rivet other joints and connections. Grind exposed welds flush. Do not expose bolts or rivet heads on fronts of locker doors or frames.
- B. Frames: Fabricate of 16-gage channels or 12-gage angles, minimum, with continuous stop/strike formed on vertical members.
- C. Finishing: Chemically pretreat metal with degreasing and phosphatizing process. Apply baked-on enamel finish to all surfaces, exposed and concealed, except plates and nonferrous metal.
- D. Color: Provide locker units in color(s) selected by Architect from all available manufacturer's standard colors. Concealed parts may be manufacturer's standard neutral color.

### 2.4 WARDROBE LOCKERS

- A. Body: Fabricate top and sides of minimum 16-gage steel, with double-flanged connections extending full height. Form solid back of not less than 18-gage steel.
1. Shelves and bottom shall be minimum 16-gage.



- B. End Panels: Provide end panels finished to match exposed frames and door units.
- C. Door: One-piece, minimum 14-gage sheet steel, flanged at all edges, constructed to prevent springing when opening or closing. Fabricate to swing 180 degrees.
  - 1. Ventilation: Provide stamped, louvered vents in door face as follows: Not fewer than 3 louver openings top and bottom.
  - 2. Hinges: Steel, full-loop, 5-knuckle, tight pin. Weld to inside of frame and secure to door with not fewer than 2 factory-installed fasteners that are completely concealed and tamperproof when door is closed.
    - a. Provide at least 3 hinges for each door over 42 inches high; at least 2 hinges for each door 42 inches high or less.
- D. Projecting Handle and Latch: Positive automatic, prelocking, pry- resistant latch and pull with rubber silencers; chromium-plated, heavy-duty, vandalproof lift-up handle, containing strike and eye for padlock; and with not less than 3-point latching.

## 2.5 LOCKS

- A. Fabricate lockers to receive built-in combination locks: Key-controlled, three-number dialing combination locks; capable of at least five combination changes made automatically with a control key. Comply with the following:
  - 1. Bolt Operation: Manually locking dead bolt or automatically locking spring bolt, as standard with manufacturer.

## 2.6 LOCKER ACCESSORIES

- A. Equipment: Furnish each locker with the following items, unless otherwise shown:
  - 1. Double-Tier Units: One double-prong hook and not fewer than 2 single-prong wall hooks.
  - 2. Single-Tier Units: One double-prong hook and not fewer than 2 single-prong wall hooks.
  - 3.
- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, aluminum number plates with numerals at least 3/8 inch high. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
- C. Tops: Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; Finish to match lockers.
- D. Locker Bases: Locker legs are not required. Locker units will be installed on poured concrete bases installed under another Section. Coordinate with concrete subcontractor through General Contractor for size of concrete base required for lockers submitted.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid, and flush installation.
- B. Anchor lockers securely to wall at back of bank of lockers. Where double banks are installed, securely connect the two banks together securing to base.
- C. Space fastenings about 48 inches on center, unless otherwise recommended by manufacturer, and apply through backup reinforcing plates where necessary to avoid metal distortion, using concealed fasteners.
- D. Install trim using concealed fasteners. Provide flush, hairline joints against adjacent surfaces.
- E. Install lockers in sequential order based on number plates. Coordinate locks sequentially with locker numbers and provide combination list in same order.

3.2 ADJUST AND CLEAN

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch up marred finishes, but replace units that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION 10 5000

## SECTION 133419 - METAL BUILDING SYSTEMS

### 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 systems for the renovation of the Construction Shop Building at the Village Creek Plant and at other areas where repairs are indicated for existing building.

- 1. Secondary framing for infill and where required for new openings at exterior walls.
- 2. Miscellaneous steel framing for openings in metal wall panels.
- 3. Metal roof panels.
- 4. Metal wall panels.
- 5. Metal liner panels.
- 6. Thermal insulation.
- 7. Accessories.

- B. Related Sections:

- 1. Division 08 Section "Hollow Metal Doors and Frames".
- 2. Division 08 Section "Overhead Coiling Service Doors"
- 3. Division 23 HVAC Specifications for HVAC equipment mounted in exterior metal panel walls.

### 1.3 DEFINITIONS

- A. Eave Height: Vertical dimension from the finished floor to eave (the line along the sidewall formed by the intersection of the planes of the roof)
- B. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

### 1.4 SUBMITTALS

- A. Product Data: For each type of metal building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
  - 1. Secondary framing for infill and where new openings are required at exterior walls.

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2. Miscellaneous framing required at openings in metal panel walls
  3. Metal roof panels.
  4. Metal wall panels.
  5. Metal liner panels.
  6. Insulation and vapor retarder facings.
  7. Flashing and trim.
  8. Accessories.
  9. Gutters and Downspouts
- B. Shop Drawings: For the following metal building system components. Include plans, elevations, sections, details, and attachments to other work.
1. Structural-Framing Drawings: Show complete fabrication of secondary framing; include provisions for openings in new and existing secondary framing. Indicate welds and bolted connections, distinguishing between shop and field applications.
  2. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
    - a. Show wall-mounted items including doors, windows, louvers, and lighting fixtures.
  3. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches :
    - a. Flashing and trim.
    - b. Gutters.
    - c. Downspouts.
    - d. Panel trim at openings and changes in wall plane.
- C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors for each type of the following products with factory-applied color finish.
- D. Qualification Data: For qualified Firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects, and addresses of architects and owners.
- E. Welding certificates. Copies of certificates for welding procedures and personnel.
- F. Metal Building System Certificates: For each type of metal building system, from manufacturer. Signed by the manufacturer's certifying that products comply with requirements. Include evidence of manufacturing experience.
- G. Erector Certificates: For each product, from manufacturer. Signed by manufacturer certifying that erectors comply with requirements.
- H. Manufacturer Certificates: For each product, from manufacturer.

1. Thermal insulation.

- I. Maintenance Data: For metal panel finishes to include in maintenance manuals.
- J. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

- A. Design shall be in accordance with local and state codes for Jefferson County, Alabama including the 2018 International Building Code or the latest adopted editions by the authority having jurisdiction.
- B. Manufacturer Qualifications: Provide metal building system components manufactured by a firm experienced in manufacturing metal building systems that are similar to those indicated for this project and have a record of successful in-service performance.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of metal building systems that are similar to those indicated for this Project in material, design and extent.
- D. Erector Qualifications: Engage an experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is certified in writing by the metal building manufacturer as qualified for the erection of the manufacturer's products.
- E. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- F. Single - Source Responsibility: Obtain metal building system components, including primary and secondary framing, metal panel assemblies, and accessory components from single source from single manufacturer.
- G. Product Options: Information on Drawings and Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject or verifications by one or more methods including preconstruction testing, field testing or in-service performance. Do not modify intended aesthetic effects, as judged by the architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- H. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."

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- I. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.
- J. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Package metal wall and roof panels for protection during transportation and handling.
- B. Handling: Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weather tight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Protect plastic insulation as follows:
  - 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
  - 2. Protect against ignition at all times. Do not deliver -plastic insulation materials to Project site before installation time.
  - 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify metal building system foundations by field measurements before metal building fabrication and indicate measurements on shop drawings.

1.8 COORDINATION

- A. Coordinate installation of roof penetrations, which are specified in Division 22 Plumbing Sections.
- B. Coordinate fabrications schedule with construction schedule to avoid delaying the work.

- C. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak proof, secure, and noncorrosive installation.

#### 1.9 WARRANTY

- A. General Warranty: 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 Contract Documents.
- B. Special Project Guarantee: Submit three executed copies of a "Roofing Guarantee" , signed and countersigned by Installer (Roofer) and Contractor, guaranteeing work of this Section, including roofing panels flashing, roof insulation, and roofing accessories, against leaks from faulty or defective materials and workmanship for a period of two (2) years from the date of substantial completion. This guarantee is in addition to the Manufacturer's Warranty required below.
- C. Special Warranty on Panels: Written warranty, executed by manufacturer agreeing to repair or replace roof or wall panels that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from the date of Substantial Completion.
- D. Special Warranty on Metal Panel Finishes: Written warranty, signed by manufacturer agreeing to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period. Deterioration of finish includes but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.
- E. Special Weather tightness Warranty for Standing-Seam Metal Roof Panels: Written warranty, signed by manufacturer agreeing to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weather tight within specified warranty period. This Special Warranty is to be a "Full Value Warranty" with third party inspection prior to issuance of Special Warranty, and shall include coverage for replacement of materials and all required labor for full warranty period.
  - 1. Warranty Period: 20 years from date of Substantial Completion.
- F. Roofing warranties or guarantees which contain language regarding the governing of the warranties or guarantees by any other state other than the State of Alabama, must be amended to exclude such language and substituting the requirements that the Laws of the State of Alabama shall govern all such warranties or guarantees.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
1. ACI Building Systems, Inc.
  2. AIM Metals, LLC
  3. American Buildings Company; Division of Magnatrax Corp.
  4. Bigbee Steel Buildings, Inc.
  5. Ceco Building Systems; Division of NCI Building Systems, L.P.
  6. Gulf States Manufacturers, Inc.; Division of Magnatrax Corp.
  7. Mid-West Steel Building Company
  8. Star Building Systems; an NCI company.
  9. Varco – Pruden Buildings

Other manufacturers may be submitted up to ten calendar days prior to bid subject to compliance with this Specification and the Owner's approval.

2.2 METAL BUILDING SYSTEMS

- A. General Description: Provide a complete, integrated set of metal building system components for installation on existing metal building framing. Provide a manufacturer's standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include secondary-frame members where required for openings in metal panel walls, roof panels, wall panels, and accessories complying with requirements indicated, including those in this article.
- B. Secondary-Framing: Manufacturer's standard rafters and exterior framed (bypass) girts as required based on location and size of openings in wall panels.
- C. Eave Height: Existing, verify in field before panel fabrication.
- D. Bay Spacing: Existing
- E. Roof Slope: Existing.
- F. Roof System: Manufacturer's standard standing seam metal roof panels with field-installed insulation.
- G. Exterior Wall System: Manufacturer's standard field-assembled wall panels with field-installed insulation.



### 2.3 METAL BUILDING SYSTEM PERFORMANCE

- A. Thermal Movements: Provide metal building roof and wall panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.
- B. Air Infiltration for Roof Panels: Provide roof panel assemblies with permanent resistance to air leakage through assembly of not more than 0.09 cfm/sq. Ft. of fixed roof area when tested according to ASTM E 1680 at a static-air-pressure difference of 4 lbs/Sq. Ft.
- C. Air Infiltration for Wall Panels: Provide wall panel assemblies with permanent resistance to air leakage through assembly of not more than 0.090 cfm/sq.Ft. of wall area when tested according to ASTM E 283 at static-air-pressure difference of 4 lbs/sq. Ft.
- D. Water Penetration for Roof Panels: Provide roof panel assemblies with no water penetration when tested according to ASTM E 1646 at a minimum differential test-pressure difference of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. Ft. (300 Pa) and not more than 12 lbf/sq. Ft. (575 Pa).
- E. Water Penetration for Wall Panels: Provide wall panel assemblies with no water penetration when tested according to ASTM E 331 at a minimum differential pressure of 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. Ft. (300 Pa) and not more than 12 lbf/sq. Ft. (575 Pa)
- F. Thermal Performance: Provide insulated metal panel assemblies with the following maximum U-factors and minimum R-values for opaque elements when tested according to ASTM C 1363 or ASTM C 518:
  - 1. Metal Roof Panel Assemblies:
    - a. R-Value: 23
  - 2. Metal Wall Panel Assemblies:
    - a. R-Value: 19

### 2.4 STRUCTURAL-STEEL FRAMING

- A. Secondary Framing: Provide the following secondary wall framing members fabricated for field-bolted assembly where required for new wall openings or adjustment of existing wall openings:
  - 1. Purlins: Z-shaped sections; fabricated from 16 gage thick (0.0598 inch) built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- wide flanges.

- a. Depth: As needed to comply with system performance requirements.
  - b. Infill purlins are required where skylights are demolished.
2. Girts: Z-shaped sections; fabricated from 16 gage (0.0598 inch) thick built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 45 to 50 degrees from flange, and with minimum 2-1/2-inch- wide flanges.
    - a. Depth: As required to comply with system performance requirements.
  3. Eave Struts: Unequal-flange, C-shaped sections; formed to provide adequate backup for both wall and roof panels. Fabricate from 16 gage (0.0598-inch) thick steel sheet, built – up plates or structural-steel shapes; to provide adequate backup for metal panels.
  4. Flange and Sag Bracing: Minimum 1-5/8” x 1-5/8” structural-steel angles or 1-inch diameter, cold-formed structural tubing to stiffen primary-frame flanges. fabricated from 16-gage (0.0598-inch) shop painted roll-formed steel.
  5. Purlin and Girt Clips: Clips shall be fabricated from 14 –gage (0.0747-inch) zinc coated steel sheet. Secondary End-Wall Framing: Structural members, except columns and beams, shall be the manufacturer's standard sections fabricated from 14-gage (0.0747-inch) cold-formed shop painted steel.
  6. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
- B. Wind Bracing: Relocate wind bracing where required for location of new openings. Provide portal frames or rods or cables for wind bracing.
- C. Bolts: Provide shop-painted bolts except when structural-framing components are in direct contact with roof and wall panels. Provide zinc-plated or cadmium-plated bolts when structural-framing components are in direct contact with roof and wall panels.
- E. Materials:
1. Structural Steel Shapes: Comply with ASTM A 36/A 36M or A529/A 529M.
  2. Steel Plate, Bar or Strip: Provide 55,000 psi minimum yield stress and 70,000 psi minimum tensile strength. Comply with ASTM A 529 /A 529M, ASTM A 570/A 570M or ASTM A 572/A 572M.
  3. Steel Tubing or Pipe: Comply with ASTM A 500, Grade B, ASTM A, 501 or ASTM A 53, Grade B.
  4. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B structural tubing.
  6. Structural Quality Zinc-Coated Steel Sheet: Comply with ASTM A 446 with G90 coating complying with ASTM A 525. Material to comply with ASTM A 653/A 653M, Grade 80.
  6. Structural Quality Aluminum-Zinc Alloy Steel Sheet: Comply with requirements of ASTM A 792/A 792M.

7. Bolts for Structural Framing: Comply with ASTM A 307 or ASTM A 325 as necessary for design loads and connection details.
- F. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
- a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.
  2. Prime galvanized members with specified primer after phosphoric acid pretreatment.
  3. Primer: SSPC-Paint 15, Type I, red oxide.

## 2.5 METAL ROOF PANELS

- A. Vertical-Rib, Standing-Seam Metal Roof Panels: Manufacturer's standard factory-formed standing seam roof panel system designed for mechanical attachment of panels to roof purlins using concealed fasteners and sealants. Form panels of 24 gage (0.0239-inch), Grade C, aluminum-zinc alloy coated steel sheets. Panels shall have a configuration consisting of 2 inch high major rib, space at 24 inches on centers. Panels are joined at side laps with an interlocking standing seam 1 inch above the major rib. Each panel provides 24 inch net coverage in width. The female panel seam shall have a factory applied sealant.
1. Material: Aluminum-zinc alloy-coated steel sheet. 0.028-inch
    - a. Exterior Finish: Fluoropolymer .
    - b. Color: As selected by Architect from manufacturer's full range . (Minimum of 8 color choices)
  2. Roof Panel Accessories: Provide components required for a complete roof panel's assembly including trim, copings, fascia, mullions, sills, corner units, ridge closures, clips seam covers, battens, flashings, gutters, downspouts, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of roof panels unless otherwise indicated.
  3. Clips: Provide 16-gage (0.0598-inch) panel clips. floating type to accommodate thermal movement ; fabricated from zinc-coated (galvanized) steel
    - a. Cleats: Factory-caulked, mechanically seamed cleats formed from 24-gage (0.0239-inch), Grade C, zinc-coated steel sheets.
    - b. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets, self-locking bolts, end – welded studs and other suitable fasteners designed to withstand design loads.
      - 1) Provide metal-backed neoprene washers under heads of fasteners bearing on weather side of panels.
      - 2) Use aluminum or stainless steel fasteners for exterior application and galvanized or cadmium-plated fasteners for interior applications.

- 3) Locate and space fastenings in true vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.
  - 4) Provide fasteners with heads matching color of roofing or siding sheets by means of plastic caps or factory-applied coating.
  - c. Flexible Closure Strips: Closed-cell, expanded cellular rubber, self-extinguishing flexible closure strips. Cur or pre-mold to match configuration of roofing and siding sheets. Provide closure strips where indicated or necessary to ensure weather-tight construction.
  - d. Sealing Tape: Pressure-sensitive 100 percent solids grey polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, non-staining tape ½" wide and 1/8" inch thick.
4. Joint Type: Mechanically seamed, folded according to manufacturer's standard.
  5. Panel Coverage: 24 inches .
  6. Panel Height: 2 inches .
  7. Uplift Rating: UL 90.
- B. Materials:
1. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
    - b. Surface: Smooth, flat finish.
- C. Finishes:
1. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Panel finish shall be a two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight, with a total minimum dry film thickness of 1 mil (0.025 mm) and 30 percent reflective gloss when tested according to ASTM D 523. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 METAL WALL PANELS

- A. Uninsulated Exterior Wall Panels: Manufacturer's standard factory-formed ribbed panels fabricated from 24 gage (0.028 inch) aluminum-zinc alloy coated steel sheets pre-painted with coil coating to provide 36-inch wide (914 mm) coverage, with 1-1/4" raised ribs at 12 inches (305 mm) o.c., and intermediate stiffening ribs symmetrically spaced between major ribs for full length of panel. Design panels for mechanical attachment to structure with exposed fasteners, in color to match prefinished wall panels, lapping major ribs at panel edges. There shall be a purlin bearing leg on the bottom section of the lap.
- B. Reverse-Rib-Profile, Exposed-Fastener Metal Wall Panels : Formed with recessed, trapezoidal major valleys and intermediate stiffening valleys symmetrically spaced between major valleys; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
1. Material: Aluminum-zinc alloy-coated steel sheet, 24 gage (0.028-inch) nominal thickness.
    - a. Exterior Finish: Fluoropolymer .
    - b. Color: As selected by Architect from manufacturer's full range .
  2. Major-Rib Spacing: 12 inches o.c.
  3. Panel Coverage: 36 inches .
  4. Panel Height: 1.25 inches .
- C. Tapered-Rib-Profile, Metal Liner Panels for interior walls and underside of roof structure : Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
1. Material: Aluminum-zinc alloy-coated steel sheet, 0.028-inch nominal thickness.
    - a. Exterior Finish: Siliconized polyester
    - b. Color: As selected by Architect from manufacturer's full range .
  2. Major-Rib Spacing: 12 inches o.c.
  3. Panel Coverage: 36 inches .
  4. Panel Height: 1.25 inches .
- D. Materials:
1. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Aluminum-Zinc Alloy-Coated Steel Sheet Surface: Smooth, flat finish.
- E. Finishes:

1. Exposed Coil-Coated Finish:
    - a. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat. Use for interior.
  2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- F. Wall Panel Accessories: Provide components required for a complete wall panel assembly, including trim, copings, mullions, sills, corner units, clips, seam covers, battens, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of panels.

## 2.7 THERMAL INSULATION

- A. Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
1. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96/E 96M, Desiccant Method.
    - a. Basis of Design: Lamtec Corporation "GymGuard." Equal products by API Group Inc. or Alpha Associates Group Inc.
    - b. Composition: White metallized polypropylene film facing and fiberglass-polyester-blend fabric backing.
    - c. Weight: 75 lbs/ 3000 square feet
    - d. Puncture Resistance : 650 Beach Units
    - e. Caliper / Thickness: 0.007 inch
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

## 2.8 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers,

closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
  2. Clips: Manufacturer's standard, formed from steel sheet, designed to withstand negative-load requirements.
  3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from steel sheet.
  4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weather tight construction.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
  2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weather tight construction.
- D. Soffit Panels: Soffit panels shall be the same material type and finish as the roof panels in .032-inch aluminum. Panels are unvented, 12-inches wide with "vee" groove at 6- inches o.c. with hook and grab interlock. Provide retainage channels at front and back edges in same material and finish as soffit panels
- E. Flashing and Trim: Formed from 0.040-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.
1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
  2. Opening Trim: Formed from 0.040-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.
- F. Gutters: Formed from 0.032-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other

special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Finish gutters to match roof fascia and rake trim.

1. Gutter Supports: Fabricated from same material and finish as gutters spaced 36" o.c.
  2. Strainers: Provide Bronze, copper, or aluminum wire ball type at outlets.
- G. Downspouts: Formed from 0.032 inch nominal-thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- long sections, complete with formed elbows and offsets. Finish downspouts to match wall panels. Provide in size and shape required for roof area.
1. Mounting Straps: Fabricated from same material and finish as gutters.
- H. Materials:
1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
    - a. Fasteners for Roof and Wall Panels: Self-drilling or self-tapping Type 410 stainless-steel, or zinc-alloy-steel hex washer head, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
    - b. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
    - c. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

## 2.9 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly and disassembly.
1. Fabricate components in such a manner that once assembled, they may be disassembled, repackaged, and res-assembled with a minimum amount of labor.
  2. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
  3. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with base plates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.



1. Make shop connections by welding or by using non-high-strength bolts.
  2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication to a minimum film thickness of 1 mil (0.025mm).
- D. Tolerances: Comply with MBMA's "Low Rise Building System Manual" : chapter IV, Section 9, "Fabrication and Erection Tolerances."
- E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

#### 2.10 FINISHES GENERAL

- A. Comply with NAAMM's "Metal finishes manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and assembled or installed to minimize contrast.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with erection only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
- B. Clean substrates of oil, grease, rolling compounds, incompatible primers, and loose mill scale that impair bond of erection materials.

- C. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

### 3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erector must be certified in writing by the metal building manufacturer as capable of erection of the metal buildings in accordance with all the requirements of these specifications and drawings.
- B. Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- C. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- D. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- E. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing, using clips with field connections using non-high strength bolts. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.
  - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
  - 2. Locate and space wall girts to suit openings such as doors and windows.
  - 3. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.
  - 4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- F. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
  - 1. Tighten rod and cable bracing to avoid sag.
  - 2. Locate interior end-bay bracing only where indicated.
- G. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- H. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

### 3.4 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge when possible, unless otherwise indicated or restricted by shipping limitations.
  - 1. Install ridge and hip caps as metal roof panel work proceeds.
  - 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels at Existing Building: Fasten roof panels to purlins with concealed clips at each standing-seam joint. Install clips over top of insulation at location and spacing determined by manufacturer. Install clips to supports with self-drilling screws. Apply a continuous ribbon of sealant tape to clean dry surface of the weather side of fastening on end laps, and on side laps as needed to make roof sheets weatherproof to driving rains.
  - 1. Field cutting by torch is not permitted.
  - 2. Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
  - 3. Install clips to supports with self-drilling or self-tapping fasteners.
  - 4. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - 5. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
  - 6. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Pre-drill panels for fasteners.
- C. Standing Seam Metal Roof Panels at Addition: Fasten roof panels over board insulation to structural metal deck with concealed clip in accordance with the manufacturer's instructions.
  - 1. Install clips at each support with self-drilling/self-tapping fasteners.
  - 2. Install factory-caulked cleats at standing-seam joints.
- D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.5 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, where possible, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
2. Shim or otherwise plumb substrates receiving metal wall panels.
3. When two rows of metal panels are required, lap panels 4 inches minimum.
4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Pre-drill panels.
6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
7. Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads or panels. Install screws in predrilled holes.
8. Install flashing and trim as metal wall panel work proceeds.
9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
11. Field cutting by torch is not permitted.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative, on level, plumb, and on location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.6 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.

B. Fiberglass Blanket Insulation: Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.

1. At wall panels, install insulation over girts in accordance with manufacturer's standard procedures.
2. At roof panels, install insulation over purlins in accordance with manufacturer's standard procedures.

- C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
  - 1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

### 3.7 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weather tight mounting, and provide for thermal expansion. Coordinate installation with door and louver manufacturer and flashings and other components.
  - 1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  - 2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  - 3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide for thermal expansion of metal units; conceal fasteners when possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
  - 1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
  - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

- D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

- 1. Provide elbows at base of downspouts to direct water away from building.

### 3.8 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Touchup Painting: After erection, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
  - 1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
  - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- D. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.
- E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as soon as each metal panel is installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
  - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 13 3419

## SECTION 23 0100 - GENERAL HVAC REQUIREMENTS

### PART 1 – GENERAL

#### 1.1 DEFINITIONS

- A. Provide – To furnish and install, complete, fully coordinated, and ready for operation.
- B. Contractor – mechanical subcontractor, or contractor engaged to perform work specified under Division 23.

#### 1.2 SCOPE OF WORK

- A. Provisions of this Section apply to all Division 23 work.
- B. Include provisions of General Conditions as part of this section.
- C. Provide all labor, materials, equipment, and services necessary for the completion of all HVAC Mechanical work shown, specified or implied, to deliver complete, and ready for operation equipment and systems.

#### 1.3 GENERAL REQUIREMENTS

- A. Coordinate HVAC work with all other trades; provide approved submittals to appropriate trades to coordinate installation of requirements the actual equipment to be installed.
- B. Protect mechanical equipment from damage during construction, when installation is complete clean equipment and touch up paint.
- C. Install all equipment to provide normal service access to all components, install in accordance with manufacturer's instruction. If manufacturer's instructions conflict with contract documents, obtain engineer of records decision before proceeding.
- D. All work shall conform to the contract documents and all codes, standards and requirements listed below and enforced in the jurisdiction in which the work will be performed.
- E. Cooperate with all other crafts/trades. Perform work in a timely manner. Do not interfere with the work of other trades.
- F. Contractor shall provide shop drawings verifying clearances routings and tie-ins on piping and ductwork prior to fabrication and installation of new work.
- G. If systems interfere or conflict the Architect and engineer shall decide which equipment to relocate regardless of which was installed first.
- H. The contractor shall be responsible for fire stopping wall penetrations at fire rated walls where ductwork, control conduit, wiring, or piping are installed. Fire stopping shall be performed immediately after the work is installed. Do not leave penetrations unprotected overnight.

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1.4 DRAWINGS AND SPECIFICATIONS

- A. HVAC drawings and specifications are intended to be worked together as a set by the contractor, drawings are not standalone.
- B. HVAC drawings are diagrammatic and subject to requirements of the architectural drawings and conditions existing in the field. Mechanical drawings indicate generally the location of components and are not intended to show all fittings or all details of the work. Mechanical drawings are intended to show size, capacity, approximate location, direction, and general relationship of the work, but not exact detail or arrangement.
- C. Coordinate dimensions with all project drawings, and field conditions. Do not scale HVAC drawings for locations of system components. Coordinate location of air devices, pipe, ductwork, lighting, ceiling grids, sprinkler piping, sprinkler heads, equipment and equipment pads and supports with architectural, structural, and electrical drawings as well as conditions existing in the field and lay out work to fit in ceiling grids, lighting, and other parts.
- D. Make no changes that alter the intent or scope of the work without written instructions from the architect. In case of doubt, submit a formal request for information (RFI) to the architect and obtain architect's response before proceeding with work. Where doubt arises as to the meaning of the HVAC drawings and specifications, obtain the Architect's written interpretation before proceeding. Failure to follow this instruction shall make the contractor liable for damage to other work, and responsible for removing and repairing defective or mis-located work in proper manner.
- E. Make minor adjustments in the field as required to provide optimum results and to facilitate ease of service, efficient operation, and best appearance. Minor adjustments are those that do not alter design intent, scope of the work or operation of HVAC systems.

1.5 REFERENCES

- A. AGA: American Gas Association.
- B. ANSI: American National Standards Institute, Inc.
- C. AMCA: Air Movement & Control Association.
- D. ARI: American Refrigeration Institute.
- E. ASHRAE: American Society of Heating, Refrigeration and Air Conditioning Engineers.
- F. ASME: American Society for Mechanical Engineers.
- G. ASTM: American Society of Testing and Materials.
- H. AWWA: American Water Works Association.
- I. FM: Factory Mutual.
- J. NAIMA: North American Insulation Manufacturers Association.
- K. NEMA: National Electrical Manufacturer's Association.
- L. NFPA: National Fire Protection Association.
- M. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry.
- N. SMACNA: Sheet Metal and Air Conditioning Contractor's National Association.
- O. UL: Underwriters Laboratories, Inc.

1.6 REGULATORY REQUIREMENTS



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- A. Comply with current edition, unless otherwise noted, of the following codes and standards.
1. ICC Building Codes 2018, including the Building, Mechanical, Gas, Fire Protection, Plumbing, and Energy Conservation Code.
  2. ADA - Americans with Disabilities Act
  3. ASHRAE 15 - Safety Code for Mechanical Refrigeration
  4. ASHRAE 62 - Ventilation for Acceptable Indoor Air Quality
  5. ASME - Boiler and Pressure Code
  6. NFPA 70 - National Electrical Code
  7. NFPA 90A - Installation of Air Conditioning and Ventilating Systems
  8. NFPA 101 - Life Safety Code
  9. SMACNA HVAC Duct Construction Standards Metal and Flexible -Current Edition.
  10. SMACNA HVAC Air Duct Leakage Test Manual -Current Edition
  11. SMACNA Guidelines for Roof Mounted Outdoor Air Conditioner Installation -Current Edition
  12. SMACNA Fire Smoke and radiation Damper Installation Guide for HVAC -Current Edition
- B. Permits, Licenses, Inspections and Fees.
1. Contractor shall give required notices, file drawings, obtain and pay for permits, deposits, and fees necessary for the installation of all Division 23 HVAC work.
  2. Contractor shall obtain and pay for inspections required by laws, ordinances, rules, regulations, or public authority having jurisdiction.
  3. Contractor shall obtain and pay for certificates of such inspections and file such certificates with the Owner.

1.7 QUALIFICATION OF THE CONTRACTOR AND SUBCONTRACTORS

- A. The mechanical contractor shall have been in business as a licensed HVAC contractor for a minimum of 3 years prior to the date of opening bids and shall have been pre-qualified as a bidder by the owner.
- B. He shall have a satisfactory experience record with air conditioning installations of character and scope comparable with this project, within the last 3 years prior to the date of opening bids.
- C. He shall have had an established service department capable of providing service inspection or full maintenance contracts.
- D. If the HVAC contractor, with the Engineer's approval, uses a sub-contractor to provide another discipline that the contractor does not normally furnish, that sub-subcontractor shall meet the same qualifications.

1.8 PRODUCT REQUIREMENTS

- A. Provide new standard, first-grade materials throughout.
- B. Multiple items of similar equipment shall be the product of the same manufacturer.

C. Substitutions:

1. Comply with the provisions of Division 1, for product requirements, substitutions and alternates, and the following.
2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified basis of design, it shall be understood that there will be no extra cost involved whatsoever, and the effect on other trades has been included in the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor furnishing the equipment.
3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements, and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
4. Each bidder may submit to the Architect a list of any substitutes which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutes. To be considered, such requests must be delivered to the office of the Architect not later than 10 days prior to bid due date. The submittal shall include the following:
  - a. Specific equipment or material proposed for substitution giving manufacturer, catalog, and model number.
  - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
  - c. A statement setting forth any changes in other materials, equipment, or other Work that incorporation of the substitute may require.
5. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.
6. All bidders will be advised by addenda of proposed substitutes which are found to be acceptable. Do not rely upon approvals made in any other manner.

1.91 SUBMITTALS

- A. Submit under provisions of Division 1 and Division 23 sections for submittals and submittal procedures.
- B. Submittals shall include product information for all equipment and components specified or shown on the plans, and contractor shop drawings that provide details, dimensions and coordination of the work with all other disciplines.
- C. For each type of product, equipment, material, and services specified in Division 23

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specification sections provide product data that is clearly marked indicating compliance with the HVAC drawing and specifications. Submittals shall be provided with specified shop drawings. Provide to the architect or prime consultant, a complete submittal fully marked to identify exactly what shall be provided including the following minimal information:

1. All submittals shall be provided in electronic pdf format and shall be organized in accordance with the HVAC specification numbering system.
  2. All submittals shall be completely marked with manufacturer's names, model number, dimensions, weights, performance ratings, efficiencies, features, and accessories to be provided.
  3. Capacities, dimensions, weights, etc. shall be in the terms specified and inch-pound system.
  4. Call attention to and clearly identify deviations from specified equipment and components regarding operation and physical dimensions, capacities, and performance.
  5. Performance curves for equipment such as fans and pumps shall be included and shall be clearly marked with operating points, and efficiency.
- D. The contractor shall obtain reviewed submittals from the Engineer that have been returned and marked as follows:
1. APPROVED – Contractor approved to order equipment and proceed with the work.
  2. APPROVED AS NOTED – Contractor approved to order equipment and proceed with the work after making corrections noted by the engineer and coordinating corrections with all disciplines. Corrected submittal shall be re-submitted for record purposes to the General Contractor, and A/E team.
  3. REVISE AND RESUBMIT – Contractor to correct submittal and resubmit to the A/E team for approval. Re-submittal shall be clearly marked as such.
- E. Final equipment or material orders shall not be placed until submittals have been returned marked either "APPROVED" OR "APPROVED AS NOTED" without exception.
- F. Shop Drawings:
1. Before starting any work submit and obtain approved shop drawings from the Engineer of Record.
  2. Shop Drawings: Provide Shop Drawings for all areas of the work include the following.
    - a. All areas of the work, as shown on the plans.
  3. NO WORK SHALL BEGIN UNTIL SHOP DRAWINGS AND COORDINATION DRAWINGS HAVE BE MARKED BY THE ENGINEER OF RECORD AS "APPROVED" OR APPRVOED AS NOTED."
  4. No work shall begin, and no equipment shall be ordered until shop drawings have been marked by the engineer of record as "APPROVED" or "APPROVED AS NOTED." Failure to submit shop drawings will make the Contractor responsible for changes required to

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facilitate installation of mechanical work and other affected disciplines.

5. Shop drawings shall fully detail all mechanical work to be performed. Shop drawings shall be submitted in electronic pdf format and shall comply with the following:
6. All shop drawings shall be drawn to 1/4" = 1'-0" scale. 1/8" – 1'-0" scale may be used when approved by the engineer of record.
7. Ductwork shop drawing shall include the following at a minimum:
  - a. Bottom of duct elevations.
  - b. Dimensions from columns lines.
  - c. Duct sizes (including insulation)
  - d. Insulation thickness.
  - e. Sheet metal gauges.
  - f. Ductwork pressure classes.
  - g. Ductwork seal class.
  - h. Locations of turning vanes, manual dampers, remote damper operators, control dampers and control devices.
  - i. Ductwork construction details.
  - j. Ductwork support details and support locations.
  - k. Ductwork seismic restraint details.
8. Piping shop drawing shall include the following at a minimum:
  - a. Bottom of pipe elevations.
  - b. Dimensions from columns lines.
  - c. Pipe sizes and schedules (including insulation)
  - d. Insulation thickness.
  - e. Fluid type.
  - f. Pipe support locations.
  - g. Pipe support details.
  - h. Seismic Restraint Details.
  - i. Location of automatic valves and system isolation valves.
  - j. Equipment connection details
9. Mechanical Equipment Room shop drawings shall include the following at a minimum:
  - a. Equipment layouts.
  - b. Location of support columns.
  - c. Location and dimensions of equipment foundation and pads.
  - d. Location and dimension of equipment and apparatus including electrical control panels, starters, service, and coil pull areas.
  - e. Coordinate with Electrical Contractor and indicate electrical equipment location(s) i.e., panels, electrical conduit runs and stubs for motors, code clearances, etc.
  - f. Dimensioned floor drains locations.
10. HVAC Direct Digital Control System shop drawing shall include the following at a minimum:

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- a. Abbreviations and Legends.
  - b. Control panel locations.
  - c. Sensor Locations (CO<sub>2</sub>, Humidity, Temperature)
  - d. Point to point wiring diagrams.
  - e. Air flow diagrams that indicate all control device locations and types.
  - f. Piping diagrams that indicate all control device locations and types.
  - g. Sequences of operation.
  - h. Product information for all control devices, wiring, and components to be provided for a complete system.
- G. Coordination Drawings: Before starting any work submit coordination drawings to the engineer of record. NO WORK SHALL BEGIN UNTIL COORDINATION DRAWINGS AND SHOP DRAWINGS HAVE BE MARKED BY THE ENGINEER OF RECORD AS "APPROVED" OR APPROVED AS NOTED." Failure to submit coordination drawings will make the Contractor responsible for changes required to facilitate installation of mechanical work and other affected disciplines.
1. Provide coordination drawing for the following areas:
    - a. ALL AREAS OF THE WORK
  2. Coordination drawings shall be prepared as noted above for shop drawings. Mechanical shop drawings shall be the basis of the coordination drawings. Information from the following disciplines shall be added to coordinate all disciplines.
    - a. Audio/Visual
    - b. Electrical
    - c. Fire Sprinkler
    - d. Plumbing
    - e. Structural

1.10 PROJECT/SITE CONDITIONS

- A. Visiting Site: Visit site before and during construction to become familiar with job site conditions and the installed work of other trades that may affect mechanical work.
- B. The contractor shall become familiar with the operations and systems in the existing building.
- C. No additional allowance will be granted because of lack of knowledge of job site conditions.
- D. Cause as little interference or interruption of existing services as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

1.11 PROJECT CLOSE-OUTS

- A. Submit project close out documents after the final inspection and all punch list items are complete.
- B. Record Drawings shall include ductwork, piping and control system record drawings shall be provided and shall include the following:

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1. Record drawings shall be an accurate record of corrections, variations, and deviations, including those required by change orders to the contract documents.
  2. Record changes daily on a set of plans kept at the job site.
  3. Submit record drawing marked as noted above to Architect for review prior to request for final payment.
  4. Marked record drawings will be returned to Contractor for use in preparing final record drawings.
  5. Final Record Drawings: Provide one complete set of prints, one set in PDF format and one electronic copy in AutoCAD or Revit format indicating the actual completed installation of the work.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
1. Record drawings – As noted above.
  2. Control manufacturer's letter of certification (Electronic pdf).
  3. Air balance report (Electronic pdf).
  4. Water balance report (Electronic pdf).
  5. Equipment Submittal Data (Electronic pdf).
  6. Equipment operating and maintenance manuals (Electronic pdf and 2 hard copies).
  7. Equipment warranty dates and guarantees (Electronic pdf and 2 hard copies).
  8. DOCUMENTATION INDICATING THE CONTRACTOR HAS FILED ALL REQUIRED WARRANTY DOCUMENTS/FORMS WITH EACH MANUFACTURER. (Electronic pdf and 2 hard copies).
  9. Pressure vessel certificates issued but the State of Alabama (Electronic pdf).
  10. State of Alabama Boiler inspections and certificates.
  11. List of Owner's Personnel who have received operating and maintenance instructions.
  12. Letter certifying and signed by Owner or his representative that the Owner or his representative has received the extra materials specified for each system.
  13. Submit factory start-up/field reports for all equipment and systems specified to have factory start up. (See Equipment Specification Sections)

1.12 TEMPORARY USE OF HEATING AND AIR CONDITIONING SYSTEMS DURING CONSTRUCTION

- A. Use of newly installed mechanical equipment to provide heating, air conditioning, and ventilation during construction will be permitted subject to compliance with the following provisions:
1. The HVAC/Control contractor shall provide written procedures detailing parties responsible for operating the equipment and the manner in which the equipment will be operated and controlled during temporary use.
  2. Equipment specified to have factory supervised start-up shall have had such start-up and factory start-up reports shall have been submitted and certified by the contractor to contain no deficiencies.
  3. All safeties, and interlocks shall have been installed and functionally tested.
  4. All smoke detectors and fire alarm system interlocks shall have been installed and functionally tested.

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5. Automatic temperature control systems for all safeties and controls shall function to prevent damage to equipment.
  6. Specified air filters shall be installed. Filters shall be changed when deemed dirty by the architect, engineer, or owner until acceptance of the systems by the owner. Clean filters shall be provided prior to test, adjust and balance of the HVAC systems.
  7. All return air and outside air openings shall have temporary filter media installed over inlet side of opening and secured airtight there to. Temporary filter media shall be replaced by the contractor when deemed dirty by the architect, engineer, or owner until acceptance of the systems by the owner.
  8. Cleaning of water systems shall have been completed.
  9. Water treatment chemicals will have been added to the system by the contractor and verified by the water treatment provided.
  10. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Owner.
  11. Warranty dates shall start at Date of Substantial Completion of the entire project, operation of the equipment on a temporary basis during construction does not constitute substantial completion or beneficial use by the owner. Substantial completion date shall be determined by the Architect.
  12. The contractor shall maintain all equipment during temporary use, including routine maintenance, and repairs of any component failures. Contractor shall carry out routine maintenance per the requirements of the equipment installation and operation manual.
- B. This paragraph shall not reduce the requirements of any other mechanical specification section.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

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SECTION 23 0513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General construction and requirements.
- B. Applications.
- C. Single phase electric motors.
- D. Three phase electric motors.
- E. Electronically Commutated Motors (ECM).

1.02 RELATED REQUIREMENTS

- A. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.
- B. Section 262913 - Enclosed Controllers.

1.03 REFERENCE STANDARDS

- A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings 2015 (Reaffirmed 2020).
- B. IEEE 112 - IEEE Standard Test Procedure for Polyphase Induction Motors and Generators 2017.
- C. NEMA MG 1 - Motors and Generators 2021.
- D. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.
- C. Test Reports: Indicate test results verifying nominal efficiency and power factor for three phase motors larger than 1/2 horsepower.
- D. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
- E. Operation Data: Include instructions for safe operating procedures.
- F. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacture of electric motors for HVAC equipment use, and their accessories, with minimum three years documented product development, testing, and manufacturing experience.
- B. Comply with NFPA 70.
- C. Provide certificate of compliance from Authority Having Jurisdiction indicating approval of high efficiency motors.

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- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Provide five year manufacturer warranty for motors larger than 20 horsepower.

PART 2 PRODUCTS

2.01 GENERAL CONSTRUCTION AND REQUIREMENTS

- A. Electrical Service:
  - 1. Motors 1/2 HP and Smaller: 115 volts, single phase, 60 Hz.
  - 2. Motors Larger than 1/2 Horsepower: 208 or 480 volts, three phase, 60 Hz.
- B. Nominal Efficiency:
  - 1. Open Motor with Two Poles: 82.5.
  - 2. Open Motor with Four Poles: 82.5.
  - 3. Open Motor with Six Poles: 50.0.
  - 4. Enclosed Motor with Two Poles: 75.5.
  - 5. Enclosed Motor with Four Poles: 82.5.
  - 6. Enclosed Motor with Six Poles: 50.0.
- C. Construction:
  - 1. Open drip-proof type except where specifically noted otherwise.
  - 2. Design for continuous operation in 104 degrees F environment.
  - 3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
  - 4. Motors with frame sizes 254T and larger: Energy efficient type.
- D. Explosion-Proof Motors: UL approved and labelled for hazard classification, with over temperature protection.
- E. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.
- F. Wiring Terminations:
  - 1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
  - 2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.02 APPLICATIONS

- A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not comply with these specifications.

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- B. Single phase motors for shaft mounted fans or blowers: Permanent split capacitor type.
- C. Motors located in exterior locations, wet air streams downstream of sprayed coil dehumidifiers, draw through cooling towers, air cooled condensers, humidifiers, direct drive axial fans, roll filters, explosion proof environments, and dust collection systems: Totally enclosed type.

2.03 SINGLE PHASE POWER - PERMANENT-SPLIT CAPACITOR MOTORS

- A. Starting Torque: Exceeding one fourth of full load torque.
- B. Starting Current: Up to six times full load current.
- C. Multiple Speed: Through tapped windings.
- D. Open Drip-proof or Enclosed Air Over Enclosure: Class A (50 degrees C temperature rise) insulation, minimum 1.0 Service Factor, prelubricated sleeve or ball bearings, automatic reset overload protector.

2.04 THREE PHASE POWER - SQUIRREL CAGE MOTORS

- A. Starting Torque: Between 1 and 1-1/2 times full load torque.
- B. Starting Current: Six times full load current.
- C. Power Output, Locked Rotor Torque, Breakdown or Pull Out Torque: NEMA Design B characteristics.
- D. Design, Construction, Testing, and Performance: Comply with NEMA MG 1 for Design B motors.
- E. Insulation System: NEMA Class B or better.
- F. Testing Procedure: In accordance with IEEE 112. Load test motors to determine free from electrical or mechanical defects in compliance with performance data.
- G. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
- H. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay for wiring into motor starter; refer to Section 262913.
- I. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA STD 9, L-10 life of 20,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.
- J. Sound Power Levels: To NEMA MG 1.
- K. Part Winding Start Where Indicated: Use part of winding to reduce locked rotor starting current to approximately 60 percent of full winding locked rotor current while providing approximately 50 percent of full winding locked rotor torque.
- L. Weatherproof Epoxy Sealed Motors: Epoxy seal windings using vacuum and pressure with rotor and starter surfaces protected with epoxy enamel; bearings double shielded with waterproof non-washing grease.
- M. Nominal Efficiency: As indicated at full load and rated voltage when tested in accordance with IEEE 112.

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- N. Nominal Power Factor: As indicated at full load and rated voltage when tested in accordance with IEEE 112.

2.05 ELECTRONICALLY COMMUTATED MOTORS (ECM)

A. Applications:

1. Residential:
  - a. Furnace:
  - b. Air Handling Unit:
    - 1) Operating Mode: Constant cfm.
    - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the air handling unit.
    - 3) RPM: 300 through 1250.
  - c. Condenser Fan:
    - 1) Operating Mode: Constant speed.
    - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the condenser fan.
    - 3) RPM: 300 through 1250.
2. Commercial:
  - a. Power Roof Ventilator (PRV):
    - 1) Operating Mode: Constant cfm.
    - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the PRV and/or specified sequence of operation.
    - 3) Shaft Extension: Single.
    - 4) Options: Remote mount control.
  - b. Fan Filter Unit:
    - 1) Input: Motor manufacturer to coordinate control requirements with the control board of the fan filter unit and/or specified sequence of operation.
    - 2) Shaft Extension: Single.
    - 3) Options: Remote mount control.
  - c. Hydronic Pump:
    - 1) Operating Mode: Constant speed.
    - 2) Input: Motor manufacturer to coordinate control requirements with the control board of the hydronic pump and/or specified sequence of operation.
    - 3) Flange Configuration: "C".

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
- C. Check line voltage and phase and ensure agreement with nameplate.

END OF SECTION

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SECTION 23 0517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe sleeves.
- B. Pipe-sleeve seals.

1.02 RELATED REQUIREMENTS

- A. Section 230719 - HVAC Piping Insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type) 2022a.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2023a.
- C. FM (AG) - FM Approval Guide Current Edition.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified this section.
  - 1. Minimum three years experience.
  - 2. Approved by manufacturer.
- C. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store sleeve and sleeve seals in shipping containers, with labeling in place.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PIPE SLEEVES

- A. Sleeves for Piping thru Non-Fire Rated Partitions: 18 gage galvanized steel 1 inch larger than pipe or pipe covering.
- B. Sleeves for Piping thru Floors in Fire Rated Chases: 18 gage galvanized steel 1 inch larger than pipe or pipe covering.
- C. Sleeves for Piping Through Non-Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- D. Sleeves for Pipes Through Fire Rated and Fire Resistive Floors, Walls, and partitions.

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1. Prefabricated fire rated sleeves including seals, UL listed.
  2. Or, at Contractor's options, 18 gage galvanized steel sized to provide clearance between pipe or pipe covering per fire stopping sealants U.L. Listing. Seal annular space between pipe or pipe covering with firestopping sealant.
- E. Vertical Piping:
1. Sleeve Length: Schedule 40 black steel pipe, 1 inch above finished floor.
  2. Provide sealant for watertight joint.
- F. Firestopping Sealant:
- G. Acceptable Manufactures:
1. 3M Brand – Fire Barrier CP25WB caulk.
  2. Flamestop V.
  3. Specified Technologies.
  4. Rectorseal Corp.
  5. Metacaulk 950.
  6. Hilti FS611A.
- H. Bear U.L. Listing for actual conditions of installation, thickness and application.
- I. Clearances:
1. Provide allowance for insulated piping.
  2. Wall, Floor, Partitions, and Beam Flanges: 1 inch greater than external pipe diameter.
  3. All Rated Openings: Caulked tight with fire stopping material in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and foreign material, from inside and outside, before assembly.

#### 3.02 INSTALLATION

- A. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- B. Install piping to conserve building space, to not interfere with use of space and other work.
- C. Install piping and pipe sleeves to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- D. Provide sleeves when penetrating footings, floors, walls, and partitions. Seal pipe including sleeve penetrations to achieve fire resistance equivalent to fire separation required.
  1. Aboveground Piping:
    - a. Pack solid using mineral fiber in compliance with ASTM C592.
    - b. Fill space with an elastomer caulk to a depth of 0.50 inch where penetrations occur between conditioned and unconditioned spaces.
  2. All Rated Openings: Caulk tight with fire stopping material in compliance with ASTM E814 in accordance with Section 078400 to prevent the spread of fire, smoke, and gases.

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3. Caulk exterior wall sleeves watertight with lead and oakum or mechanically expandable chloroprene inserts with mastic-sealed components.
- E. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.03 CLEANING

- A. Upon completion of work, clean all parts of the installation.
- B. Clean equipment, pipes, valves, and fittings of grease, metal cuttings, and sludge that may have accumulated from the installation and testing of the system.

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SECTION 23 0529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment components.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 055000 - Metal Fabrications: Materials and requirements for fabricated metal supports.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General-Purpose Piping 2023.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings 1999, with Editorial Revision (2022).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures 1999 (Reapproved 2022).
- H. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2023.
- I. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2022.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023b.
- K. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).
- L. FM (AG) - FM Approval Guide Current Edition.
- M. MFMA-4 - Metal Framing Standards Publication 2004.
- N. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- O. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P. UL (DIR) - Online Certifications Directory Current Edition.

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- Q. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
2. Coordinate the work with other trades to provide additional framing and materials required for installation.
3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.05 QUALITY ASSURANCE

A. Comply with applicable building code.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Installer Qualifications for Field-Welding: As specified in Section 055000.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of plumbing work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported 1.15. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.

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5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
  - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
  - b. Outdoor and Damp or Wet Indoor Locations: Use aluminum, galvanized steel or approved equivalent unless otherwise indicated.
  - c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
  - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Prefabricated Trapeze-Framed Metal Strut Systems:
  1. MFMA-4 compliant, pre-fabricated, MSS SP-58 type 59 continuous-slot metal strut channel with associated tracks, fittings, and related accessories.
  2. MFMA-4 compliant, prefabricated, side-loading continuous-slot metal strut channel bracket with associated tracks, fittings, and related accessories.
  3. Strut Channel or Bracket Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
  4. Accessories: Provide bracket covers, cable basket clips, cable tray clips, clamps, conduit clamps, fire-retarding brackets, j-hooks, protectors, and vibration dampeners.
- C. Prefabricated Trapeze-Framed Fiberglass Strut Systems:
  1. MSS SP-58 type 59, prefabricated continuous-slot fiberglass strut channel, associated fittings, and related accessories.
  2. Minimum Channel Dimensions: 1-5/8 inch width by 1 inch height.
  3. Flammability: Fire retardant with NFPA 101, Class A flame spread index (maximum of 25) when tested in accordance with ASTM E84; self-extinguishing in accordance with ASTM D635.
- D. Hanger Rods:
  1. Threaded zinc-plated steel unless otherwise indicated.
  2. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Piping up to 1 inch: 1/4 inch diameter.
    - c. Piping larger than 1 inch: 3/8 inch diameter.
    - d. Trapeze Support for Multiple Pipes: 3/8 inch diameter.
- E. Thermal Insulated Pipe Supports:
  1. Manufacturers:
    - a. Buckaroos, Inc; [www.buckaroos.com/#sle](http://www.buckaroos.com/#sle).
    - b. KB Enterprises; [www.snappitz.com/#sle](http://www.snappitz.com/#sle).
  2. General Requirements:
    - a. Insulated pipe supports to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
    - b. Surface Burning Characteristics: Flame spread index/smoke developed index of 5/30, maximum, when tested in accordance with ASTM E84 or UL 723.
    - c. Pipe supports to be provided for nominally sized, 1/2 to 30 inch iron pipes.

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- d. Insulation inserts to consist of rigid phenolic foam insulation surrounded by a 360 degree, PVC jacketing.
3. PVC Jacket:
  - a. Pipe insulation protection shields to be provided with a ball bearing hinge and locking seam.
  - b. Minimum Service Temperature: Minus 40 degrees F.
  - c. Maximum Service Temperature: 180 degrees F.
  - d. Moisture Vapor Transmission: 0.0071 perm inch, when tested in accordance with ASTM E96/E96M.
  - e. Thickness: 60 mil.
4. Pipe insulation protection shields to be provided at the hanger points and guide locations on pipes requiring insulation as indicated on drawings.
5. Products:
  - a. Buckaroos, Inc; CoolDry: [www.buckaroos.com/#sle](http://www.buckaroos.com/#sle).
- F. Pipe Supports:
  1. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
  2. Liquid Temperatures Up To 122 degrees F:
    - a. Overhead Support: MSS SP-58 Types 1, 3 through 12.
    - b. Support From Below: MSS SP-58 Types 35 through 38.
  3. Operating Temperatures from 122 to 446 degrees F:
    - a. Overhead Support: MSS SP-58 Type 1 or 3 through 12, with appropriate saddle of MSS SP-58 Type 40 for insulated pipe.
- G. Pipe Stanchions:
  1. Manufacturers:
    - a. Anvil International; H-Block: [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle), or equal.
  2. Material: Malleable iron, ASTM A47/A47M; or carbon steel, ASTM A36/A36M.
  3. Provide coated or plated saddles to isolate steel hangers from dissimilar metal tube or pipe.
  4. For pipe runs, use stanchions of same type and material where vertical adjustment is required for stationary pipe.
- H. Beam Clamps:
  1. Manufacturers:
    - a. FNW; 7201: [www.fnw.com/#sle](http://www.fnw.com/#sle), or equal.
  2. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
  3. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
  4. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).
  5. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
  6. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
  7. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,

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8. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
  9. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
- I. U-Bolts:
1. Manufacturers:
    - a. FNW; 7610: [www.fnw.com/#sle](http://www.fnw.com/#sle), or equal.
    - b. Source Limitations: Furnish hardware, fittings, and accessories from single manufacturer.
  2. MSS SP-58 Type 24, carbon steel u-bolt for pipe support or anchoring.
- J. Offset Pipe Clamps: Double-leg design two-piece pipe clamp.
- K. Pipe Hangers:
1. Split Ring Hangers:
    - a. Manufacturers:
      - 1) FNW; 7001: [www.fnw.com/#sle](http://www.fnw.com/#sle), or equal
    - b. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
    - c. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
    - d. Provide hanger rod and nuts of the same type and material for a given pipe run.
    - e. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
  2. Swivel Ring Hangers, Adjustable:
    - a. Manufacturers:
      - 1) FNW; 7010: [www.fnw.com/#sle](http://www.fnw.com/#sle), or equal.
    - b. MSS SP-58 Type 10, epoxy-painted, zinc-colored.
    - c. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
    - d. FM (AG) and UL (DIR) listed for specific pipe size runs and loads.
  3. Clevis Hangers, Adjustable:
    - a. Manufacturers:
      - 1) FNW; 7005: [www.fnw.com/#sle](http://www.fnw.com/#sle), or equal, or equal.
    - b. Copper Tube: MSS SP-58 Type 1, epoxy-plated copper.
    - c. Felt-Lined: MSS SP-58 Type 1, zinc-plated, silicone-free carbon steel.
    - d. Light-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
    - e. Standard-Duty: MSS SP-58 Type 1, zinc-colored, epoxy plated.
- L. Nonmetallic Pipe Hangers:
1. Manufacturers:
    - a. DecoShield Systems, Inc; Snap-2 Hangers: [www.decoshield.com/#sle](http://www.decoshield.com/#sle), or equal.
- M. Dielectric Barriers: Provide between metallic supports and metallic piping and associated items of dissimilar type; acceptable dielectric barriers include rubber or plastic sheets or coatings attached securely to pipe or item.
- N. Pipe Shields for Insulated Piping:
1. Manufacturers:

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- a. Anvil International; [www.anvilintl.com/#sle](http://www.anvilintl.com/#sle).
- b. FNW; 7750: [www.fnw.com/#sle](http://www.fnw.com/#sle).
2. General Construction and Requirements:
  - a. Surface Burning Characteristics: Comply with ASTM E84 or UL 723.
  - b. Shields Material: UV-resistant polypropylene with glass fill.
  - c. Maximum Insulated Pipe Outer Diameter: 12-5/8 inch.
  - d. Minimum Service Temperature: Minus 40 degrees F.
  - e. Maximum Service Temperature: 178 degrees F.
  - f. Pipe shields to be provided at hanger, support, and guide locations on pipe requiring insulation or additional support.
- O. Anchors and Fasteners:
  1. Manufacturers - Mechanical Anchors:
    - a. FNW; 7502: [www.fnw.com/#sle](http://www.fnw.com/#sle).
    - b. Hilti, Inc; [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
    - c. ITW Red Head, a division of Illinois Tool Works, Inc; [www.itwredhead.com/#sle](http://www.itwredhead.com/#sle).
  2. Manufacturers - Powder-Actuated Fastening Systems:
    - a. Hilti, Inc; [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
    - b. ITW Ramset, a division of Illinois Tool Works, Inc; [www.ramset.com/#sle](http://www.ramset.com/#sle).
    - c. Powers Fasteners, Inc; [www.powers.com/#sle](http://www.powers.com/#sle).
  3. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
  4. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  5. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  6. Hollow Masonry: Use toggle bolts.
  7. Hollow Stud Walls: Use toggle bolts.
  8. Steel: Use beam-ceiling clamps, beam clamps, machine bolts, or welded threaded studs.
  9. Beam Ceiling Flanges: ASTM A47/A47M Grade 32510, malleable iron or stainless steel with copper, plain, stainless steel, or zinc finish.
  10. Sheet Metal: Use sheet metal screws.
  11. Plastic and lead anchors are not permitted.
  12. Powder-actuated fasteners are not permitted.
  13. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
    - a. Comply with MFMA-4.
    - b. Channel Material: Use galvanized steel.
    - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
- P. Pipe Installation Accessories:
  1. Copper Pipe Supports:
    - a. Manufacturers:
      - 1) HoldRite, a brand of Reliance Worldwide Corporation; [www.holdrite.com/#sle](http://www.holdrite.com/#sle).
  2. Thermal Insulated, Surface-Mounted Pipe Supports:
    - a. Manufacturers:
      - 1) FNW; 7701: [www.fnw.com/#sle](http://www.fnw.com/#sle).

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- 2) HoldRite, a brand of Reliance Worldwide Corporation; [www.holdrite.com/#sle](http://www.holdrite.com/#sle).
- b. Material: Carbon steel with epoxy copper or zinc finish.
- c. Weather and UV light resistant foam, plastic, or rubber material with built-in strut. Maximum Load: 50 lb for single pipe or multiple landed on top strut.
3. Overhead Pipe Supports:
4. Inserts and Clamps:
  - a. Manufacturers:
    - 1) HoldRite, a brand of Reliance Worldwide Corporation; [www.holdrite.com/#sle](http://www.holdrite.com/#sle), or equal.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Provide independent support from building structure. Do not provide support from piping, ductwork, conduit, or other systems.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- E. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- F. Provide thermal insulated pipe supports complete with hangers and accessories. Install thermal insulated pipe supports during the installation of the piping system.
- G. Equipment Support and Attachment:
  1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Preset Concrete Inserts: Use manufacturer-provided closure strips to inhibit concrete seepage during concrete pour.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.

END OF SECTION

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SECTION 23 0553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.
- D. Ceiling tacks.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting: Identification painting.

1.03 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems 2020.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials 2017.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- C. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- D. Product Data: Provide manufacturers catalog literature for each product required.
- E. Manufacturer's Installation Instructions: Indicate special procedures, and installation.
- F. Project Record Documents: Record actual locations of tagged valves.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Control Panels: Nameplates.
- C. Dampers: Ceiling tacks, where located above lay-in ceiling.
- D. Heat Transfer Equipment: Nameplates.
- E. Major Control Components: Nameplates.
- F. Piping: Pipe markers.
- G. Valves: Tags and ceiling tacks where located above lay-in ceiling.

2.02 NAMEPLATES

- A. Manufacturers:
  - 1. Advanced Graphic Engraving, LLC: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  - 2. Brimar Industries, Inc: [www.pipemarker.com/#sle](http://www.pipemarker.com/#sle).
  - 3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).

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4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  5. Seton Identification Products, a Tricor Direct Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Letter Color: White.
  - C. Letter Height: 1/4 inch.
  - D. Background Color: Black.
  - E. Plastic: Comply with ASTM D709.

#### 2.03 TAGS

- A. Manufacturers:
  1. Advanced Graphic Engraving: [www.advancedgraphicengraving.com/#sle](http://www.advancedgraphicengraving.com/#sle).
  2. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  3. Brimar Industries, Inc: [www.pipemarkers.com/#sle](http://www.pipemarkers.com/#sle).
  4. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  5. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  6. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame.

#### 2.04 PIPE MARKERS

- A. Manufacturers:
  1. Brady Corporation: [www.bradycorp.com/#sle](http://www.bradycorp.com/#sle).
  2. Brimar Industries, Inc: [www.pipemarkers.com/#sle](http://www.pipemarkers.com/#sle).
  3. Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
  4. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com/#sle](http://www.kolbipipemarkers.com/#sle).
  5. Seton Identification Products, a Tricor Company: [www.seton.com/#sle](http://www.seton.com/#sle).
- B. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Color code as follows:
  1. Heating, Cooling, and Boiler Feedwater: Green with white letters.
  2. Toxic and Corrosive Fluids: Orange with black letters.
  3. Compressed Air: Blue with white letters.

#### 2.05 CEILING TACKS

- A. Manufacturers:
  1. Craftmark Pipe Markers; [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle). Craftmark Pipe Markers: [www.craftmarkid.com/#sle](http://www.craftmarkid.com/#sle).
- B. Description: Steel with 3/4 inch diameter color coded head.
- C. Color code as follows:
  1. HVAC Equipment: Yellow.
  2. Fire Dampers and Smoke Dampers: Red.
  3. Heating/Cooling Valves: Blue.

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PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 099123 for stencil painting.

3.02 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Use tags on piping 3/4 inch diameter and smaller.
  - 1. Identify service, flow direction, and pressure.
  - 2. Install in clear view and align with axis of piping.
  - 3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- E. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

3.03 SCHEDULE

- A. Equipment Type: All mechanical equipment.
  - 1. Identification: Label with Mark specified in schedules.
  - 2. Background: White
    - a. Size: 3x5
  - 3. Lettering:
    - a. Size: 1/2"
    - b. Color: Black

END OF SECTION

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SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic and refrigerating systems.
- C. Field quality-control testing of Laboratory fume hoods.
- D. Measurement of final operating condition of HVAC systems.

1.02 REFERENCE STANDARDS

- A. ASHRAE Std 110 - Methods of Testing Performance of Laboratory Fume Hoods 2016, with Errata.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems 2008, with Errata (2019).
- C. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems 2019.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing 2002.

1.03 SUBMITTALS

- A. Installer Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- B. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
  - 1. Submit to Architect.
  - 2. Submit to the Commissioning Authority.
  - 3. Submit six weeks prior to starting the testing, adjusting, and balancing work.
  - 4. Include certification that the plan developer has reviewed Contract Documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
  - 5. Include at least the following in the plan:
    - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
    - c. Identification and types of measurement instruments to be used and their most recent calibration date.
    - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    - e. Final test report forms to be used.
    - f. Detailed step-by-step procedures for TAB work for each system and issue, including:
      - 1) Terminal flow calibration (for each terminal type).

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- 2) Diffuser proportioning.
  - 3) Branch/submain proportioning.
  - 4) Total flow calculations.
  - 5) Rechecking.
  - 6) Diversity issues.
  - g. Expected problems and solutions, etc.
  - h. Details of how TOTAL flow will be determined; for example:
    - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
    - 2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
  - i. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
  - j. Confirmation of understanding of the outside air ventilation criteria under all conditions.
  - k. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
  - l. Method of checking building static and exhaust fan and/or relief damper capacity.
  - m. Proposed selection points for sound measurements and sound measurement methods.
  - n. Methods for making coil or other system plant capacity measurements, if specified.
  - o. Time schedule for TAB work to be done in phases (by floor, etc.).
  - p. Description of TAB work for areas to be built out later, if any.
  - q. Time schedule for deferred or seasonal TAB work, if specified.
  - r. False loading of systems to complete TAB work, if specified.
  - s. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
  - t. Interstitial cavity differential pressure measurements and calculations, if specified.
  - u. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
  - v. Procedures for formal progress reports, including scope and frequency.
  - w. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB that affect, or could affect, the control system setup and operation.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
1. Revise TAB plan to reflect actual procedures and submit as part of final report.
  2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  3. Provide reports in PDF electronic format complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air

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outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
7. Include the following on the title page of each report:
  - a. Name of Testing, Adjusting, and Balancing Agency.
  - b. Address of Testing, Adjusting, and Balancing Agency.
  - c. Telephone number of Testing, Adjusting, and Balancing Agency.
  - d. Project name.
  - e. Project location.
  - f. Project Architect.
  - g. Project Engineer.
  - h. Project Contractor.
  - i. Project altitude.
  - j. Report date.

- E. Project Record Documents: Record actual locations of balancing valves and rough setting.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
  1. National Environmental Balancing Bureau, NEBB.
  2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
  3. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
  1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  2. Having minimum of three years documented experience.
  3. Certified by one of the following:
    - a. NEBB, National Environmental Balancing Bureau: [www.nebb.org/#sle](http://www.nebb.org/#sle).
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.
- F. Pre-Qualified TAB Agencies:
  1. National True Test Inc..
  2. Environmental Testing Solutions.

3. Procomm Solutions.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - 1. Systems are started and operating in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  - 5. Duct systems are clean of debris.
  - 6. Fans are rotating correctly.
  - 7. Fire and volume dampers are in place and open.
  - 8. Air coil fins are cleaned and combed.
  - 9. Access doors are closed and duct end caps are in place.
  - 10. Air outlets are installed and connected.
  - 11. Duct system leakage is minimized.
  - 12. Hydronic systems are flushed, filled, and vented.
  - 13. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 PREPARATION

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
  - 1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- C. Provide additional balancing devices as required.

3.04 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.05 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
  - 1. Running log of events and issues.
  - 2. Discrepancies, deficient or uncompleted work by others.
  - 3. Contract interpretation requests.
  - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.



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- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. Mark on drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.

3.07 WATER SYSTEM PROCEDURE

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

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- C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.
- D. Effect system balance with automatic control valves fully open to heat transfer elements.
- E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.08 SCOPE

- A. Test, adjust, and balance the following:
  - 1. Boilers
  - 2. Air Cooled Refrigerant Condensers.
  - 3. Unit Air Conditioners.
  - 4. Air Coils.
  - 5. Air Handling Units.
  - 6. Fans.

3.09 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
  - 1. Manufacturer.
  - 2. Model/Frame.
  - 3. HP/BHP.
  - 4. Phase, voltage, amperage; nameplate, actual, no load.
  - 5. RPM.
  - 6. Service factor.
  - 7. Starter size, rating, heater elements.
  - 8. Sheave Make/Size/Bore.
- B. V-Belt Drives:
  - 1. Identification/location.
  - 2. Required driven RPM.
  - 3. Driven sheave, diameter and RPM.
  - 4. Belt, size and quantity.
  - 5. Motor sheave diameter and RPM.
  - 6. Center to center distance, maximum, minimum, and actual.
- C. Pumps:
  - 1. Identification/number.
  - 2. Manufacturer.
  - 3. Size/model.
  - 4. Impeller.
  - 5. Service.
  - 6. Design flow rate, pressure drop, BHP.
  - 7. Actual flow rate, pressure drop, BHP.
  - 8. Discharge pressure.

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9. Suction pressure.
  10. Total operating head pressure.
  11. Shut off, discharge and suction pressures.
  12. Shut off, total head pressure.
- D. Combustion Equipment:
1. Boiler manufacturer.
  2. Model number.
  3. Serial number.
  4. Firing rate.
  5. Overfire draft.
  6. Gas meter timing dial size.
  7. Gas meter time per revolution.
  8. Gas pressure at meter outlet.
  9. Gas flow rate.
  10. Heat input.
  11. Burner manifold gas pressure.
  12. Percent carbon monoxide (CO).
  13. Percent carbon dioxide (CO<sub>2</sub>).
  14. Percent oxygen (O<sub>2</sub>).
  15. Percent excess air.
  16. Flue gas temperature at outlet.
  17. Ambient temperature.
  18. Net stack temperature.
  19. Percent stack loss.
  20. Percent combustion efficiency.
  21. Heat output.
- E. Air Cooled Condensers:
1. Identification/number.
  2. Location.
  3. Manufacturer.
  4. Model number.
  5. Serial number.
  6. Entering DB air temperature, design and actual.
  7. Leaving DB air temperature, design and actual.
  8. Number of compressors.
- F. Cooling Coils:
1. Identification/number.
  2. Location.
  3. Service.
  4. Manufacturer.
  5. Air flow, design and actual.
  6. Entering air DB temperature, design and actual.
  7. Entering air WB temperature, design and actual.

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8. Leaving air DB temperature, design and actual.
  9. Leaving air WB temperature, design and actual.
  10. Water flow, design and actual.
  11. Water pressure drop, design and actual.
  12. Entering water temperature, design and actual.
  13. Leaving water temperature, design and actual.
  14. Saturated suction temperature, design and actual.
  15. Air pressure drop, design and actual.
- G. Heating Coils:
1. Identification/number.
  2. Location.
  3. Service.
  4. Manufacturer.
  5. Air flow, design and actual.
  6. Water flow, design and actual.
  7. Water pressure drop, design and actual.
  8. Entering water temperature, design and actual.
  9. Leaving water temperature, design and actual.
  10. Entering air temperature, design and actual.
  11. Leaving air temperature, design and actual.
  12. Air pressure drop, design and actual.
- H. Electric Duct Heaters:
1. Manufacturer.
  2. Identification/number.
  3. Location.
  4. Model number.
  5. Design kW.
  6. Number of stages.
  7. Phase, voltage, amperage.
  8. Test voltage (each phase).
  9. Test amperage (each phase).
  10. Air flow, specified and actual.
  11. Temperature rise, specified and actual.
- I. Air Moving Equipment:
1. Location.
  2. Manufacturer.
  3. Model number.
  4. Serial number.
  5. Arrangement/Class/Discharge.
  6. Air flow, specified and actual.
  7. Return air flow, specified and actual.
  8. Outside air flow, specified and actual.
  9. Total static pressure (total external), specified and actual.

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10. Inlet pressure.
  11. Discharge pressure.
  12. Sheave Make/Size/Bore.
  13. Number of Belts/Make/Size.
  14. Fan RPM.
- J. Return Air/Outside Air:
1. Identification/location.
  2. Design air flow.
  3. Actual air flow.
  4. Design return air flow.
  5. Actual return air flow.
  6. Design outside air flow.
  7. Actual outside air flow.
  8. Return air temperature.
  9. Outside air temperature.
  10. Required mixed air temperature.
  11. Actual mixed air temperature.
  12. Design outside/return air ratio.
  13. Actual outside/return air ratio.
- K. Exhaust Fans:
1. Location.
  2. Manufacturer.
  3. Model number.
  4. Serial number.
  5. Air flow, specified and actual.
  6. Total static pressure (total external), specified and actual.
  7. Inlet pressure.
  8. Discharge pressure.
  9. Sheave Make/Size/Bore.
  10. Number of Belts/Make/Size.
  11. Fan RPM.
- L. Duct Traverses:
1. System zone/branch.
  2. Duct size.
  3. Area.
  4. Design velocity.
  5. Design air flow.
  6. Test velocity.
  7. Test air flow.
  8. Duct static pressure.
  9. Air temperature.
  10. Air correction factor.

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SECTION 23 0713 - DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Duct liner.
- C. Weather barrier coatings.
- D. Jacketing and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 078400 - Firestopping.
- C. Section 230553 - Identification for HVAC Piping and Equipment.
- D. Section 233100 - HVAC Ducts and Casings: Glass fiber ducts.

1.03 REFERENCE STANDARDS

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019, with Editorial Revision (2023).
- C. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- D. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2023.
- E. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- G. ASTM C916 - Standard Specification for Adhesives for Duct Thermal Insulation 2020.
- H. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material) 2019.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023b.
- J. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- K. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

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1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Knauf Insulation; Atmosphere Duct Wrap: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
  - 1. K value: 0.36 at 75 degrees F, when tested in accordance with ASTM C518.
  - 2. Maximum Service Temperature: 1,200 degrees F.
  - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
- C. Vapor Barrier Jacket:
  - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
  - 3. Secure with pressure-sensitive tape.
- D. Vapor Barrier Tape:
  - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
- E. Indoor Vapor Barrier Mastic:
  - 1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

2.03 GLASS FIBER, RIGID

- A. Manufacturer:



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1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  2. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
  3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  4. Owens Corning Corporation; 700 Series FIBERGLAS Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Insulation: ASTM C612; rigid, noncombustible blanket.
1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
  2. Maximum Service Temperature: 450 degrees F.
  3. Maximum Water Vapor Absorption: 5.0 percent.
  4. Maximum Density: 8.0 pcf.
- C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
  2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
  3. Secure with pressure-sensitive tape.
- D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
- E. Protective Coating:
- F. Indoor Vapor Barrier Finish:
1. Cloth: Untreated; 9 oz/sq yd weight, glass fabric.
  2. Vinyl emulsion type acrylic, compatible with insulation, black color.

#### 2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
1. Armacell LLC; ArmaFlex Ultra with FlameDefense: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  2. K-Flex USA LLC; Insul-Sheet: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
1. Minimum Service Temperature: Minus 40 degrees F.
  2. Maximum Service Temperature: 180 degrees F.
  3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.
1. Manufacturers:
    - a. Design Polymeric; DP 5050 Water Based, High Strength, Weather Barrier Coating: [www.designpoly.com/#sle](http://www.designpoly.com/#sle).
    - b. Vimasco Corporation; [www.vimasco.com/#sle](http://www.vimasco.com/#sle).

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2.05 WEATHER BARRIER COATINGS

- A. Weather-Resistive Barrier Coating: Fire-resistant, UV resistant, water-based mastic for use over closed cell polyethylene and polyurethane foam insulation; applied with glass fiber or synthetic reinforcing mesh.
  - 1. Manufacturers:
    - a. H.B. Fuller Construction Products, Inc; Childers - CP Series Weather Barrier Coating: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
  - 2. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.
  - 3. Water Vapor Permeance: Greater than 1.0 perm in accordance with ASTM E96/E96M.

2.06 JACKETING AND ACCESSORIES

- A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.
  - 1. Lagging Adhesive:
    - a. Manufacturers:
      - 1) Design Polymerics; DP 3050 Water Based, Premium Quality, Lagging Adhesive, and Vapor Retarder: [www.designpoly.com/#sle](http://www.designpoly.com/#sle), or equal.
- B. Aluminum Jacket:
  - 1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
  - 2. Thickness: 0.016 inch sheet.
  - 3. Joining: Longitudinal slip joints and 2 inch laps.
  - 4. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
  - 5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.
  - 6. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

2.07 DUCT LINER

- A. Manufacturers:
  - 1. CertainTeed Corporation; [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville; [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Knauf Insulation; [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 4. Owens Corning Corporation; QuietR Rotary Duct Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Note: Choose the liner type - Elastomeric Foam or Glass Fiber.
- C. Glass Fiber Insulation: Non-corrosive, incombustible glass fiber complying with ASTM C1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, acrylic polymer, or black composite.
  - 1. Fungal Resistance: No growth when tested according to ASTM G21.
  - 2. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F.
  - 3. Service Temperature: Up to 250 degrees F.
  - 4. Rated Velocity on Coated Air Side for Air Erosion: 5,000 fpm, minimum.
  - 5. Minimum Noise Reduction Coefficients:
- D. Adhesive: Waterproof, fire-retardant type, ASTM C916.

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1. Manufacturers:
  - a. Design Polymeric; DP 2502 Water Based, Low VOC, Duct Liner Adhesive: [www.designpoly.com/#sle](http://www.designpoly.com/#sle).
  - b. Elgen Manufacturing Company, Inc; Water Based Liner Adhesive: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
  - c. Vimasco Corporation; [www.vimasco.com/#sle](http://www.vimasco.com/#sle).
- E. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.
  1. Manufacturers:
    - a. Elgen Manufacturing Company, Inc; Peel and Press Insulation Hangers: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle), or approved equal.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
  1. Provide insulation with vapor barrier jackets.
  2. Finish with tape and vapor barrier jacket.
  3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
  4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
  1. Provide with or without standard vapor barrier jacket.
  2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with canvas jacket sized for finish painting.
- F. External Duct Insulation Application:
  1. Secure insulation without vapor barrier with staples, tape, or wires.
  2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
  3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
  4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
- G. Duct and Plenum Liner Application:
  1. Adhere insulation with adhesive for 90 percent coverage.
  2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
  3. Seal and smooth joints. Seal and coat transverse joints.
  4. Seal liner surface penetrations with adhesive.

5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

### 3.03 SCHEDULES

- A. Concealed, round, supply air, return air, outdoor air, relief air and exhaust air duct insulation shall be the following: Mineral-Fiber Blanket: Minimum R-6; 2.5-inch-thick, 1.5-lb/cu. ft. nominal density.
- B. Concealed rectangular supply air, return air, outdoor air, relief air and exhaust air duct insulation shall be the following: Mineral-Fiber Blanket: Minimum R-6; 2.5-inch-thick, 1.5-lb/cu. ft. nominal density.
- C. Exhaust Ducts Within 10 ft of Exterior Openings: Ductliner 1".
- D. Supply air ducts within 5 feet of the supply fan: Ductliner 1/2" in addition to external insulation.
- E. Exposed in Mechanical Rooms: Mineral-Board - Minimum R-6; 3 inches thick, 2-lb/cu. ft. nominal density.
- F. Plenums: Mineral-Board: Minimum R-6; 3 inches thick, 2-lb/cu. ft. nominal density.

END OF SECTION

SECTION 23 0719 - HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Weather barrier coatings.
- D. Jacketing and accessories.
- E. Engineered wall outlet seals and refrigerant piping insulation protection.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 099123 - Interior Painting: Painting insulation jacket.
- C. Section 232300 - Refrigerant Piping: Placement of inserts.

1.03 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus 2019.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- C. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019, with Editorial Revision (2023).
- D. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement 2007 (Reapproved 2019).
- E. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement 2007 (Reapproved 2019).
- F. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form 2023.
- G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation 2022a.
- H. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel 2008 (Reapproved 2023).
- I. ASTM C1775 - Standard Specification for Laminate Protective Jacket and Tape for Use Over Thermal Insulation for Outdoor Applications 2022.
- J. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces 2008 (Reapproved 2019).
- K. ASTM D5590 - Standard Test Method for Determining the Resistance of Paint Films and Related Coatings to Fungal Defacement by Accelerated Four-Week Agar Plate Assay 2017 (Reapproved 2021).
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023b.

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- M. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).
- N. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 3 years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 GLASS FIBER, RIGID

- A. Manufacturers:
  - 1. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 2. Johns Manville Corporation: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 3. Knauf Insulation: [www.knaufinsulation.com/#sle](http://www.knaufinsulation.com/#sle).
  - 4. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
- B. Insulation: ASTM C547 and ASTM C795; rigid molded, noncombustible.
  - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
  - 2. Maximum Service Temperature: 850 degrees F.
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Aluminum-Foil Laminate Jacket:
  - 1. Manufacturers:
    - a. H.B. Fuller Construction Products, Inc: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
  - 2. Factory-applied, pressure sensitive adhesive jacketing to comply with ASTM C1775.
- D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- F. Vapor Barrier Lap Adhesive: Compatible with insulation.
- G. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.

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- H. Fibrous Glass Fabric:
  - 1. Cloth: Untreated; 9 oz/sq yd weight.
  - 2. Blanket: 1.0 pcf density.
  - 3. Weave: 5 by 5.
- I. Indoor Vapor Barrier Finish:
  - 1. Cloth: Untreated; 9 oz/sq yd weight.
  - 2. Vinyl emulsion type acrylic, compatible with insulation, black color.
- J. Outdoor Vapor Barrier Mastic: Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.
- K. Insulating Cement: ASTM C449.

#### 2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Manufacturers:
  - 1. Aeroflex USA, Inc; Aerocel Stay-Seal with Protape (SSPT): [www.aeroflexusa.com/#sle](http://www.aeroflexusa.com/#sle).
  - 2. Armacell LLC; ArmaFlex Ultra with FlameDefense: [www.armacell.us/#sle](http://www.armacell.us/#sle).
  - 3. K-Flex USA LLC; K-Flex Titan: [www.kflexusa.com/#sle](http://www.kflexusa.com/#sle).
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F.
  - 2. Maximum Service Temperature: 180 degrees F.
  - 3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- D. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

#### 2.04 WEATHER BARRIER COATINGS

- A. Weather-Resistive Barrier Coating: Fire-resistive, UV resistant, water-based mastic for use over closed cell polyethylene and polyurethane foam insulation; applied with glass fiber or synthetic reinforcing mesh.
  - 1. Manufacturers:
    - a. H.B. Fuller Construction Products, Inc; Childers - CP Series Weather Barrier Coating: [www.fosterproducts.com/#sle](http://www.fosterproducts.com/#sle).
  - 2. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.
  - 3. Water Vapor Permeance: Greater than 1.0 perm in accordance with ASTM E96/E96M.
  - 4. Resistance to Fungal Growth: No growth when tested in accordance with ASTM D5590.
  - 5. Color: As selected by Architect.

#### 2.05 JACKETING AND ACCESSORIES

- A. PVC Plastic.
  - 1. Manufacturers:
    - a. Johns Manville Corporation; [www.jm.com/#sle](http://www.jm.com/#sle).
  - 2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
    - a. Minimum Service Temperature: 0 degrees F.

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- b. Maximum Service Temperature: 150 degrees F.
  - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
  - d. Thickness: 10 mil, 0.010 inch.
  - e. Connections: Brush on welding adhesive.
3. Covering Adhesive Mastic: Compatible with insulation.
- B. Aluminum Jacket:
1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
  2. Thickness: 0.016 inch sheet.
  3. Type: Factory-applied, self-adhesive jacketing.
  4. Finish: Smooth.
  5. Joining: Longitudinal slip joints and 2 inch laps.
  6. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
  7. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

## 2.06 ACCESSORIES

- A. General Requirements:
1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
  2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
  3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
  4. Supply materials that are asbestos free.
- B. Corrosion Inhibitors:
1. Corrosion Control Gel:
    - a. Manufacturers:
      - 1) Polyguard Products; RG2400LT: [www.polyguardproducts.com/#sle](http://www.polyguardproducts.com/#sle).
    - b. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
  1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.



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- E. Glass Fiber Insulated Pipes Conveying Fluids Below Ambient Temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Insert location: Between support shield and piping and under the finish jacket.
  - 3. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 4. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 078400.
- K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.
- L. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.
- M. Heat Traced Piping: Insulate fittings, joints, and valves with insulation of like material, thickness, and finish as adjoining pipe. Size large enough to enclose pipe and heat tracer. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

### 3.03 SCHEDULE

- A. Indoor Heating Systems:
  - 1. Heating Water Supply and Return: Molded fiberglass, 2" thick.
- B. Indoor Cooling Systems
  - 1. Condensate Drains from Cooling Coils: Flexible Elastomeric 1".
  - 2. Refrigerant Suction: Flexible Elastomeric 1".
  - 3. Refrigerant Hot Gas: Flexible Elastomeric 1".
- C. Outdoor Cooling Systems

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1. Refrigerant Suction: Flexible Elastomeric 1" with aluminum metal jacket.
2. Refrigerant Hot Gas: Flexible Elastomeric 1" with aluminum metal jacket..

END OF SECTION

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SECTION 23 0913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Control panels.
- B. Control Valves:
  - 1. Ball valves with factory-mounted actuators.
  - 2. Butterfly valves with factory-mounted actuators.
  - 3. Electronic valve operators.
- C. Dampers.
- D. Damper Operators:
  - 1. Electric operators.
- E. Humidistats:
  - 1. Room humidistats.
- F. Wall-, Surface-, and Duct-Mounted Sensors:
  - 1. Temperature sensors.
  - 2. Humidity sensors.
  - 3. IAQ (indoor air quality) sensors.
  - 4. Building static pressure transmitters.
- G. Thermostats:
  - 1. Electric thermostats.
- H. Fan and pump motor run-status monitoring.
- I. Pipe-Mounted Sensors and Transmitters:
  - 1. Temperature sensors.
  - 2. Pressure transmitters.

1.02 RELATED REQUIREMENTS

- A. Section 233300 - Air Duct Accessories.

1.03 REFERENCE STANDARDS

- A. ANSI/FCI 70-2 - Control Valve Seat Leakage 2021.
- B. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks 2020, with Errata (2023).
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- D. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats 2013.
- E. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2024.
- G. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances Current Edition, Including All Revisions.

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1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- B. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.
- C. Manufacturer's Instructions: Provide for all manufactured components.
- D. Designer's qualification statement.
- E. Installer's qualification statement.
- F. Project Record Documents: Record actual location of control components, including panels, thermostats, and sensors.
  - 1. Revise shop drawings to reflect actual installation and operating sequences.
- G. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design system under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years experience approved by manufacturer.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

PART 2 PRODUCTS

2.01 EQUIPMENT - GENERAL

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enameled finished face panel.

2.03 HUMIDISTATS

- A. Room Humidistats:
  - 1. Manufacturers:

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- a. Honeywell International, Inc; [buildingcontrols.honeywell.com/#sle](http://buildingcontrols.honeywell.com/#sle).
  - b. Johnson Controls International, PLC; [www.johnsoncontrols.com/#sle](http://www.johnsoncontrols.com/#sle).
  - c. Siemens Industry, Inc; [www.siemens.com/#sle](http://www.siemens.com/#sle).
  - d. Veris Industries; [www.veris.com/#sle](http://www.veris.com/#sle).
2. Wall mounted, proportioning type.
  3. Throttling Range: Adjustable 2 percent relative humidity.
  4. Operating Range: 30 to 80 percent.
  5. Cover: Set point indication.

2.04 WALL-, AND SURFACE-MOUNT SENSORS

A. Temperature Sensors:

1. Manufacturers:
  - a. Dwyer Instruments Inc; [www.dwyer-inst.com/#sle](http://www.dwyer-inst.com/#sle).
  - b. Johnson Controls International, PLC; [www.johnsoncontrols.com/#sle](http://www.johnsoncontrols.com/#sle).
  - c. Veris Industries; [www.veris.com/#sle](http://www.veris.com/#sle).
2. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy.
3. Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F.
4. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
5. Temperature Sensing Device: Compatible with project DDC controllers.
6. Performance Characteristics:
  - a. RTD:
    - 1) Room Sensor Accuracy: Plus/minus 0.50 degrees F minimum.
    - 2) Duct Averaging Accuracy: Plus/minus 0.50 degrees F minimum.
    - 3) Chilled Water Accuracy: Plus/minus 0.50 degrees F minimum.
    - 4) All Other Accuracy: Plus/minus 0.75 degrees F minimum.
    - 5) Range: Minus 40 degrees F through 220 degrees F minimum.
  - b. Thermistor:
    - 1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
    - 2) Range: Minus 25 degrees F through 122 degrees F minimum.
    - 3) Heat Dissipation Constant: 2.7 mW per degree C.
  - c. Temperature Transmitter:
    - 1) Accuracy: 0.10 degree F minimum or plus/minus 0.20 percent of span.
    - 2) Output: 4 to 20 mA.
  - d. Sensing Range:
    - 1) Provide limited range sensors if required to sense the range expected for a respective point.
    - 2) Use RTD type sensors for extended ranges beyond minus 30 to 230 degrees F.
    - 3) Use temperature transmitters in conjunction with RTDs when RTDs are incompatible with DDC controller direct temperature input.
  - e. Wire Resistance:
    - 1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.

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- 2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.
- f. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
- g. Room Temperature Sensors:
  - 1) Construct for surface or wall box mounting.
  - 2) Provide the following:
    - (a) Setpoint reset slide switch with an adjustable temperature range.
    - (b) Individual heating/cooling setpoint slide switches.
    - (c) Momentary override request push button for activation of after-hours operation.
    - (d) Analog thermometer.
- h. Temperature Averaging Elements:
  - 1) Use on duct sensors for ductwork 10 sq ft or larger.
  - 2) Use averaging elements where prone to stratification with sensor length 8 ft or 16 ft.
  - 3) Provide for all mixed air and heating coil discharge sensors regardless of duct size.

## 2.05 THERMOSTATS

- A. Electric Thermostats:
  1. Manufacturers:
    - a. Honeywell International, Inc; [buildingcontrols.honeywell.com/#sle](http://buildingcontrols.honeywell.com/#sle).
    - b. Johnson Controls International, PLC; [www.johnsoncontrols.com/#sle](http://www.johnsoncontrols.com/#sle).
    - c. Siemens Industry, Inc; [www.siemens.com/#sle](http://www.siemens.com/#sle).
  2. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
  3. Service: Cooling only.
  4. Covers: Locking with set point adjustment, with thermometer.
  5. ber.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that systems are ready to receive work.
- B. Beginning of installation means installer accepts existing conditions.
- C. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- D. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats; see Section 262726.
- C. Provide separable sockets for liquids and flanges for air bulb elements.

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- D. Provide valves with position indicators and with pilot positioners where sequenced with other controls.
- E. Provide isolation (two-position) dampers of parallel blade construction.
- F. Mount control panels adjacent to associated equipment on vibration free walls or free-standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
- G. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.
- H. Provide conduit and electrical wiring in accordance with Section 260583. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

3.03 MAINTENANCE

- A. Provide service and maintenance of control system for one year from Date of Substantial Completion.
- B. Provide complete service of controls systems, including call backs, and submit written report of each service call.
- C. In addition to normal service calls, make minimum of two complete normal inspections of approximately 2 hours duration to inspect, calibrate, and adjust controls.

END OF SECTION

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## SECTION 23 2300 - REFRIGERANT PIPING

### PART 1 GENERAL

#### 1.01 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Strainers.
- F. Pressure relief valves.
- G. Filter-driers.
- H. Solenoid valves.
- I. Expansion valves.
- J. Engineered wall seals and insulation protection.
- K. Exterior penetration accessories.

#### 1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 083100 - Access Doors and Panels.
- C. Section 099123 - Interior Painting.
- D. Section 230716 - HVAC Equipment Insulation.
- E. Section 230719 - HVAC Piping Insulation.
- F. Section 236313 - Air Cooled Refrigerant Condensers.
- G. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections.

#### 1.03 REFERENCE STANDARDS

- A. AHRI 710 (I-P) - Performance Rating of Liquid-Line Driers 2009.
- B. AHRI 711 (SI) - Performance Rating of Liquid-Line Driers 2009.
- C. AHRI 760 (I-P) - Performance Rating of Solenoid Valves for Use with Volatile Refrigerants 2014.
- D. ASHRAE Std 15 - Safety Standard for Refrigeration Systems 2022, with Errata (2023).
- E. ASHRAE Std 34 - Designation and Safety Classification of Refrigerants 2022, with Errata (2023).
- F. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings 2021.
- G. ASME B31.5 - Refrigeration Piping and Heat Transfer Components 2022.
- H. ASME B31.9 - Building Services Piping 2020.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.

- J. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service 2020.
- K. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding 2019.
- L. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation 2018, with Amendment (2019).
- M. UL 429 - Electrically Operated Valves Current Edition, Including All Revisions.

#### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

### PART 2 PRODUCTS

#### 2.01 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure integrity of system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
- C. Liquid Indicators:
  - 1. Use line size liquid indicators in main liquid line leaving condenser.
  - 2. Use line size on leaving side of liquid solenoid valves.
- D. Valves:
  - 1. Use service valves on suction and discharge of compressors.
  - 2. Use gauge taps at compressor inlet and outlet.
  - 3. Use gauge taps at hot gas bypass regulators, inlet and outlet.
  - 4. Use check valves on compressor discharge.
  - 5. Use check valves on condenser liquid lines on multiple condenser systems.
- E. Strainers:
  - 1. Use line size strainer upstream of each automatic valve.
- F. Filter-Driers:
  - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.
- G. Solenoid Valves:
  - 1. Use in liquid line of systems operating with single pump-out or pump-down compressor control.

#### 2.02 REGULATORY REQUIREMENTS

- A. Comply with ASME B31.9 for installation of piping system.

#### 2.03 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.

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1. Fittings: ASME B16.22 wrought copper.
  2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Pipe Supports and Anchors:
1. Provide hangers and supports that comply with MSS SP-58.
    - a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  5. Vertical Support: Steel riser clamp.
  6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
  7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
  8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
  9. Rooftop Supports for Low-Slope Roofs: Steel pedestals with bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified; and as follows:
    - a. Bases: High density, UV tolerant, polypropylene or reinforced PVC.
    - b. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
    - c. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
    - d. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports; corrosion resistant material.
    - e. Height: Provide minimum clearance of 6 inches under pipe to top of roofing.

#### 2.04 REFRIGERANT

- A. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
- B. Refrigerant: R-410a, as defined in ASHRAE Std 34.

#### 2.05 MOISTURE AND LIQUID INDICATORS

#### 2.06 MOISTURE AND LIQUID INDICATORS

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or soldered ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

#### 2.07 VALVES

#### 2.08 VALVES

- A. Service Valves:
  1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or soldered ends, for maximum pressure of 500 psi.

## 2.09 SOLENOID VALVES

- A. Valve: AHRI 760 (I-P), pilot operated, copper, brass or steel body and internal parts, synthetic seat, stainless steel stem and plunger assembly (permitting manual operation in case of coil failure), integral strainer, with flared, soldered, or threaded ends; for maximum working pressure of 500 psi.
- B. Coil Assembly: UL 429 UL listed, replaceable with molded electromagnetic coil, moisture and fungus proof, with surge protector and color coded lead wires, integral junction box with pilot light.

## 2.10 ELECTRONIC EXPANSION VALVES

- A. Valve:
  - 1. Brass body with flared or soldered connection, needle valve with floating needle and machined seat, stepper motor drive.
- B. Evaporation Control System:
  - 1. Electronic microprocessor based unit in enclosed case, proportional integral control with adaptive superheat, maximum operating pressure function, preselection allowance for electrical defrost and hot gas bypass.
- C. Refrigeration System Control: Electronic microprocessor based unit in enclosed case, with proportional integral control of valve, on/off thermostat, air temperature alarm (high and low), solenoid valve control, liquid injection adaptive superheat control, maximum operating pressure function, night setback thermostat, timer for defrost control.

## 2.11 ENGINEERED WALL SEALS AND INSULATION PROTECTION

- A. Manufacturers:
  - 1. Airex Manufacturing, Inc; [www.airexmfg.com/#sle](http://www.airexmfg.com/#sle) or equal.
- B. Basis of Design: Airex Manufacturing, Inc; [www.airexmfg.com/#sle](http://www.airexmfg.com/#sle).
  - 1. Pipe Penetration Wall Seal: Airex Titan Outlet.
  - 2. Refrigeration Pipe Insulation Protection System: Airex E-Flex Guard.
  - 3. Pipe Penetration Wall Seal and Insulation Protection System: Airex Pro-System Kit.
- C. Pipe Penetration Wall Seal: Seals HVAC piping wall penetrations with compression gasket wall mounted rigid plastic outlet cover.
  - 1. Wall Outlet Size, Stucco and Masonry Applications: 7-1/2 inch wide by 10 inch high.
    - a. Elastomeric Sleeve Diameter: 1-11/16 inch.
  - 2. Wall Outlet Size, Siding and Compact Applications: 6-7/8 inch wide by 3-7/8 inch high.
    - a. Elastomeric Sleeve Diameter: 1-11/16 inch.
  - 3. Outlet Cover Color: Gray.
- D. Insulation Protection System: Mechanical line insulation and PVC cover.
  - 1. PVC Insulation Cover Color: Black with full-length velcro fastener.

## 2.12 EXTERIOR PENETRATION ACCESSORIES

- A. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
  - 1. Products:

- a. Alta Products, LLC; Sigrist Pipe Chase Housing, Curbs, and Exit Seals: [www.altaproductsllc.com/#sle](http://www.altaproductsllc.com/#sle).
- b. Menzies Metal Products; [www.menzies-metal.com/#sle](http://www.menzies-metal.com/#sle).

### PART 3 EXECUTION

#### 3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain-end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

#### 3.02 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- E. Pipe Hangers and Supports:
  1. Install in accordance with ASME B31.5.
  2. Support horizontal piping as indicated.
  3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  4. Place hangers within 12 inches of each horizontal elbow.
  5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  6. Provide copper plated hangers and supports for copper piping.
- F. Arrange piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access to concealed valves and fittings.
- I. Flood piping system with nitrogen when brazing.
- J. Insulate piping and equipment.
- K. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.
- L. Provide replaceable cartridge filter-driers, with isolation valves and valved bypass.
- M. Locate expansion valve sensing bulb immediately downstream of evaporator on suction line.
- N. Provide external equalizer piping on expansion valves with refrigerant distributor connected to evaporator.
- O. Fully charge completed system with refrigerant after testing.
- P. Provide electrical connection to solenoid valves. See Section 260583.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Test refrigeration system in accordance with ASME B31.5.
- C. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test and repair piping until no leakage.

END OF SECTION

SECTION 23 3100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.
- C. Nonmetal ducts.
- D. Air plenums and casings.
- E. Ducts for kitchen exhaust applications.
- F. Ducts for laboratory and industrial-grade applications.
- G. Prefabricated ventilation subducts.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 099123 - Interior Painting: Weld priming, paint or coating.
- C. Section 230713 - Duct Insulation: External insulation and duct liner.
- D. Section 233300 - Air Duct Accessories.

1.03 REFERENCE STANDARDS

- A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.
- D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- E. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus 2019, with Editorial Revision (2023).
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023b.
- G. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements 2018, with Editorial Revision (2020).
- H. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry 2018, with Editorial Revision (2020).
- I. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements 2017, with Editorial Revision (2020).
- J. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements 2023.

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- K. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2024.
- L. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems 2021.
- M. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- N. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines 2001.
- O. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual 2012.
- P. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

1.05 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Provide metal duct unless otherwise indicated.
- C. Acoustical Treatment: Provide sound-absorbing liners and sectional silencers for metal-based ducts in compliance with Section 233319.
- D. Duct Shape and Material in accordance with Allowed Static Pressure Range:
  - 1. Round: Plus or minus 2 in-wc of galvanized steel.
  - 2. Rectangular: Plus or minus 1/2 in-wc of galvanized steel.
- E. Duct Sealing and Leakage in accordance with Static Pressure Class:
  - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
    - a. Supply Air: 2" in-wc pressure class, galvanized steel and aluminum.
    - b. Outside Air Intake: 1 in-wc pressure class, galvanized steel and aluminum..
    - c. Return and Relief Air: 2" in-wc pressure class, galvanized steel and aluminum..
    - d. General Exhaust Air: 2" in-wc pressure class, galvanized steel and aluminum..
  - 2. Low Pressure Service: Up to 2 in-wc:
    - a. Seal: Class A, apply to seal off transverse joints, and oongitudinal seams.
  - 3. Low Pressure Service: From 2 in-wc to 3 in-wc:
    - a. Seal: Class A, apply sealing of transverse joints and longitudinal seams, and duct wall penetratons.
  - 4. Medium and High Pressure Service: Above 3 in-wc:



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- a. Seal: Class A, apply sealing of transverse joints, longitudinal seams, and duct wall penetrations.
  - b. Leakage:
    - 1) Rectangular: Class 6 or 6 cfm/100 sq ft.
    - 2) Round: Class 3 or 3 cfm/100 sq ft.
- F. Duct Fabrication Requirements:
1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
  2. No variation of duct configuration or size permitted except by written permission. Size round duct installed in place of rectangular ducts in accordance with ASHRAE (FUND) Handbook - Fundamentals.
  3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
  4. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
  5. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
  6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
  7. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
  8. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.02 METAL DUCTS

2.03 METAL DUCTS

- A. Material Requirements:
1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
  2. Aluminum: ASTM B209/B209M, aluminum sheet, alloy 3003-H14.
- B. Metal Duct Coating Requirements:
1. PVC Coating for Steel Duct: 4 mils polyvinyl chloride plastic on both sides.
- C. Rectangular Metal Duct:
- D. Round Spiral Duct:
1. Round spiral duct with manufactured from G-90 galvanized steel conforming to ASTM and SMACNA standards.
- E. Connectors, Fittings, Sealants, and Miscellaneous:
1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
  2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).

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3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
4. Gasket Tape:
  - a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
6. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:
  - a. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  - b. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  - c. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  - d. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
  - e. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
  - f. Other Types: As required.
  - g. Manufacturers:
    - 1) Powers Fasteners, Inc; [www.powers.com/#sle](http://www.powers.com/#sle), or equal.

#### 2.04 FLEXIBLE DUCTS

- A. Vapor Barrier Insulated Flexible Air Ducts:
  1. UL 181, Class 1, two-ply polyester or vinyl film supported by helically wound spring steel wire.
  2. Pressure Rating: From 10 in-wc positive to 1 in-wc negative.
  3. Temperature Range: Minus 10 to 160 degrees F.
  4. Manufacturers:
    - a. Flexmaster.
    - b. Thermaflex.
    - c. Atco

#### 2.05 AIR PLENUMS AND CASINGS

- A. Fabricate in accordance with SMACNA (DCS) for indicated operating pressures indicated.
- B. Minimum Fabrication Requirements:
  1. Fabricate acoustic plenum or casing with reinforcing turned inward.
  2. Provide 16-gauge, 0.059-inch sheet steel back facing and 22-gauge, 0.029-inch perforated sheet steel front facing with 3/32 inch diameter holes on 5/32 inch centers.
  3. Construct panels 3 inches thick, packed with 4.5 pcf minimum glass fiber insulation media, on inverted channel of 16-gauge, 0.059-inch sheet steel.
  4. Mount floor-mounted plenum or casings on 4-inch high concrete curbs. At floor, rivet panels on 8-inch centers to angles. Where floors are acoustically insulated, provide liner of galvanized 18-gauge, 0.052-inch expanded metal mesh supported at 12-inch centers, turned up 12 inches at sides with sheet metal shields.

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- C. Access Doors:
  - 1. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.
  - 2. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles.
  - 3. Provide clear wire glass observation ports, minimum 6 by 6 inch size.
- D. Thermal Panels:
  - 1. Material: Steel-faced composite panel with noncombustible structural high density mineral fiber core for plenum fabrication.
    - a. Facing: Galvanized steel (G90), 24 gauge, 0.0275 inch.
    - b. Finish: Unpainted.
    - c. Core: Mineral wool board.
    - d. Structural: Nonload bearing.
  - 2. Panel Thickness: 2.5 inches.
  - 3. R-Value: 12 when tested in accordance with ASTM C177.
  - 4. Manufacturers:
    - a. DuraSystems Barriers Inc; DuraTherm: [www.durasystems.com/#sle](http://www.durasystems.com/#sle).
    - b. or equal..

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install products following the manufacturer's instructions.
- C. Comply with safety standards NFPA 90A and NFPA 90B.
- D. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- F. Flexible Ducts: Connect to metal ducts with adhesive and metal draw bands. .
- G. PVC Coated Metal Ductwork: Tape with PVC tape.
- H. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- I. Provide openings in ductwork as indicated to accommodate thermometers and controllers. Provide pilot tube openings as indicated for testing of systems, complete with metal can with spring device or screw to insure against air leakage. For openings, insulate ductwork and install insulation material inside a metal ring.
- J. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- K. Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.
- L. Set plenum doors at 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.

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- M. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- N. Louver Fit-out:
  - 1. Provide blank-out panels sealing available area of wall-mounted exterior-faced louver when connected ductwork is smaller than actual louver free area, and duct outlet is smaller than the louver frame.
  - 2. Use the same duct material painted black on the exterior side, then seal louver frame and duct.
- O. Plenums and Casings:
  - 1. Mount floor-mounted casings on 4 inch high concrete curbs.
  - 2. At floor, rivet panels on 8 inch centers to angles.
- P. Fire Partitions: Provide firestopping sealing. See Section 078400.
- Q. Duct Insulation: Provide duct insulation. See Section 230713.
- R. Painting: Provide surface finish as indicated on drawings. See Sections 099113 and 099123.

3.02 CLEANING

- A. Clean thoroughly each duct system. See Section 230130.51.
- B. Clean duct systems with high-power vacuum machines. Protect equipment that could be harmed by excessive dirt with filters or bypass during cleaning. Provide adequate access to the ductwork for cleaning purposes.

END OF SECTION

SECTION 23 3300 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers - metal.
- C. Backdraft dampers - fabric.
- D. Combination fire and smoke dampers.
- E. Duct access doors.
- F. Duct test holes.
- G. Fire dampers.
- H. Flexible duct connectors.
- I. Smoke dampers.
- J. Volume control dampers.
- K. Low leakage (Class 1A) control dampers.
- L. Miscellaneous Products:
  - 1. Damper operators.
  - 2. Damper position switch.
  - 3. Fire-rated enclosures.
  - 4. Duct opening closure film.
  - 5. Airflow meters, thermal-dispersion type.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 233100 - HVAC Ducts and Casings.

1.03 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods of Testing Dampers for Rating 2018.
- B. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks 2020, with Errata (2023).
- C. ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks 2020, with Errata (2023).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023b.
- E. Bluetooth CS - Bluetooth Core Specification 2016, Addendum 2017.
- F. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks--Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications 2020 (Corrigendum 2022).

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- G. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks 2020, with Corrigendum (2022).
- H. LonMark Interoperability Guide - LonMark Application-Layer Interoperability Guide and LonMark Layer 1-6 Interoperability Guide; Version 3.4 2005.
- I. Modbus (PS) - The Modbus Organization Communications Protocol. Latest Update.
- J. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- K. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- L. Bluetooth CS - Bluetooth Core Specification 2016, Addendum 2017.
- M. IEEE 802.11 - IEEE Standard for Information Technology--Telecommunications and Information Exchange between Systems - Local and Metropolitan Area Networks--Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications 2020 (Corrigendum 2022).
- N. IEEE 802.15.4 - IEEE Standard for Low-Rate Wireless Networks 2020, with Corrigendum (2022).
- O. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- P. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2024.
- Q. NFPA 92 - Standard for Smoke Control Systems 2021, with Amendment.
- R. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations 2024.
- S. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2022.
- T. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible 2020.
- U. UL 33 - Safety Heat Responsive Links for Fire-Protection Service Current Edition, Including All Revisions.
- V. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations Current Edition, Including All Revisions.
- W. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations Current Edition, Including All Revisions.
- X. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances Current Edition, Including All Revisions.
- Y. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.
- Z. UL 555 - Standard for Fire Dampers Current Edition, Including All Revisions.
- AA. UL 555C - Standard for Safety Ceiling Dampers Current Edition, Including All Revisions.
- BB. UL 555S - Standard for Smoke Dampers Current Edition, Including All Revisions.
- CC. UL 1978 - Grease Ducts Current Edition, Including All Revisions.
- DD. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces Current Edition, Including All Revisions.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

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- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

- A. Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.02 BACKDRAFT DAMPERS - METAL

- A. Manufacturers:
  1. Louvers & Dampers, Inc, a brand of Mestek, Inc: [www.louvers-dampers.com/#sle](http://www.louvers-dampers.com/#sle).
  2. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  3. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  4. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
  5. Substitutions: See Section 016000 - Product Requirements.
- B. Gravity Backdraft Dampers, Size 18 by 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- C. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.03 BACKDRAFT DAMPERS - FABRIC

- A. Manufacturers:
  1. Metal Form Manufacturing, Inc; [www.mfmca.com/#sle](http://www.mfmca.com/#sle).
  2. American Warming and Ventilating, a brand of Mestek, Inc; [www.awv.com/#sle](http://www.awv.com/#sle).
  3. Vent Products Company, Inc; [www.ventproducts.com/#sle](http://www.ventproducts.com/#sle).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Fabric Backdraft Dampers: Factory-fabricated.
  1. Frame: Galvanized steel, 18-gauge, 0.0478-inch minimum base sheet thickness.
  2. Blades: Neoprene coated fabric material.
  3. Birdscreen: 1/2 inch nominal mesh of galvanized steel or aluminum.
  4. Maximum Velocity: 1000 fpm (5 mps) face velocity.

2.04 COMBINATION FIRE AND SMOKE DAMPERS

- A. Manufacturers:
  1. AireTechnologies, Inc, a DMI Company: [www.airetechnologies.com/#sle](http://www.airetechnologies.com/#sle).
  2. Lloyd Industries, Inc: [www.firedamper.com/#sle](http://www.firedamper.com/#sle).
  3. Louvers & Dampers, Inc, a brand of Mestek, Inc: [www.louvers-dampers.com/#sle](http://www.louvers-dampers.com/#sle).
  4. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  5. NCA, a brand of Metal Industries Inc: [www.ncamfg.com/#sle](http://www.ncamfg.com/#sle).
  6. Pottorff: [www.pottorff.com/#sle](http://www.pottorff.com/#sle).
  7. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).

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8. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
- B. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.
- C. Provide factory sleeve and collar for each damper.
- D. Multiple Blade Dampers: Fabricate with 16 gauge, 0.0598 inch galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 by 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock, and 1/2 inch actuator shaft.
- E. Operators: UL listed and labeled; spring-return, electric-type suitable for 120 volts, single phase, 60 Hz. Locate damper operator on interior of duct and link to damper operating shaft.
- F. Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure.
- G. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuation of electro thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.
- H. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

#### 2.05 DUCT ACCESS DOORS

- A. Manufacturers:
  1. Acudor Products Inc, a Division of Nelson Industrial Inc: [www.acudor.com/#sle](http://www.acudor.com/#sle).
  2. Ductmate Industries, Inc, a DMI Company: [www.ductmate.com/#sle](http://www.ductmate.com/#sle).
  3. Elgen Manufacturing Company, Inc: [www.elgenmfg.com/#sle](http://www.elgenmfg.com/#sle).
  4. Lloyd Industries, Inc: [www.firedamper.com/#sle](http://www.firedamper.com/#sle).
  5. MKT Metal Manufacturing: [www.mktduct.com/#sle](http://www.mktduct.com/#sle).
  6. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
  7. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  8. SEMCO LLC: [www.semcohvac.com/#sle](http://www.semcohvac.com/#sle).
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.

#### 2.06 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.
  1. Manufacturers:
    - a. Carlisle HVAC Products; Dynair Test Port with Red Cap with O-Ring Seal: [www.carlislehvac.com/#sle](http://www.carlislehvac.com/#sle).

#### 2.07 FIRE DAMPERS

- A. Manufacturers:
  1. AireTechnologies, Inc, a DMI Company: [www.airetechnologies.com/#sle](http://www.airetechnologies.com/#sle).
  2. Lloyd Industries, Inc: [www.firedamper.com/#sle](http://www.firedamper.com/#sle).



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3. Louvers & Dampers, Inc, a brand of Mestek, Inc: [www.louvers-dampers.com/#sle](http://www.louvers-dampers.com/#sle).
4. Nailor Industries, Inc: [www.nailor.com/#sle](http://www.nailor.com/#sle).
5. NCA, a brand of Metal Industries Inc: [www.ncamfg.com/#sle](http://www.ncamfg.com/#sle).
6. Panasonic Corporation of North America; Flex Damper: [www.panasonic.com/#sle](http://www.panasonic.com/#sle).
7. Pottorff: [www.pottorff.com/#sle](http://www.pottorff.com/#sle).
8. Ruskin Company: [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
9. United Enertech: [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).

- B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.
- C. Ceiling (Radiation) Dampers: Galvanized steel, 22-gauge, 0.0299-inch frame and 16-gauge, 0.0598-inch flap, two layers of 0.125-inch thick ceramic fiber on top side and one layer on bottom side for round flaps, with locking clip.
  1. Boot Fitting: Factory-provided el type (90 degree). Include field-provided collar.
  2. Box Fitting: Factory-provided 26 gauge, 0.0179 inch with field-provided collar.
  3. Rated for three hour service in compliance with UL 555C.

#### 2.08 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.

#### 2.09 SMOKE DAMPERS

- A. Fabricate in accordance with NFPA 90A and UL 555S, and as indicated.
- B. Dampers: UL Class 1 airfoil blade type smoke damper, normally open automatically operated by pneumatic actuator.
- C. Electro Thermal Link: Fusible link melting at 165 degrees F; 120 volts, single phase, 60 Hz; UL listed and labeled.

#### 2.10 VOLUME CONTROL DAMPERS

- A. Manufacturers:
  1. AireTechnologies, Inc, a DMI Company; [www.airetechnologies.com/#sle](http://www.airetechnologies.com/#sle).
  2. Louvers & Dampers, Inc, a brand of Mestek, Inc; [www.louvers-dampers.com/#sle](http://www.louvers-dampers.com/#sle).
  3. Nailor Industries, Inc; [www.nailor.com/#sle](http://www.nailor.com/#sle).
  4. Ruskin Company; [www.ruskin.com/#sle](http://www.ruskin.com/#sle).
  5. United Enertech; [www.unitedenertech.com/#sle](http://www.unitedenertech.com/#sle).
- B. Fabricate in accordance with SMACNA (DCS) and as indicated.
- C. Splitter Dampers:
  1. Material: Same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
  2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
  3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.
- D. Single Blade Dampers:
  1. Fabricate for duct sizes up to 6 by 30 inch.
  2. Blade: 24 gauge, 0.0239 inch, minimum.

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- E. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches. Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
  - 1. Blade: 18 gauge, 0.0478 inch, minimum.
- F. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
  - 1. Manufacturers:
    - a. Carlisle HVAC Products; Dynair End Bearing Leak Resistant Sets: [www.carlislehvac.com/#sle](http://www.carlislehvac.com/#sle).
- G. Quadrants:
  - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
  - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 233100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96 Provide minimum 8 by 8 inch size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch size access door for balancing dampers only. Review locations prior to fabrication.
- D. Provide duct test holes where indicated and required for testing and balancing purposes.
- E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire-rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.
- G. Demonstrate re-setting of fire dampers to Owner's representative.
- H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- I. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
- J. Use splitter dampers only where indicated.

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- K. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

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SECTION 23 3423 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof exhausters.
- B. Wall exhausters.
- C. Cabinet exhaust fans.
- D. Ceiling exhaust fans.
- E. Upblast roof exhausters.
- F. Inline centrifugal fans and blowers.

1.02 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.
- B. Section 233300 - Air Duct Accessories: Backdraft dampers.

1.03 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program 2015.
- B. AMCA 99 - Standards Handbook 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans 2020.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating 2016.
- E. AMCA 300 - Reverberant Room Method for Sound Testing of Fans 2014.
- F. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data 2022.
- G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Greenheck Fan Corporation; [www.greenheck.com/#sle](http://www.greenheck.com/#sle).
- B. Loren Cook Company; [www.lorencook.com/#sle](http://www.lorencook.com/#sle).
- C. Twin City Fan & Blower; [www.tcf.com/#sle](http://www.tcf.com/#sle).

2.02 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: Comply with AMCA 204.

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- B. Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C. Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.
- D. Fabrication: Comply with AMCA 99.
- E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

#### 2.03 ROOF EXHAUSTERS

- A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
- B. Roof Curb: 12 inch high self-flashing of galvanized steel with continuously welded seams, built-in cant strips.
- C. Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor and wall mounted multiple speed switch.
- D. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
- E. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm gets attained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

#### 2.04 WALL EXHAUSTERS

- A. Fan Unit: V-belt or direct driven with spun aluminum housing; resiliently mounted motor; 1/2 inch mesh, 0.062 inch thick aluminum wire bird screen.
- B. Disconnect Switch: Factory wired, nonfusible, in housing for thermal overload protected motor, and wall mounted multiple speed switch.
- C. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.
- D. Sheaves: For V-belt drives, provide cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm can be reached with sheaves set at mid-position; fan shaft with self-aligning prelubricated ball bearings.

#### 2.05 CABINET EXHAUST FANS

- A. Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with acoustic insulation, resiliently mounted motor, gravity backdraft damper in discharge.
- B. Disconnect Switch: Cord and plug-in housing for thermal overload protected motor and wall mounted switch.
- C. Grille: Molded white plastic.

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- D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is reached with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

2.06 UPBLAST ROOF EXHAUSTERS

- A. Belt Drive Fan:
  - 1. Fan Wheel:
    - a. Type: Non-overloading, backward inclined centrifugal.
    - b. Material: Aluminum, statically and dynamically balanced.
  - 2. Housing:
    - a. Construct of heavy gauge aluminum including curb cap, windband, and motor compartment.
    - b. Rigid internal support structure.
    - c. One-piece fabricated or fully welded curb-cap base to windband for leak proof construction.
    - d. Construct drive frame assembly of heavy gauge steel, mounted on vibration isolators.
    - e. Provide breather tube for fresh air motor cooling and wiring.
- B. Shafts and Bearings:
  - 1. Fan Shaft:
    - a. Ground and polished steel with anti-corrosive coating.
    - b. First critical speed at least 25 percent over maximum cataloged operating speed.
  - 2. Bearings:
    - a. Permanently sealed or pillow block type.
    - b. Minimum L10 life in excess of 100,000 hours (equivalent to L50 average life of 500,000 hours), at maximum cataloged operating speed.
    - c. 100 percent factory tested.
- C. Drive Assembly:
  - 1. Belts, pulleys, and keys oversized for a minimum of 150 percent of driven horsepower.
  - 2. Belts: Static free and oil resistant.
  - 3. Fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.
  - 4. Motor pulley adjustable for final system balancing.
  - 5. Readily accessible for maintenance.
- D. Disconnect Switches:
  - 1. Factory mounted and wired.
  - 2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
  - 3. Finish for Painted Steel Enclosures: Provide manufacturer's standard or factory-applied gray unless otherwise indicated.
  - 4. Positive electrical shutoff.
  - 5. Wired from fan motor to junction box installed within motor compartment.
- E. Drain Trough: Allows for single-point drainage of water, grease, and other residues.
- F. Options/Accessories:

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1. Birdscreen:
  - a. Provide galvanized steel construction.

#### 2.07 INLINE CENTRIFUGAL FANS AND BLOWERS

- A. Centrifugal Fan Unit: V-belt or direct driven, with galvanized steel housing lined with acoustic insulation, resiliently-mounted motor, gravity backdraft damper in discharge.
- B. Backward Inclined Blower:
  1. Direct-driven, resiliently mounted motor, heavy-duty ball bearings, powder-coated steel housing for outdoor service, and removable service panels.
  2. Accessories: Provide external vibration isolator spring, filter section, and MERV- \_\_\_ filters.
- C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm gets reached with sheaves set at mid-position; fan shaft with self-aligning prelubricated ball bearings.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
- D. Hung Cabinet Fans:
  1. Install fans with resilient mountings and flexible electrical leads, see Section 230548.
  2. Install flexible connections between fan and ductwork; see Section 233300. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.
- E. Provide sheaves required for final air balance.
- F. Install backdraft dampers on inlet to roof and wall exhausters.
- G. Provide backdraft dampers on outlet from cabinet and ceiling exhauster fans and as indicated.

END OF SECTION



SECTION 23 7219 - FIXED PLATE AIR-TO-AIR ENERGY RECOVERY UNITS

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. Fixed-plate total heat exchangers.
- B. Related Requirements:
  - 1. Section 233119 "HVAC Casings" for customized housings used for air-to-air energy recovery units.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: For air-to-air energy recovery equipment.
  - 1. Include plans, elevations, sections, and mounting details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
  - 1. Mechanical-room layout and relationships between components and adjacent structural and mechanical elements.
  - 2. Support location, type, and weight.
  - 3. Field measurements.

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1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For air-to-air energy recovery equipment to include in maintenance manuals.

1.6 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in a clean, dry place.
- B. Comply with manufacturer's written rigging and installation instructions for unloading and moving to final installed location.
- C. Handle products carefully to prevent damage, breakage, denting, and scoring. Do not install damaged products.
- D. Protect products from weather, dirt, dust, water, construction debris, and physical damage.
  - 1. Retain factory-applied coverings on equipment to protect finishes during construction and remove just prior to operating unit.
  - 2. Cover unit openings before installation to prevent dirt and dust from entering inside of units. If required to remove coverings during unit installation, reapply coverings over openings after unit installation and remove just prior to operating unit.
  - 3. Replace installed products damaged during construction.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of air-to-air energy recovery equipment that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period for Fixed-Plate Total Heat Exchangers: 10 years.

PART 2 - PRODUCTS

2.1 PERFORMANCE 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. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.

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C. ASHRAE Compliance:

1. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
2. Capacity ratings for air-to-air energy recovery equipment shall comply with ASHRAE 84, "Method of Testing Air-to-Air Heat/Energy Exchangers."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

E. Comply with ASTM E84 or UL 723.

2.2 CAPACITIES AND CHARACTERISTICS

A. See schedules on plans.

2.3 FIXED-PLATE TOTAL HEAT EXCHANGERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CORE Energy Recovery Solutions.
2. Dais Analytic Corporation.
3. Soler and Palau
4. Mitsubishi Electric Sales Canada Inc.

B. Casing: Aluminum or Galvanized steel.

C. Drain Pan: Same material as casing, with drain connections on exhaust and supply side.

1. Comply with requirements in ASHRAE 62.1.

D. Plates: Evenly spaced, sealed, and arranged for counter airflow.

1. Plate Material and Coating: Chemically treated paper, or polymer on aluminum, with selective hydroscopicity, moisture permeability, and gas barrier properties.

E. Bypass Plenum: Within casing, with gasketed face-and-bypass dampers having operating rods extended outside casing.

F. Maximum Differential Pressure: Suitable for maximum 6-inch wg.

G. Maximum Temperature: Suitable for maximum 194 deg F.

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2.4 SOURCE QUALITY CONTROL

- A. AHRI 1060 Certification: Certified according to AHRI 1060.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install fixed-plate heat exchangers so supply and exhaust airstreams flow in opposite directions.
  - 1. Install duct access doors in both supply and exhaust ducts, both upstream and downstream, for access to heat exchanger.
- B. Equipment Mounting:
  - 1. Install air-to-air energy recovery equipment on cast-in-place concrete equipment bases. Retain first paragraph below for air-to-air energy recovery equipment requiring seismic restraints.
- C. Install units with clearances for service and maintenance.

3.3 PIPING CONNECTIONS

- A. Where installing piping adjacent to unit, allow space for service and maintenance.
- B. Connect piping to units mounted on vibration isolators with flexible connectors.
- C. Condensate Drain Piping: Pipe drains from drain pans to nearest floor drain; use ASTM B88, Type L, drawn-temper copper water tubing with soldered joints, same size as condensate drain connection.
- D. Condensate Drain Piping: Pipe drains from drain pans to nearest floor drain; use ASTM D1785, Schedule 40 PVC pipe and solvent-welded fittings, same size as condensate drain connection.
- E. Condensate Drain Piping Installation: Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.

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3.4 ELECTRICAL CONNECTIONS

- A. Ground equipment according to Section Grounding and Bonding for Electrical Systems.
- B. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- C. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
  - 1. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch high.

3.5 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Air-to-air energy recovery equipment will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.7 STARTUP SERVICE

- A. Perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Verify that shipping, blocking, and bracing are removed.
  - 3. Verify that unit is secure on mountings and supporting devices and that connections to electrical systems are complete. Verify that proper thermal-overload protection is installed.
- B. Starting procedures for air-handling units include the following:
  - 1. Measure and record motor electrical values for voltage and amperage.

END OF SECTION 23 7219

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SECTION 23 8126.13 - SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.
- B. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections and installation and wiring of thermostats and other controls components.

1.02 REFERENCE STANDARDS

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment 2023.
- B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units 2004.
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems 2022, with Errata (2023).
- D. ASHRAE Std 23 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Compressor Units 2022.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems 2024.
- F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems 2021.
- G. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical Current Edition, Including All Revisions.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.04 WARRANTY

- A. See Section 23 0100 General Provisions HVAC, for additional warranty requirements.
- B. Provide one year manufacturers warranty for solid state ignition modules.
- C. Provide five year manufacturers warranty for heat exchangers.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. SEE SCHEDULES

2.02 SYSTEM DESIGN

- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
  - 1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator; auxiliary electric heat.
  - 2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
- B. Performance Requirements: See Drawings for additional requirements.

### 2.03 INDOOR AIR HANDLING UNITS FOR DUCTLESS SYSTEMS

- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.
  - 1. Location: High-wall.
  - 2. Cabinet: Galvanized steel.
  - 3. Fan: Line-flow fan direct driven by a single motor.
  - 4. Filter return air with washable, antioxidant pre-filter and a pleated anti-allergy enzyme filter.
- B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
  - 1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
  - 2. Manufacturer: System manufacturer.

### 2.04 OUTDOOR UNITS

- A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
  - 1. Comply with AHRI 210/240.
  - 2. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
  - 3. Refrigerant: R-410A , or current refrigerant offered by manufacturer..
  - 4. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL 207.
- B. Compressor: Hermetic, modulating 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high-pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.
- C. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
- D. Coil: Air-cooled, aluminum fins bonded to copper tubes.
- E. Accessories: Filter drier, high-pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
  - 1. Provide thermostatic expansion valves.
  - 2. Provide heat pump reversing valves.
- F. Operating Controls:
  - 1. Control by room thermostat to maintain room temperature setting.
  - 2. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 psig and off when pressure drops below 140 psig for operation to 0 degrees F.
- G. Mounting Pad: Precast concrete parking bumpers, minimum 4 inches square; minimum of two located under cabinet feet.



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2.05 ELECTRIC FURNACE COMPONENTS

- A. Electric Heater: Helix wound bare nichrome wire heating elements arranged in incremental stages of 5 kW each, with porcelain insulators.
- B. Operating Controls:
  - 1. Heater stages energized in sequence with pre-determined delay between heating stages.
  - 2. High limit temperature control to de-energize heating elements, with automatic reset.
  - 3. Supply fan started before electric elements are energized and continues operating after thermostat is satisfied until bonnet temperature reaches minimum setting. Include manual switch for continuous fan operation.
  - 4. Outdoor thermostat lock-out of some heating elements until outdoor temperature drops.

2.06 ACCESSORY EQUIPMENT

- A. SEE SCHEDULES

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.
- C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.
- B. Install in accordance with NFPA 90A and NFPA 90B.
- C. Install refrigeration systems in accordance with ASHRAE Std 15.

END OF SECTION

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**SECTION 26 00 10 - ELECTRICAL GENERAL**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. The "General Conditions" and "Special Conditions" of Contract as written and referred to hereinbefore are adopted and made part of Division 26.

1.2 DESCRIPTION OF WORK:

- A. Provide equipment, labor, etc., required to install complete working electrical system as shown and specified.
- B. Provide equipment and/or wiring normally furnished or required for complete electrical systems but not specifically specified on the drawings or in specifications, as though specified by both.
- C. All equipment and wiring shall be new and bear U.L. label.
- D. Electrical work includes, but is not limited to:
  - 1. Arrange with local utility companies for services as shown or specified.
  - 2. Removal or relocation of electrical services located on or crossing through project property, above or below grade, obstructing construction of project or conflicting with completed project or any applicable code.
  - 3. Alterations and additions to existing electrical systems.
  - 4. Complete 600 volt Distribution System. Provide meters, switchboards, panelboards, circuit breakers, power outlets, convenience outlets, switches, and/or other equipment forming part of system.
  - 5. Connection of all appliances and equipment.
  - 6. Complete alterations and additions to fire alarm system.
  - 7. Testing of all systems

1.3 WORK NOT INCLUDED:

- A. Furring for conduit and equipment.
- B. Finish painting of conduit and equipment.

- C. Installation of motors except where specifically noted.
- D. Control wiring for mechanical systems, except where indicated to be provided by Electrical Contractor.

1.4 RELATED WORK SPECIFIED ELSEWHERE:

- A. Classification of excavation: Architectural Division.
- B. Painting: Painting Division.
- C. Concrete Work: Concrete Division.

1.5 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Obtain and pay for all permits required for work. Comply with all ordinances pertaining to work described herein.
- B. Install work under this Division per drawings, specifications, latest edition of the National Electrical Code, Local Building Codes, and any special codes having jurisdiction over specific portions within complete installation. In event of conflict, install work per most stringent code requirements determined by Engineer.
- C. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Engineer Certificates of Inspection and approval issued by authorities.

1.6 QUALIFICATIONS OF CONTRACTOR:

- A. Has completed minimum two projects same size and scope in past five (5) years.
- B. This qualification applies to Sub-Contractors.
- C. Use workmen experienced in their respective trade. Submit qualifications of Superintendent for review.
- D. Owner reserves right to reject bid of any Contractor failing to meet these qualifications.

1.7 GENERAL JOB REQUIREMENTS:

- A. Drawings and Specifications:
  - 1. Electrical work is shown on "E" series drawings inclusive. Follow any supplementary drawings as though listed above.

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2. Drawings and specifications are complementary. Work called for by one is binding as if called for by both.
3. Drawings show general run of circuits and approximate location of equipment. Right is reserved to change location of equipment and devices, and routing of conduits to a reasonable extent, without extra cost to Owner.
4. Refer conflicts between drawings and specifications describing electrical work and work under other Divisions to Engineer for remedial action.
5. Use dimensions in figures in preference to scaled dimensions. Do not scale drawings for exact sizes or locations.
6. Execution of Contract is evidence that Contractor has examined all drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
7. Charges for extra work not allowed unless work authorized by written order from Engineer approving charge for work.

B. Visit to Site:

1. Visit site to survey existing conditions affecting work. Include necessary materials and labor to accomplish the electrical work, including relocation of existing services and utilities on building site in bid. No consideration given to future claims due to existing conditions.

C. Definitions:

1. Provide: Furnish, install and connect complete.
2. Wire: Furnish all necessary wiring and connect complete.
3. Install: Set in place and wire complete.
4. Work: Materials completely installed and connected.
5. AWG: American Wire Gage.
6. NEC: National Electrical Code (latest edition)
7. NFPA: National Fire Protection Association.
8. OSHA: Occupation Safety and Health Administration.

9. UL: Underwriters Laboratories, Inc.
10. NEMA: National Electrical Manufacturers Association.
11. IEEE: Institute of Electrical and Electronic Engineers.

D. Workmanship, Guarantee and Approval:

1. Work under this Division shall be first class with emphasis on neatness and workmanship.
2. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. Installation subject to Engineer's constant observation, final approval, and acceptance. Engineer may reject unsuitable work.
3. Furnish Engineer written guarantee, stating that if workmanship and/or material executed under this Division is proven defective within one (1) year after final acceptance, such defects and other work damaged will be repaired and/or replaced at no cost to the owner.
4. In event project is occupied or systems placed in operation in several phases at Owner's request, guarantee will begin on date each system or item of equipment is accepted by Owner.

E. Observations of Work and Demonstration of Operation:

1. At observations of work, open panel covers, junction box covers, pull box covers, device covers, and other equipment with removable plates for check. Provide sufficient personnel to expedite cover removal and replacement.
2. Contractor to assist Engineer in demonstration of operation of new systems to satisfaction of Owner. Contractor to have manufacturer available for demonstration of systems where requested by Owner.

F. Submittals, Shop and Erection Drawings:

1. Submit complete shop drawings for all material and equipment furnished under Division 16 of specifications, to Engineer for review within 30 days after award of contract. Shop drawings shall be submitted on timely basis to allow adequate lead time for review, re-submission if necessary, manufacture and delivery to allow access of material to project at correct time based on schedule established by Engineer/Contractor. Include complete descriptive data with dimensions, operating data and weight for each item of equipment. Carefully

examine shop drawings to assure compliance with drawings and specifications prior to submittal to Engineer. Shop drawings and submittals shall bear the stamp of approval of the Electrical and General Contractor as evidence drawings have been reviewed by both for compliance with the contract documents. Submittals without this stamp of approval will not be considered and will be returned for proper resubmission.

2. Submittals, shop and erection drawings shall be submitted as electronic portable document files (PDF) format.
3. Review of shop drawings does not relieve Contractor of responsibility for errors and omissions in shop drawings. Contractor is responsible for dimensions and sizes of equipment. Inform Engineer in writing of equipment differing from that shown.
4. Provide for Owner one (1) electronic copy in portable document file (PDF) format of final shop and erection drawings.

G. Cooperation:

1. Carefully coordinate work with other contractors. Refer conflicts between trades to Architect.
2. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor and/or Engineer].

H. Maintenance and Operating Instructions for Equipment:

1. Submit to Engineer data prepared by manufacturer for each item of electrical equipment completely describing equipment. Data to include parts lists, description of operation, shop drawings, wiring diagrams, maintenance procedures and other literature required for maintenance of equipment. Provide one (1) hard copy and one (1) electronic copy in portable document (PDF) format. Bind hard copy in booklet form for presentation and bind PDF copy in similar manner.

I. Record Drawings:

1. Provide "Record" drawings at the completion of job.
2. Keep a complete set of contract drawings on job and record day to day changes with red pencil. Indicate actual location of conduit systems, outlets, and equipment. Drawing set shall be maintained in good order Turn prints over to Engineer at final observation.
3. Contractor shall transfer information from the marked-up record drawings to

the AutoCAD files and turn both over to [Architect (or) Engineer] as a part of the close-out documents.

J. Items for Owner:

1. Provide following items for Owner at time of substantial completion:
  - a. Certificates of inspection and approval from authorities having jurisdiction.
  - b. Written guarantees.
  - c. Record drawings.
  - d. Final approved submittals and shop drawings, one (1) hard copy and one (1) electronic copy in PDF format.
  - e. Spare fuses (furnish receipt).
  - f. Maintenance data, one (1) hard copy and one (1) electronic copy in PDF format.
  - g. Affidavit of Owner Instruction (1 copy).

K. Marking:

1. Identify each starter, (including starters furnished under Mechanical Section), panelboard, cabinet, control device, breaker, disconnect and safety switch with 1/4" high black letters cut in a white laminated phenolic strip. Use red letters for all equipment connected to emergency system. Attach to enclosure with two (2) metal screws or with an epoxy adhesive.
2. Nameplates required for other items in this Division similar to those described above.

L. Protection and Storage:

1. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury.
2. Do not leave exposed or unprotected, electrical items carrying current. Protect personnel from exposure to contact with electricity.
3. Protect work and materials from damage by weather, entrance of water or dirt. Cap conduit during installation.
4. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
5. Exercise particular care when working around telephone (electronic) equipment to prevent entrance of dust, moisture and debris into the equipment. Provide dust barriers and partitions as required.
6. Deliver equipment and materials to job site in original, unopened, labeled



container. Store to prevent damage and injury. Store ferrous materials to prevent rusting. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Storage space on site and in building designated by Owner Engineer.

7. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations, referred to Engineer.

M. Excavation and Backfill:

1. Excavate for work in this Division.
2. Avoid existing facilities in excavating. Contractor is responsible for repair and replacement of damaged facilities in executing work.
3. Backfill in twelve inch (12") lifts, wetted down and tamped. Compaction minimum 95% of adjacent earth.
4. Repairing to be comparable to work cut including new asphalt paving, concrete paving, sod, replanting shrubbery, etc. Engineer will observe repair work, and reject unsuitable work.

N. Cutting and Repairing:

1. Cut and repair walls, floors, roof, etc., required to install work. Where work cut is finished, employ original installer of finish to repair finish. Do not cut structural members.

O. Anchors:

1. Provide anchors for all equipment, raceways, hangers, etc. to safely support weight of item involved. Anchors to consist of expansion type devices similar to "Redhead" or lead expansion anchors. Plastic anchors are not acceptable. Protect electronic equipment from drilling residue.

P. Cleaning and Painting:

1. Clean equipment furnished in this Division after completion of work.
2. Touch-up or re-paint damaged painted finishes.
3. Remove debris, packing cartons, scrap, etc., from site.

Q. Starters:

1. Separately mounted starters are furnished under another Division, but installed

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in Division 26 unless specifically noted otherwise.

R. "Contingency Items":

1. Provide in electrical pricing the following electrical devices or equipment including cost of labor and materials for complete installation:
  - a. 5 20 amp duplex receptacle complete with outlet box, coverplate and 20 feet of 2#12 and 1#12(G)-1/2"C connected to nearest receptacle circuit.
  2. Furnish and installed the following fire alarm system devices complete with outlet box, 30 feet of conduit, wiring and all necessary system programming required to be an integral part of fire alarm system:
    - a. 6 Duct mounted smoke detectors complete with housing and sampling tube.
    - b. 2 Control zam.
  3. All unused components will be turned over to Owner for attic stock.

U. Code Compliance:

1. Entire electrical installation shall comply with all aspects of code including local interpretations. This includes but is not limited to:
  - a. Installation adjustment to meet all code clearances between electrical such as ductwork, other HVAC, plumbing, fire protection, and structural systems.
  - b. Locations for items such as fire alarm initiating and signaling devices, exit lights, emergency egress lighting, disconnect switches, etc.
2. No additional compensation will be allowed for code compliance. Notify Engineer of difficulty encountered for assistance.

END OF SECTION 26 05 10

**SECTION 16011 - WORK IN EXISTING FACILITY**

**PART 1 - GENERAL**

**1.1 DOCUMENTATION OF EXISTING CONDITIONS:**

- A. Before new work begins, the Contractor shall determine and document in writing to the Architect condition of existing electrical work and auxiliary systems to remain in service. After new work begins, existing electrical work or systems found to be inoperative or defective and documented shall be repaired or replaced by Contractor at no additional cost to Owner.

**1.2 DEMOLITION OF EXISTING ELECTRICAL SYSTEMS:**

- A. Demolish existing electrical work, including auxiliary systems, in areas of existing building to be renovated. Coordinate removal of electrical systems with General Contractor and Owner.
- B. In all areas to be renovated, remove all electrical equipment; i.e.: Light fixtures, panelboards, switches, receptacles, auxiliary system devices, telephone outlets, etc; unless otherwise noted. Remove existing branch circuits (conduit, wire, outlet boxes) serving equipment to be removed. Abandon circuits concealed in concrete. Remove conductors from abandoned conduits. Leave existing branch circuits and feeders which run through reworked areas and serve existing equipment to remain in service, continuous and uninterrupted. Repair, reterminate, re-support, etc., any damaged circuits.
- C. Abandon outlets in existing masonry walls: Remove plaster frames, fill outlet box with grout and patch finish to match existing wall. Cut off conduits at wall where stubbed-out in furred ceiling space.
- D. Cut off conduits concealed in slab two inches below top of base floor slab and patch slab or floor to match existing.

**1.3 CUTTING AND REPAIRING:**

- A. General Contractor shall do all cutting and repairing of walls, floors, roof, etc., required for installation of work installed in this Division but shall backcharge the Electrical Contractor for this work. Advise General Contractor of amount and nature of cutting and repairing necessary to install work prior to bid date.
- B. Do not pierce exterior walls below grade with hanger bolts. Do not cut building structural members except as approved by Engineer. Engineer must approve cutting methods.
- C. Repair work comparable with work cut. New finishes shall match adjacent finishes.

Engineer will approve repaired work and may reject unsuitable work.

1.4 CONTINUITY OF SERVICE:

- A. Provide continuous, uninterrupted electrical service to existing outlets, apparatus, and equipment in existing building. Provide temporary wiring installed in safe, approved manner to equipment and outlets as required. Where service interruptions are required, obtain approval for interruption in writing from Owner 10 days prior to interruption. Include schedule of work to be performed and time required to accomplish work in request for interruption. Work during service interruptions may occur after normal working hours. Include premium (overtime) time labor in bid.

1.5 SALVAGE:

- A. Electrical equipment, wiring, etc., removed and not required to be part of new electrical installation is classed as salvage.
- B. Salvageable equipment becomes property of Contractor. Remove from job site.

END OF SECTION 26 00 11

**SECTION 26 00 30 – COORDINATION**

**PART 1 - GENERAL**

**1.1 PURPOSE**

- A. The contractor is responsible for coordinating system(s) installation and equipment requirements with other trades to avoid conflicts and to ensure that proper electrical connections are provided for equipment furnished by others. Failure to do so will not be considered as justification for additional cost.

**1.2 COORDINATION WITH OTHER TRADES**

- A. Contract drawings contain diagrammatic layouts and indicate general arrangement of equipment, system components, devices, boxes, conduit, etc.
- B. Prior to installation of material and equipment, review and coordinate work with Architectural, Structural, Mechanical, Plumbing, Fire Protection drawings and other Division work for exact space conditions; where not readily discernable request information from Architect before proceeding.
- C. Check Drawings of all other trades to verify extent of material and equipment to be installed in spaces available and consider layout alternatives so that all requirements can be accommodated.
- D. Maintain maximum headroom at all locations without finished ceilings.
- E. Maintain finished ceiling heights as indicated on Architectural reflected ceiling plans, and building sections and elevation drawings.
- F. Coordinate installations with other trades prior to proceeding to prevent conflict with work of other trades and cooperate in making reasonable modifications in layout as needed.
- G. Where conflicts occur with placement of mechanical and electrical materials as they relate to placement of other building materials, the Architect shall be consulted for assistance in coordination of the available space to accommodate all trades.
- H. Coordinate equipment installation to maintain manufacturer and code required working clearances.

END OF SECTION 26 00 30

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**SECTION 26 05 15 - CONDUCTORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Furnishing, installing and testing 600 volt conductors for lighting, power, and auxiliary systems.

**PART 2 - PRODUCTS**

**2.1 CONDUCTORS:**

- A. 98% conductivity copper; #12 AWG minimum; #10 AWG and smaller solid, #8 and larger stranded.
- B. Conductors furnished with NEC, 600 volt, insulation as follows:

Dry locations:

# 6 AWG and smaller - type THW, THWN or XHHW (do not intermix in circuits)

Wet locations: type RHH-RHW-USE

- C. Wiring for controls and auxiliary systems #14 AWG stranded minimum with NEC type THWN insulation.
- D. Color Code as follows and/or per local ordinances. Conductors #10 and smaller with colored insulation. For conductors #8, and larger color code with colored pressure sensitive tape. Apply minimum 2" of tape to each individual phase or neutral conductor in half lapped pattern. The equipment ground conductor shall be taped green for its entire exposed length. Color-code as follows:

<u>Phase</u>	<u>120/208V</u>
A	Black
B	Red
C	Blue
Neutral	White
Equip. Ground	Green

- I. Manufacturers of copper conductors: Pirelli, Phelps Dodge, Capital Cable, Rome Southwire, Senator, Essex, American, or approved equal.

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PART 3 - EXECUTION

- A. Install wiring complete with connections to equipment.
- B. No wiring installed until after plastering and similar work is complete and dry.
- C. Install wiring so conductors are not in tension in completed system.
- D. Form wiring neatly and group in circuits. Tie grouped conductors with nylon ties, T&B "Tyrap" or approved equal.
- E. Use pulling compound of Ideal "Yellow 77", Minerallac No. 100, or approved equal. Do not use pulling compound for circuits on secondary side of ungrounded isolation transformers.
- F. Join and terminate copper conductors individually.
  - 1. Lugs in damp locations connected to copper bus: Solid 98% conductivity long copper barrel, tin plated, compression type connectors, Thomas & Betts color keyed, Burndy "Hydent" or approved equal; applied with appropriate hydraulic tool.
  - 2. Lugs in dry locations and lugs connected to aluminum bus - heavy casting aluminum, CU/AL rated, listed under UL Standard 486B, rated 90 degrees C; plated to prevent electrolysis, Thomas & Betts, Blackburn, IlSCO or approved equivalent.
- G. Provide lugs where not furnished as part of equipment -furnish as specified above, to connect all conductors.
- H. Make conductor taps #8 and larger from a second conductor with 98% conductivity bolted insulated connector, T&B "IDT", IlSCO "KUP-L-TAP" or approved equivalent. Insulate splices with 600 volt "heat shrink" covers T&B or equal.
- I. Splice conductors #8 and larger with solid copper barrel, type fittings applied with an appropriate hydraulic tool. Splices used only where approved. Splice fittings: Burndy "Hydent". Insulate splices with 600 volt "heat shrink" covers T&B or equal.
- J. Joints #10 and smaller: T&B Sta-Kon wire joints EPT66M, with insulating caps, installed with WT161 Tool or C nest of WT11M Tool; Ideal Super/Nuts; Ideal Wing Nuts; 3M "Scotchlock" or Buchanan Electric Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators installed with C24 pressure tool. Where conductors are connected to screw terminals, use nylon insulated, locking fork, T&B Sta-Kon or approved equal. Where joints are made in damp or wet locations insulate splices with 600 volt "heat shrink" covers T&B or equal.



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- K. Provide cable supports: As required by NEC. Supports with malleable screwed conduit fitting and non-conductive wedges drilled for the conductors; O.Z. Manufacturing Company or approved equal. Furnish pullbox, sized per NEC for each cable support.
- L. Bond circuit ground wires where installed to all devices, equipment, outlet and junction boxes, and grounding bushings (where provided) with a full size conductor and screw type connection.
- M. Securely fasten non-ferrous identifying tapes, pressure sensitive labels or engraved nameplates to all cables, feeders and power circuits in vaults, pull boxes, manholes, switchboard rooms, terminations of cables, etc.
- N. Mark all branch circuit conductors at panel terminations including neutrals with pressure sensitive numbers to correspond to circuit numbers connected.
- O. Connect circuits and feeders as shown on drawings. Drawings are diagrammatic and do not show every detail required in the wiring system. Detail wiring accomplished per NEC.
- P. All conductors making up parallel feeders to be same size, same type, and same insulation, all cut same length. Bond each group of conductors making up a phase or neutral at both ends in an approved manner.
- Q. DO NOT COMBINE CIRCUITS unless specifically approved by the Engineer. No more than 3 phase or current carrying conductors in a circuit.

END OF SECTION 26 05 15

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**SECTION 26 05 17 - METAL CLAD (MC) CABLE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Furnishing and installing metal clad "MC" cable with 600 volt conductors in a spiral flexible enclosure for lighting, power, and auxiliary systems.
- B. Use of "MC" cable shall be limited to 20, 30, and 40 amp circuits of #12, #10, or #8 wire.

**1.2 SUBMITTALS:**

- A. Provide manufacturer product data for metal clad cable to be furnished. Submittal data shall include ratings, materials, construction and physical characteristics. Provide samples when requested by Engineer.

**PART 2 - PRODUCTS**

**2.1 CONDUCTORS:**

- A. Conductor 98% copper #12, #10 or #8 AWG minimum type THHN insulation manufactured and tested in compliance with UL-83; insulation resistance 6-1 megohms per 1000 feet.
- B. Grounding conductors to be same size as phase conductors, and shall be insulated.
- C. The conductors shall be cabled together with a binder tape bearing the print legend wrapped around the assembly.
- D. Jacket shall be galvanized steel or lightweight aluminum, and shall be applied over the inner cable assembly with a positive interlocked armor.
- E. Color Code as follows and/or per local ordinances and as follows with colored insulation:

<u>Phase</u>	<u>120/208 Volts</u>
A	Black
B	Red
C	Blue
Neutral	White
Equipment Ground	Green

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- F. Cable shall be listed for use in UL 1, 2 and 3 hour through penetration fire-stop systems.
- G. Cable shall meet the requirements of UL Standard 83, UL standard 1069, UL standard 1569.
- H. Product shall be as manufactured by Galflex, AFC Cable, Southwire, or approved equal.

PART 3 - EXECUTION

- A. In finished areas "MC" cable shall be concealed above ceiling or in wall. Exposed "MC" cable in finished areas is not allowed.
- B. Cable shall not be used for homerun to panel. Homerun shall be installed in conduit from panel to first outlet or junction then converted to "MC" cable.
- C. Installation shall be in accordance with applicable NEC Article. Support cable on 5 foot centers, minimum, and not more than 12 inches from box or cabinet. Support independent of ceiling. Provide additional supports as required to prevent sagging.
- D. Cable shall be handled and installed without damage to the outer interlocked metal jacket. Any section of cable with separation in the outer jacket shall be replaced.
- E. Fittings and connectors shall be products specifically designed for MC cable.
- F. Joints #12 and smaller: T&B Sta-Kon wire joints EPT66M, with insulating caps, installed with WT161 Tool or C nest of WT11M Tool; Ideal Super/Nuts; Ideal Wing Nuts; 3M "Scotchlock" or Buchanan Electric Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators installed with C24 pressure tool. Where conductors are connected to screw terminals, use nylon insulated, locking fork, T&B Stan-Kon or approved equal.
- G. Bond circuit ground wires where installed to all devices, equipment, outlet and junction boxes, and grounding bushings (where provided) with a full size conductor and screw type connection.
- H. Securely fasten non-ferrous identifying tapes, pressure sensitive labels or engraved nameplates to all cables, feeders and power circuits in vaults, pull boxes, manholes, switchboard rooms, terminations of cable, etc.
- I. Mark all branch circuit conductors at panel terminations including neutrals with pressure sensitive numbers to correspond to circuit numbers connected.
- J. Connect circuits shown on drawings. Drawings are diagrammatic and do not show every detail required in the wiring system. Detail wiring accomplished per NEC.

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- K.     Circuiting: Where drawings do not show required number of conductors provide number as required to provide complete connections and control as designated by circuit numbers and switching.
  - 1.     DO NOT COMBINE circuits unless specifically approved by the Engineer.

END OF SECTION 26 05 17

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**SECTION 26 0530 – FIRESTOPPING FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Firestopping materials and accessories.

**1.2 RELATED WORK SPECIFIED ELSEWHERE:**

- A. Section 26 0010.....Electrical General
- B. Section 26 0517.....Metal Clad (MC) Cable
- C. Section 26 0531.....Raceways

**1.3 CODES AND STANDARDS**

- A. International Building Code.
- B. Underwriters Laboratories - Fire Resistance Directory
  - 1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials (UL723).
  - 2. ASTM E119 - Method for Fire Tests of Building Construction and Materials (UL263).
  - 3. ASTM E814 - Test Method of Fire Tests of Through-Penetration Firestops (UL1479).

**1.4 QUALITY ASSURANCE:**

- A. Fireproofing Materials:
  - 1. ASTM E119 and/or ASTM E814 to achieve a fire rating as noted on Drawings.
  - 2. All fireproofing shall be UL classified for the appropriate UL system number.
- B. Surface Burning:
  - 1. ASTM E84 with a flame spread smoke developed rating of 0/5.
- C. Manufacturer:
  - 1. Company specializing in manufacturing the products specified in this Section with minimum three years experience.

**1.5 SUBMITTALS:**

- A. Submit under provisions of Section 260010 - Electrical General.
- B. Product Data: Provide data on product characteristics, performance and limitation criteria.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions. Include the UL System Numbers which apply to each application.
- D. Conform to applicable code for fire resistance ratings and surface burning characteristics.

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- E. Provide certificate of compliance from authority having jurisdiction indicating approval.
- F. Provide mock-up of applied firestopping material for each type of application.
- G. If accepted, mock-up will demonstrate minimum standard for the work.
- H. Mock-up may remain as part of the work.
- I. Do not apply materials when temperature of substrate material and ambient air is below 40 degrees F.
- J. Maintain this minimum temperature before, during, and for 3 days after installation of materials.
- K. Provide ventilation in areas to receive solvent cured materials. Use water based materials in occupied areas.
- L. Sequence work to permit firestopping materials to be installed after and surrounding work is complete.

1.6 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, grade, and UL label where applicable.
- B. Coordinate delivery with scheduled installation date to allow minimum storage time at site.
- C. Store materials in clean, dry, ventilated location. Protect from soiling, abuse, and moisture. Follow manufacturer's instructions.

1.7 GUARANTEE:

- A. Submit copies of written guarantee agreeing to repair or replace joint sealers which fail in adhesion, cohesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability or appear or deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated. The guarantee period shall be one year from date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. 3M brand CP25 Fire Barrier Caulk, CS195 Composite Sheet, FS195 Wrap/Strip, RC-1 Restricting Collars, Interim Fire Dam 150 caulk or moldable putty. Other approved manufacturers are GE "Pensil" Systems and Dow Corning Fire Stop Systems.
- B. Primer: Type recommended by firestopping manufacturer for specified substrate surfaces.

2.2 ACCESSORIES:

- A. Dam Materials: Mineral fiberboard, mineral fiber matting, sheet metal or alumina silicate fire board.

PART 3 - EXECUTION



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3.1 GENERAL:

- A. Verify site conditions.
- B. Verify that openings are ready to receive the Work of this Section.

3.2 PREPARATION:

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose materials or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which affect bond.

3.3 INSTALLATION:

- A. Install penetration seal materials in accordance with printed instructions of the UL Fire Resistance Directory and in accordance with manufacturer's instruction.
- B. Seal holes or voids made by penetrations to ensure an effective smoke barrier.
- C. Where floor openings without penetrating items are more than four inches in width and subject to traffic or loading, install fire stopping materials capable of supporting same loading as floor.
- D. Protect materials from damage on surfaces subject to traffic.
- E. Examine penetration sealed areas to ensure proper installation before concealing or enclosing areas.
- F. Keep areas of work accessible until inspection by applicable code authorities.
- G. Perform under this section patching and repairing of fire stopping caused by cutting or penetration by other trades
- H. Install backing materials to arrest liquid material leakage.

3.4 APPLICATION:

- A. Apply materials in accordance with manufacturer's instructions.
- B. Apply firestopping material in sufficient thickness to achieve rating to uniform density and texture.
- C. Install material at floors, walls or partition openings which contain penetrating sleeves, piping, ductwork, conduit and other items requiring firestopping.

3.5 CLEANING:

- A. Clean up spills of liquid components.
- B. Neatly cut and trim materials as required.
- C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.
- D. Protect finished work.
- E. Protect adjacent surfaces from damage by material installation.

3.6 SYSTEMS AND APPLICATION SCHEDULE:

Construction Condition UL Designation

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Metal Pipe or Conduit .....	C-AJ-1001, C-AJ-1007, C-AJ-1027, C-AJ-1044
Through Round Opening.....	W-J-1010
Metal Pipes or Conduits.....	C-AJ-1001, C-AJ-1006, C-BJ-1020, C-BJ-3017,
Through Large Opening.....	C-AJ-1044, W-J-1010
Busway Through Rectangular.....	F-A-6001, C-AJ-6001
Cables Through Opening.....	C-AJ-3021, C-AJ-3030
Cable Tray.....	C-AJ-4003
Blank Opening.....	C-AJ-0004, C-AJ-0009
Non-metallic (Plastic) Pipe..... or Conduit Through Opening	C-AJ-2001
Metal Pipe or Conduit..... Through Gypsum Board Wall	W-L-1001, W-L-1016
Non-Metallic (Plastic) Pipe..... or Conduit Through Gypsum Board Wall	W-L-2002
Cables Through Gypsum .....	W-L-3001
Board Wall	
Metal Pipe or Conduit..... Through Wood Construction	F-C-1002
Non-Metallic (Plastic) Pipe..... or Conduit Through Wood Construction	F-C-2002
Cables Through Wood..... Construction	F-C-3001

- A. The following sections have applications for fire ratings less than 2-hours: C-AJ-2001, C-AJ-5001, WL-L-1001, W-L-2002.
- B. The following sections have applications for fire ratings of 4-hours: C-AJ-5001, C-AJ-1007, C-BJ-1020, and C-BJ-3017
- C. All sections (including those previously listed) listed have applications for fire ratings of 2-hours or less.

END OF SECTION 26 0530

**SECTION 26 05 31 – RACEWAYS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Installation of raceway systems and necessary fittings for all work in Division 16.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

**A. Metallic Raceways:**

- |              |             |
|--------------|-------------|
| 1. Republic  | 5. Triangle |
| 2. Wheatland | 6. Walker   |
| 3. Allied    | 7. Western  |
| 4. Clifton   | 8. AFC      |

**B. Fittings**

- |                           |               |
|---------------------------|---------------|
| 1. Thomas & Betts         | 5. EFCOR      |
| 2. Hubbell: RACO; Killark | 6. OZ Gedney  |
| 3. Appleton               | 7. Bridgeport |
| 4. Midwest                | 8. AFC        |

**2.2 RACEWAYS**

**A. Rigid galvanized steel conduit:**

- 1. Conform to ASA Standard C80.1 and U.L. Standard No. 6 for rigid metallic conduit, except hot dipped galvanized after threading.
- 2. Fittings, ells, couplings, etc., galvanized threaded type meeting above standards. Threadless fittings not allowed.
- 3. Terminate rigid conduit with two locknuts, one inside, one outside of the cabinet, junction or outlet and a bushing. Bushing - malleable iron with smooth bakelite ring molded into edge of bushing to prevent damage to cable, OZ Mfg. Co., type "B" or approved equal.
- 4. Where grounding bushings are required, construction of bushing similar to above except a lug provided for grounding connection, OZ type "BLG" or approved equal.

**B. Rigid intermediate grade conduit, IMC, to conform to UL Standard No.1242; hot dipped**

galvanized or approved equivalent.

1. All fittings, ells, couplings, etc., constructed to same standards as rigid steel conduit. Fittings - threaded type with all threads engaged. Use "Uni-swivel" couplings in dry locations only.
  2. Conduit terminations same as rigid steel conduit.
- C. Flexible steel conduit:
1. Greenfield", continuous spirally wound and inter-locked, threadless, galvanized conforming to U.L. and CSA Standards for flexible steel conduit.
  2. Connectors and fittings galvanized steel, threadless type with insulated throats, U.L. approved for grounding means.
- D. Liquid tight flexible steel conduit constructed similar to flexible steel conduit above, except with polyvinyl chloride jacket.
1. Fitting Assembly - sealing type, with steel gland, nylon ring and ground cone inside locknut. All fittings with insulated throat, U.L. approved for grounding means.
- F. Electrical metallic tubing, EMT, threadless, steel type conforming to ASA Standard C80.3 galvanized inside and out, and with additional corrosion resistant finish.
1. Fittings, connectors, couplings, etc., insulated throat ![galvanized steel, rain tight, compression type;] ![galvanized steel screw indenter].
- H. Type EB – encased burial duct: Polyvinyl chloride compound conforming to NEMA Standard TC-6, UL listed and designed for encased burial use.
1. Fittings same material as conduit and installed with watertight joint compound recommended by manufacturer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION:

- A. Install conduit as follows:
1. Use rigid steel or intermediate grade conduit for:
    - a. Circuits in hazardous and wet locations.
    - b. Circuits exposed to mechanical damage.

- c. All motor circuits.
  2. Use electrical metallic tubing, EMT, for:
    - a. Branch circuits (conduit 2-1/2" diameter and smaller) in dry locations.
    - b. Feeders run overhead in dry locations. Branch circuits in concrete slab above slab on grade.
  3. Use type EB conduit for exterior concrete encased application where shown.
- B. Size conduit per NEC. Minimum size 3/4" diameter, but no more than three (3) #12 installed in 3/4" conduit.
- C. Run conduit concealed where possible. Run concealed conduit above furred ceiling in an orderly manner. Multiple conduits grouped and run parallel.
- D. In concrete slab: Install conduits in center of concrete slabs and tie to reinforcing steel with tie wires. Do not install conduit larger than 1" in concrete slabs unless approved by Engineer. Install with minimum of 2" between parallel runs. Do not cross conduits in slab unless necessary, then only one conduit crossover in 12" space.
- E. Exposed Conduit: Use only where specifically shown or approved. Run perpendicular to building walls and partitions and tight against structure. Conceal vertical portion of conduits where possible.
- F. Paint underground metal conduit with 2 coats of asphaltum or bituminous. Make underground conduit fittings watertight using Teflon tape. Do not use split couplings and similar fittings underground and exposed to moisture. Run underground conduits minimum 24" below grade. Do not run conduit in slag fill.
- G. Paint conduit fittings and threads exposed to moisture with Rustoleum silver paint after installation.
- H. Furnish offsets required to meet field conditions. Make bends in conduit in accordance with the National Electrical Code, except make minimum radius of 6 times conduit diameter or 6" whichever is greater. Bend IMC conduit without deforming.
- I. Where conduit crosses expansion joints, install expansion type fittings OZ type EX with bonding jumper or approved equal.
- J. Make connections to equipment away from wall with conduit extensions exposed from ceiling to floor, anchored with floor flange and/or angle frame as required. Make connections to equipment with flexible conduit from tee conduit in conduit riser.
- K. Vibrating equipment and equipment requiring adjustment, i.e.: motors, transformers, etc: make final connections with flexible conduit.

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- L. Isolate conduit connections to equipment on roof from roof penetration of conduit with short section of flexible conduit between roof penetration and equipment.
- M. Use liquidtight flexible conduit where exposed to moisture, oil, etc.
- N. Install conduit to avoid hot water pipes. Maintain 9" clearance of such pipes, unless closer crossings are unavoidable. Maintain minimum 1" clearance from covering of pipe crossed.
- O. Support conduit per NEC. Support individual conduits with galvanized hangers and rods as follows:
  - 1" diameter and smaller..... ¼" dia. rod
  - 1-¼" to 3" diameter..... 3/8" dia. rod
  - Larger than 3" diameter..... ½" dia. Rod
- P. Individual conduit hangers - Minnerallac, or approved equal. Support EMT near each joint. Support for multiple conduit runs consist of Uni-strut channel as required with 1/2" diameter galvanized bolts or rods anchored to structure. Provide "U" bolt clamps for each conduit on hangers. Support vertical riser conduits with galvanized bolted clamps at each floor. Do not support conduit to ceiling support system.
- Q. Terminate conduits entering sheet metal boxes with double locknuts and bushings. Terminate conduit exposed to moisture with watertight hubs.
- R. Install appropriate seal-off where conduits exit hazardous areas, areas of temperature differential etc.
- S. Where ground conductor installed in conduits 1-1/4" and larger provide grounding bushings, and bond full size ground wire to bushings and from bushing to box or cabinet. Bond with self-tapping screw and appropriate lug. Where ground wires are run in smaller conduits, bond to outlet and junction boxes with self-tapping screw lug. Provide other conduits with non-grounding bushings as described under another article.
- T. Install aluminum conduit using "No-OXID-A" compound (Dearborn Chemical Company) on all threads.
- U. Conduit work in hazardous areas, or areas with large temperature differential: Use rigid steel or IMC conduit with sealing fittings, poured with hardening compound after conductors are pulled-in. Seals installed per NEC. Conduit seals Crouse-Hinds type EYS or approved equal.
- V. Sleeves:
  - 1. Provide sleeves for raceways penetrating floor and structural members. Sleeves

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consist of Electrical Metallic Tubing set in forms. (Exception: Use Schedule 40 PVC for individual ground conductors).

2. Size sleeves to allow 1/2" clearance around raceway extending from bottom of floor construction to 2" above floor, minimum sleeve size 2-1/2" diameter. After raceways are installed, seal space between the raceway and sleeve with non-hardening, fireproof, compound, CTC PR-855 sealant, T&B "Flame Safe" for 2 hour fire rating or approved equal.

END OF SECTION 26 05 31

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**SECTION 26 05 32 - OUTLET BOXES and JUNCTION BOXES**

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. Outlet, junction boxes, conduit bodies, wiring gutters and their installation.

PART 2 - PRODUCTS

2.1 OUTLET AND JUNCTION BOXES

- A. Provide outlet boxes for wiring devices, fixtures and special system outlets.
1. Use galvanized steel for concealed boxes and exposed boxes in dry locations where conduit or 'MC' cable is used.
  2. Use cast iron conduit fittings similar to "Condulets" or "Unilets" with threaded hubs for exposed boxes outside and exposed to moisture.
- B. Metallic Outlet Boxes: Use for concealed and exposed outlets for lights, switches, wall receptacles, etc. where metallic conduit and armored (AC) cable metal clad (MC) cable are used. Provide standard galvanized steel outlet box with plaster rings where required.
1. Provide 1/16" thick boxes and covers of form and dimension suitable for its specific use and location, kind of fixture to be used and number, size and arrangement of connecting conduits.
  2. Provide 3/8" fixture studs where required.
  3. Ceiling Outlet Boxes: 4" octagonal or 4-11/16" square and 2" deep minimum. Plaster rings not required for ceiling outlet unless needed for device.
  4. Switch and receptacle outlet boxes: For single devices use 14 cubic inch, 2 3/4" deep boxes with plaster rings as necessary. Provide multi-gang boxes where shown or required.
  5. Telecommunications outlets: Use double gang box with single gang plaster ring. Where double gang device plate is required use double gang plaster ring.
  6. Steel City, Appleton, Raco, Bowers or approved equivalent.
- C. Use surface type weatherproof boxes with appropriate gasketed cover for surface mounted wall outlets in areas with surface mounted conduit and exposed to moisture conduit. Red Dot, Raco, Appleton or approved equal.

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- D. Use surface type galvanized steel handy/utility boxes for surface mounted wall outlets in areas with exposed EMT conduit with not exposed to moisture. Steel City, Raco, Appleton or approved equal.

## 2.2 LARGE JUNCTION BOXES

- A. Furnish pull, tap and cable support boxes required by NEC for excessive number of 90 degree conduit bends, conductor taps and cable supports.
  - 1. Box construction per NEC and manufactured with galvanized sheet steel, 12 gage minimum, with angle iron frame where required for rigidity; welded or bolted construction. Install bolts to prevent damage to cables in box.
  - 2. Boxes with removable screw type covers and plated screws. Provide split covers where necessary for access. Maximum single piece cover - 36" x 36".
  - 3. Provide separate junction boxes for each feeder. If conduit is installed so separate junction boxes are not practical, one large pull-box may be used with each set of feeder conductors separated by 12 gage steel barriers. Furnish junction box or each compartment in junction box with ground lug for connection of ground wire.

## 2.3 CONDUIT BODIES

- A. Conduit bodies shall be installed to provide ease of pulling conductors and to provide neat appearance of conduit installation, and as shown on drawings. Conduit bodies constructed of malleable iron or copper free aluminum castings. Bodies shall be finished with standard durable exterior coatings of manufacturer specified. Provide rollers in type "C" and type "LB" bodies, 1-1/4" size and larger. Provide gasketed plated steel or malleable iron covers.
- B. Conduit bodies shall be manufactured by Crouse-Hinds, Pyle National, Killark, Appleton or approved equivalent.

## 2.5 SURFACE METAL RACEWAYS:

- A. Where indicated on the drawings, wiring shall be run in exposed surface metal raceways complete with outlet boxes and fittings. All circuits run in surface metal raceways shall have a ground conductor with green insulation sized per the NEC, but not smaller than No. 12 AWG screw connected to each outlet box. All wiring in surface metal race ways shall be type "THWN: conductors.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF OUTLET BOXES

- A. Fasten outlet boxes securely to structure.

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- B. Set all flush outlet boxes so edge of device flange is flush with finished surface.
- C. Open no more knockouts in outlet box than required. Any un-used openings in the box shall be plugged.
- D. Seal boxes during construction.
- E. Stagger back to back boxes 3" minimum. In rated walls use appropriate U.L. spacing.
- F. Coordinate and verify rough-in location and mounting height of all boxes with drawings and other trades prior to installation.
- G. Where code requires maximum spacing of receptacles the contractor is responsible for adjusting rough-in locations as required to ensure compliance.
- H. Support All Boxes:
  - 1. Outlet boxes - with 1/4" diameter galvanized rods or bolts anchored to structure.
  - 2. Outlet boxes for surface mounted luminaires on furred ceilings with 3/4" channel iron fastened to ceiling channels. See Section covering "Luminaires".
  - 3. Pull, junction and cable boxes with 3/8" diameter galvanized rods or bolts (4 minimum).
  - 4. Support outlet boxes in steel stud partitions with Caddy "BHA" bar hangers or approved equivalent.
- I. Install adjacent outlets at different levels in one vertical line where possible.
- J. Provide green covered bonding jumper, screw connected to outlet box in all receptacle boxes.
- K. Paint wiring connections in ground mounted outlets or floor outlets in wet locations with "Scotchkote" and fill box with "Duxseal".
- L. Mark outlet box covers with permanent ink markers to indicate circuit number(s) and panel of origination. Use black markers for normal service circuits and orange for emergency service.
- M. Use 4" octagonal boxes with blank covers for master outlets, installed to permit installation of collars by others.
- N. Where outlet boxes installed in unfinished concrete walls or columns, provide 1" deep plaster ring with box and ring set in position before the concrete is poured so concrete will fill around the ring and cover plate can be installed flush with the unfinished surface. In case of brick walls, follow same procedure with mason filling around the plaster ring

with mortar.

- O. Install all outlets located on columns on centerline of column and bend or shift reinforcing so that the outlet box will be flush with the finished concrete. Provide plaster rings as required so that the plate is flush with the finished plaster or exterior concrete surface.
- P. Where outlets installed in waterproofed columns or walls, provide 6"x6"x3" deep wood box placed in the forms before concrete is poured. Box will be removed before waterproofing is applied. General Contractor will waterproof wall and opening, after which Electrical Contractor will install outlet box. General Contractor will grout around box. Set boxes carefully so that cover plates will be flush.
- Q. Install conduit bodies where shown or where required for sharp bends and/or aesthetics in raceway system. Do not use in lieu of pullboxes except in limited space or as directed by Engineer.

### 3.2 INSTALLATION OF JUNCTION BOXES:

- I. All junction boxes shall be accessible.
- J. Securely fastened to structure.
- K. Exterior below grade boxes shall be embedded 6" of concrete on sides and bottom. Top shall be level with finished grade unless shown otherwise.
- L. There shall be no more knockouts opened in any box than are actually required.
- M. Protection during construction.
- N. Provide identification (See Section 26 00 10).

END OF SECTION 26 05 32

**SECTION 26 24 16 – PANELBOARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Furnish and install all lighting and power panelboards as shown on the drawings and described herein.

**1.2 SUBMITTALS:**

- A. Provide shop drawings including an individual diagram of each panelboard showing all specified requirements.

**PART 2 - PRODUCTS**

**2.1 GENERAL:**

- A. Panelboards shown on the drawings are based on Square D's published information relative to physical size and arrangement. The contractor shall verify that equipment to be furnished can be mounted in space provided and meet the requirements of the National Electric Code for clearances.
- B. Panelboards to be constructed in accordance with latest NEMA and UL standards.
- C. All panelboards to be of the same manufacturer as other distribution equipment.
- D. Panelboard assembly to be UL labeled, and UL labeled as service entrance equipment where used for that purpose.
- E. Panelboards to have integrated equipment fault rating equal to interrupting rating of lowest rated overcurrent device.
- F. Panelboards shall be factory assembled and breakers shall be arranged exactly as shown on the drawings.

**2.2 PANEL INTERIOR:**

- A. Bussing:
  - 1. 98% conductivity copper, silver-plated at joints or equivalent plated 55% conductivity aluminum.
  - 2. Bus assembly designed for a maximum temperature rise of 55 degree C above 40 degree C ambient temperature when carrying rated current.
  - 3. Minimum thickness of bus bars - 3/32".

4. Bussing braced to withstand a fault current equal to the highest device interrupting capacity in the panel.
5. Neutral bus full size copper or aluminum sized on same basis as phase busses and insulated from the cabinet.
6. Arrange bus bar connections so that adjacent vertical circuit protective devices are consecutively connected to phases A, B, and C throughout panel. Provide full capacity ground bus in each panel bolted to cabinet.

B. Cable terminations:

1. Include neutral and ground connections as shown.
2. Make with separate, individual heavy casting aluminum, AL/CU rated lugs, Thomas & Betts, IlSCO, Blackburn or approved equivalent.
3. Make with separate, individual heavy duty copper or bronze lugs Thomas & Betts "Lock-tite", solid copper barrel compression type, Thomas & Betts color keyed, Burndy "Hydent", or approved equivalent.
4. Use 2 bolt tongue or equivalent connection to bus for #1/0 or larger cables.
5. Securely bolt lugs to bus with bolts, nuts and lock washers.
6. Provide double lugs on main bus where shown.
7. Feed-through lugs (one set of lugs on each end of main vertical bus) is not acceptable unless approved by Engineer

C. Circuit breakers:

1. Molded case, thermal-magnetic, quick-make, quick-break, trip free on faults, thermal-inverse time delay element and magnetic instantaneous trip coil in each ungrounded phase conductor, or approved equivalent solid state trip unit.
2. Engrave breaker ampere rating on handle or trip unit.
3. Furnish multi-pole breakers with internal common trip.
4. Ground fault breakers class "A" type to trip on fault currents of 4-6 ma.
5. Main circuit breakers UL rated for service entrance use.

6. Switch "SWD" rated where required by NEC.
- D. Surge Protection Device / Transient Voltage Surge Suppression:
1. Panelboard shall be provided by UL 1449 listed and CSA 22.2 certified transient voltage surge suppressor where shown. The panelboard SPD/TVSS shall be tested and suitable for ANSI/IEEE C62.41 Cat. C1 (6kV, 3kA) environments.
  2. Suppressor shall be included and mounted within the panelboards by the manufacturer of the equipment. See panelboard schedule for panelboard with TVSS.
  3. The panelboard shall be constructed using a direct bus bar connection (no cable connection between bus bar and SPD/TVSS). Panelboards that use a wire connection do not meet the intent of this specification
  4. All monitoring diagnostics features such as indicator lights, trouble alarms and surge counter shall be visible from the front of the panelboard.
- E. Panelboards classified by type over-current protection as follows:
1. BQL Bolted quick-lag circuit breaker distribution, 0-100 ampere branches, with minimum interrupting rating of 10,000 symmetrical amperes at 208 volts. Equivalent to Square D type "NQOD", Siemens type "S1", General Electric type 'AQ' or Eaton/Cutler-Hammer type 'PRL2a'.
  2. CCB Heavy duty convertible circuit breaker distribution, 0-800 ampere branches with minimum interrupting rating of 42,000 symmetrical amperes at 208 volts. Equivalent to Square D type 'I-Line', Siemens type 'S5', General Electric 'Sectra series or Eaton/Cutler-Hammer type 'PRL4'.
- F. All space in panelboards usable. Panelboard space provided with necessary connections for future installation of overcurrent devices.

### 2.3 CABINETS:

- A. Code thickness, hot dip galvanized steel or painted with trim and door. Hardware: combination latch and cylinder lock, all keyed the same. Provide celluloid or plastic covered directory card holder on the inside of door. Trim, door and exposed interior shall be finished with factory prime and smooth finish coat of the color selected by Architect. Reinforce cabinets as necessary for service and short circuit rating intended.
- B. Flush or surface as indicated of sufficient size to allow minimum 3" gutter space each

side of panel and eight inches (8") at top and bottom, minimum 20" wide. Provide adjustable trim clamp, semi-flush hinges and inside rabbet.

- C. Provide panels with fully hinged front cover.

#### 2.4 MANUFACTURERS:

- A. Panelboards manufactured by Square D, Siemens, and General Electric, or Eaton/Cutler-Hammer.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION:

- A. Mount panelboards securely to building structure with 3/8" minimum diameter galvanized bolts and inserts number as required for size of panel, but not less than 4. Mount panelboards with top at 6'-0" above finished floor. For panels taller than 6'-0" mount panel as low as possible.
- B. Where two sets of feeder cables are required in panel gutter space, run one set in each side of panel.
- C. Close all unused openings.

#### 3.2 IDENTIFICATION:

- A. Provide and engraved laminated plastic nameplate showing name and voltage on each panelboard.
- B. Permanently attach nameplates and circuit numbers to panel using screws or an epoxy adhesive.
- C. Use horizontal consecutive circuit numbers for lighting and appliance panels as shown in panelboard schedules.
- D. Provide typewritten circuit directories describing service of each circuit in Types 'BQL' panels.
- E. Provide engraved laminated plastic nameplate circuit identification for each circuit in Types 'CCB' and 'FDP' panels.
- F. Provide Arc-Flash warning label that complies with NEC 110.16.



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END OF SECTION 26 24 16

**SECTION 26 28 16 – ENCLOSED SWITCHES & CIRCUIT BREAKERS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION OF WORK:**

- A. Furnish and install enclosed safety switches, disconnects and separately mounted enclosed circuit breakers as shown on the drawings and/or where required by code to serve as a means of disconnect for equipment.

**1.2 SUBMITTALS:**

- A. Provide manufacturer product data for each device to be furnished. Submittal data shall include device ratings, materials, construction and physical characteristics. Provide samples when requested by Architect.

**PART 2 - PRODUCTS**

**2.1 DISCONNECT SWITCHES:**

- A. Heavy duty rated 250 or 600 volts as required; quick-make, quick-break operation; horsepower rated. If switch is not available with proper horsepower rating, classify switch as isolating switch only and provide nameplate reading "DO NOT OPEN UNDER LOAD". Operating handle interlocked with switch door to prevent opening door with switch closed. Provide mechanical over-ride for authorized personnel to open switch door without operating switch handle.
- B. Fusible or non-fusible as shown. Furnish Busman "Fuse-Tron" fuses for each fusible position, size as shown. Furnish 3 spare fuses for each size.
- C. Furnish with provisions for locking with padlock. Enclosures for switches shall be NEMA 1 (general purpose indoor), NEMA 3R (rain tight outdoor), or special enclosure as indicated.
- D. Standard product of Siemens, Square "D", General Electric, or Eaton/Cutler Hammer.

**PART 3 - EXECUTION**

- A. Secure disconnect switches to building or equipment surface as shown. If location shown is not suitable for installing, provide Unistrut P-1000 rack mounted as directed to secure switch.
- B. Disconnects shall be located to be accessible and within 5 feet or closer to equipment served.
- C. Provide engraved nameplates identifying equipment served fuse or breaker size. Refer

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to Specification Section 26 05 10.

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SECTION 26 50 00 – LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

- A. Furnish and install all lighting luminaires, with all necessary accessories and lamps, as shown, specified, and/or scheduled.

1.2 RELATED SECTIONS:

- A. Refer Division 1 for allowances and Owner-furnished items to be installed under this Section.

1.3 ABBREVIATIONS:

- A. IC Rated            Lighting fixture rated for direct contact with insulation
- B. LED                Light Emitting Diode
- C. PF                  Power Factor
- D. RLO                Relative Light Output

1.4 SUBMITTALS:

- A. Refer to Section 260510 for submittal requirements.
- B. Shop drawing submittals for luminaires shall include the following for each Luminaire: complete construction details including all dimensions, complete Description of materials used, complete electrical data (including operating Voltage), photometric test report from an independent testing lab, complete description of finish, and manufacturer catalog cutsheet of lamp to be used.

PART 2 - PRODUCTS

2.1 LUMINAIRES:

- A. Furnish and install luminaires as shown in luminaire schedule, or otherwise indicated on the drawings. Manufacturer catalog numbers shown are for general descriptive purposes, and are only intended to establish the standard of quality.

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- B. Locations of luminaires shown on electrical drawings are diagrammatic. Verify location of luminaires with architectural drawings prior to installation. Conflicts between electrical and architectural drawings shall be referred to the Architect for resolution prior to installation.
- C. Provide luminaires complete with all options, accessories and other appurtenances required for a complete installation. Contractor shall coordinate fixture mounting with type ceiling and wall construction, and provide luminaires with all necessary installation hardware properly configured for the type construction.
- D. Pendant stem mounted luminaires shall be furnished with ball aligner swivel, 30 degrees from vertical minimum with swivel below canopy, with ½" diameter metal tube (stem)
- E. Luminaire support wires shall be zinc-coated, soft temper ASTM A641/A641M steel, 12 gage.
- F. Luminaires with aircraft cable suspension system shall use 1/16" diameter (minimum) stainless steel aircraft cable and adjustable cable gripper with swaged cable stop at ceiling canopy. Cable size shall be selected by luminaire manufacturer to provide adequate support.
- G. All luminaires shall be UL listed for the application.
- H. Metal luminaire housings shall be free of tool marks, dents, burrs and sharp edges. All metal parts shall be painted, galvanized, or otherwise corrosion-resistant.
- I. Reflector surfaces shall be finished specular, semi-specular, diffuse or painted as indicated. Specular finish materials shall have a minimum reflectance value of 83%. Semi-specular or diffuse finish shall have reflectance of 75% and white painted finish materials shall have reflectance of 88%.
- J. Plastic lenses and shielding shall meet NFPA and local building code requirements for light transmitting plastics.
- K. Exit signs shall be furnished with 6" high letters with ¾" stroke. Verify color of signage required by local code authorities. Signs shall meet all NFPA, UL and local building code requirements.

## 2.2 LED PRODUCTS

- A. LEDs shall be manufactured by Nichia. Other manufacturers will be considered if submitted for review at least 10 days prior to bid.

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B. Lumen Output:

1. Minimum initial delivered lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0 to 360 degree zone, as measured by IESNA Standard LM-79-08 in an accredited lab. Exact testing lumen output shall be clearly noted on the shop drawings.
  - a. Type XX – 8 ¼" x 4' – 3400 (30 watts max.) or 4800 (45 watts max.) nominal delivered lumens at 3500k per specification.
  - b. Type YY – 8 ¼" x 8' – 6800 (60 watts max.) or 9600 (90 watts max.) nominal delivered lumens at 3500k per specification.
  - c. Lumen output shall not decrease by no more than 20% over the minimum operational life of 50,000 hours at the rated ambient operating temperature.
2. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of all LEDs within the luminaire.
3. LED boards shall be suitable for field maintenance and have plug-in connectors. LED boards shall be upgradeable.
4. Light Color/Quality:
  - a. Correlated Color Temperature (CCT) range as specification, between 3000K, 3500K and 4000K shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2-D CIE chromaticity chart. (Edit color temperature per project specification)
  - b. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.
  - c. The Color Rendition Index (CRI) shall be 80 or greater.
  - d. LED boards to be tested for color consistency and shall be within a space of 2.5 MacAdam ellipses on the CIE chromaticity chart.

C. LED Power Supply and Drive

1. Driver: Acceptable manufacturer: eldoLED

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2. Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
3. Drive shall be UL Recognized under the component program and shall be modular for simple field replacement. Drivers that do not meet these requirements will not be accepted.
4. Electrical characteristics: 120 – 277 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
5. Dimming: Driver shall be suitable for full-range dimming. LED dimming shall be equal in range and quality to a commercial grade incandescent dimmer. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100 percent to 0.1 percent of rated lumen output with a smooth shut off function.
6. Dimming Quality to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, inaudible in 26db environment, and stable when input voltage conditions fluctuate over what is typically experienced in a commercial environment. Demonstration of this compliance to dimming performance will be necessary for substitutions or prior approval.
  - a. Dimming shall be controlled by a 0-10V signal.
  - b. Driver shall include ability to provide no light output when the analog control signal drops below 0.5V, or the DALI/DMS digital signal calls for light to be extinguished and shall consume 0.5 watts or less in this standby. Control deadband between .5 and .65V shall be included to allow for voltage variation of incoming signal without causing noticeable variation in luminaire to luminaire output.
  - c. Driver shall be capable of configuring a linear or logarithmic dimming curve, allowing fine grained resolution at low light levels.
  - d. Driver must be capable of 20 bit dimming resolution for white light LED driver
  - e. Driver shall track evenly across multiple luminaires at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range.

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7. Flicker: Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-0.1 percent luminaire shall have:
  - a. Less than 1 percent flicker index at frequencies below 120 Hz.
  - b. Less than 12 percent flicker index at 120 Hz, and shall not increase at greater than 0.1 percent per Hz to a maximum of 80 percent flicker index at 800Hz.
8. Driver disconnect shall be provided where required to comply with codes.
9. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements.
10. The surge protection which resides within the drive shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A, where failure does not mean a momentary loss of light during the transient event.

D. Electrical

1. Power Consumption: Maximum power consumption, +/- 5% when operating between 120 – 277V (or 346V) shall be as follows:
  - a. Type XX – 8 ¼" x 4' – 30 watts and 45 watts nominal
  - b. Type YY – 8 ¼" x 8' – 60 watts and 90 watts nominal
2. Operation Voltage – The luminaire shall operate from a 60 Hz  $\pm$  3 Hz AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage of (+/= 10%) shall have no visible effect on the luminous output.
3. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD.
5. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference and withstand up to a 1,000 volt



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surge without impairment of performance as defined by ANSI C62.41 Category A.

6. Inrush Current: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 A<sup>2</sup>s.
7. RF Interference: The luminaire and associated on-board circuitry must meet Class A emission limits referred to in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
8. Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance:
  - a. Adjustment of forward LED voltage, supporting 3V through 60V.
  - b. Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1mA.
  - c. Adjustment for operating hours to maintain constant lumens (within 5 percent ) over the 50,000 hour design life of the system, and deliver up to 20 percent energy savings early in the life cycle.
9. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without lowering the luminaire.
10. All electrical components shall be RoHS compliant.

E. Photometric Requirements

1. Luminaire performance shall be tested as described herein.
2. Luminaire performance shall be judged against the specified minimum illuminance in the specified pattern for a particular application.
3. Luminaire lighting performance shall be adjusted (depreciated) for the minimum life expectancy (Section 2.2.4).
  - a. The performance shall be adjusted (depreciated) by using the LED manufacturer's data or the data from the IESNA Standard TM-21 test report, whichever one results in a higher level of lumen depreciation.
  - b. The ratio of the peak-to-zenith maximum candela ratios shall be- 1.94:1 @ 127.5 degrees.

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- c. The luminaire may be determined to be compliant photometrically, if:
  - (1) The initial minimum illuminance level is achieved in 100% of the area of the specified lighting pattern.
  - (2) The measurements shall be calibrated to standard photopic calibrations.
  
- F. Thermal Management
  - 1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life (Section 2.2.7 (c)).
  - 2. The LED manufacturer's maximum junction temperature for the expected life (Section 2.2.7 (c)) shall not be exceeded at the average operating ambient (Section 2.2.2)
  - 3. The LED manufacturer's maximum junction temperature for the catastrophic failure shall not be exceeded at the maximum operating ambient temperature (Section 2.2.3).
  - 4. The luminaire shall have a UL or CSA rating.
  - 5. The Driver manufacturer's maximum case temperature shall not be exceeded at the maximum operating ambient temperature. Thermal management shall be passive by design. The use of fans or other mechanical cooling devices shall not be allowed.
  
- G. Optics
  - 1. Optics shall consist of high performance advanced optical film, diffuser, and metal reflector.
  - 2. Optics shall eliminate source image.
  
- H. Digital Controls
  - 1. Each luminaire shall be equipped with one (1) digital RJ45 port and interface with other digital control equipment.
  - 2. Connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6ma per driver at a low end of 0.3V. Limit the number of drivers on each 0-10V control output based on voltage drop and control capacity.
  - 3. Digital manual wall control shall integrate with the SSL luminaire via CAT5E cable and be self-commissioning.

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4. Digital occupancy sensor shall integrate with the SSL luminaire via CAT5E cable and be self-commissioning.
5. Digital photocell shall integrate with the SSL luminaire via CAT5E cable and be self-commissioning.
6. Integral Daylight Dimming or Daylighting Dimming with Occupancy Detection sensors shall be provided as per specification. Sensor shall be designed to be low profile to minimize appearance in luminaire.
7. Lumen Management: The luminaire shall be capable of continuously monitoring system performance to allow for constant lumen management/compensation function. Lumen output to be maintained at 80% for life of the luminaire, initial input to be 80% of rated input watts and climb to rated watts by end of rated life. Energy savings shall be 20% initially and 10% over the rated life of the luminaire.
8. Each luminaire shall be supplied with a unique network address. This address shall be printed on two identification labels. One label shall be permanently affixed to the luminaire and one label shall be easily removed for network control commissioning purposes. Both labels shall be in a location which is easily accessible by the installing contractor.
9. Control Input:
  - a. 4-Wire (0-10V DC Voltage Controlled) dimming Drivers:
    - (1) Must meet IEC 60929 Annex E for General White Lighting LED drivers
    - (2) Must meet ESTA E1.3 for RGBW LED drivers.
  - b. Digital (DALI Low Voltage Controlled) Dimming Drivers:
    - (1) Must meet IEC 62386
- I. Luminaire Identification
  1. Each luminaire shall have the manufacturer's name, trademark, model number, serial number, date of manufacture (month-year), and lot number as identification permanently marked inside each unit and the outside of each packaging box.
  2. The following operating characteristics shall be permanently marked inside each unit: rated voltage and rated power in Watts and Volt-Ampere.
- J. Quality Assurance

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1. The luminaires shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) design quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification. These tests shall include: CCT, CRI, lumen output, and wattage. Test shall be recorded, analyzed and maintained for future reference.
2. QA process and test results documentation shall be kept on file for a minimum period of seven years.
3. LED luminaire designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

K. Design Qualification Testing

1. Design Qualification Testing shall be performed by a National Voluntary Laboratory Accreditation Program (NVLAP) testing facility. Such testing may be performed by the manufacturer or an independent testing lab hired by the manufacturer on new luminaire designs and when a major design change has been implemented on an existing design. A major design change is defined as a design change (electrical or physical), which changes any of the performance characteristic of the luminaire, results in a different circuit configuration for the power supply, or changes the layout of the individual LEDs in the module.
2. A quantity of two units for each design shall be submitted for Design Qualification Testing.
3. Product submittals shall be accompanied by product specification sheets or other documentation that includes the designed parameters as detailed in this specification. These parameters include (but are not limited to):
  - a. Maximum power in Watts.
  - b. L80 in hours, when extrapolated for the worse case operating temperature (section 2.2.3). TM21 report shall be submitted to demonstrate this.
4. Luminaire shall be tested per IESNA LM 79-08.

L. WARRANTY

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1. The manufacturer shall provide a single source, 5 year limited warranty against loss of performance and defects in materials and workmanship for all components of the luminaire. Warranty is from the time of acceptance of the luminaires. All warranty documentation shall be provided to customer prior to the first shipment.
2. Provide manufacturer's warranty covering 5 years on drivers from date of purchase. Refer to manufacturer's terms and conditions on the website for detailed information.

2.3 EMERGENCY LIGHTING:

- A. Provide luminaires and exit signs with self-contained battery power supplies as indicated. All equipment shall conform to UL924-Emergency Lighting and Power Equipment.
- B. Battery shall be sealed, maintenance-free lead-acid type (indoors) or nickel-cadmium (outdoors or unconditioned spaces) with 10-year nominal life. Unit shall incorporate a fully-automatic solid state charger and automatic transformer relay to transformer to backup battery power supply upon failure of normal power.
- C. All emergency lighting equipment shall be equipped with means to test operation and an LED indicating battery status.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Support luminaires from structure of the building, independent from the ceiling membrane or finish material. Luminaire shall be set level, plumb, and square with ceilings and walls.
- B. Recessed lay-in luminaires in suspended grid ceilings shall be supported from the ceiling grid. Provide devices for securing the luminaire to the ceiling grid to comply with the National Electrical Code ("earthquake clips"). Luminaires heavier than 30 pounds shall have supplemental support wires anchored to the structure above the ceiling. Provide independent support wires, anchored to a structure above and attached to fixture at each corner.
- C. Recessed luminaires in fire-rated ceiling assemblies shall be installed in accordance with the UL listing of the assembly.

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- D. Recessed luminaires (non lay-in or hard ceiling types) shall be supported by ¾" steel ceiling channel, or factory-supplied hanger bars one on each side of the luminaire, anchored to ceiling structure. Recessed luminaires heavier than 20 pounds shall have supplemental support anchored to the structure above the ceiling. Do not use conduit to support luminaire.
- E. Provide recessed luminaires with appropriate frames, hardware and trim for the ceiling installed.
- F. Install luminaires free and clear of structural and mechanical interferences above the ceiling. If location indicated on the drawing conflicts with other elements, notify the Architect for directions for remedial action.
- G. Attach surface and pendant mounted luminaires to 3/16" fixture stud in outlet box. Luminaires in excess of 20 pounds shall have supplemental support anchored to the structure above the ceiling.
- H. Luminaires surface mounted to grid-type ceilings shall be mounted with Caddy IDS type clips anchored to structure above.
- I. Wall mounted luminaires shall be anchored to wall structure. Luminaire shall fully conceal the outlet box.
- J. Wiring to luminaires shall be with flexible metallic conduit to junction box. Do not wire luminaire to luminaire unless noted otherwise, or if using manufactured wiring systems.
- K. Individual flexible connections, less than 6 feet in length, shall consist of 2#14 and 1#14 (ground) in 3/8" flexible metallic conduit (for circuits 20A or less). Bond ground wire and conduit at each end.
- L. Recessed luminaires in insulated ceilings shall be installed so that insulation is no less than 3 inches away from the fixture enclosure unless the luminaire is listed for direct contact with insulation (IC rated).
- M. Provide equipment, labor and materials, as needed for final aiming of adjustable luminaires. Aiming shall take place immediately before final occupancy by the Owner.
- N. Exterior pole-mounted luminaire with anchor base type poles shall be installed on a reinforced concrete foundation designed to withstand fixture weight and prevailing wind conditions. Conduit raceway shall be pre-set in the foundation and terminate inside the pole.
- O. Provide a copper-clad steel grounding rod, installed and bonded at each lighting pole.

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- P. Exterior pole-mounted luminaires with direct-embedment type poles shall be installed in carefully compacted earth per pole manufacturer's recommendations.
- Q. All poles shall be installed so that the pole is plumb to the earth, with the bottom of the base flush to the foundation, paving, or finished grade, unless indicated otherwise. Verify soil conditions at each pole location to ensure adequacy of soil to support pole. Advise Architect if soil conditions are not adequate.
- R. All pole-mounted luminaires shall have in-line fuse installed at the hand hole of the pole with weatherproof fuse holder. Provide sufficient slack in conductors to allow servicing outside of pole.
- S. Reflectors, trim cones, and other visible trim of luminaires shall not be installed until completion of ceiling work, and shall be clean and free of dust, fingerprints, scratches, dents etc. upon substantial completion.

END OF SECTION 26 50 00

**SECTION 28 31 11 - ALTERATIONS AND ADDITIONS TO EXISTING FIRE ALARM SYSTEM**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS:**

- A. Drawings and General Provisions of Contract including General and Supplementary Conditions and other Division 1 Specifications apply.

**1.2 RELATED SPECIFICATION SECTIONS:**

Division 23.....	HVAC
Section 26 05 31.....	Raceways
Section 26 05 32.....	Outlet Boxes
Section 26 24 16.....	Panelboards

**1.3 DESCRIPTION OF WORK:**

- A. This section covers the furnishing, installation and testing of complete Alterations and Additions to exiting Fire Alarm System which includes actuation devices, notification appliances, and actuation devices which cause other Code or operations functions to occur, such as air handling unit shut down and fire door/shutter operations.
- B. This section requires all conduit and wiring to support complete Fire Alarm System. Drawings do not show conduit and wiring requirements. This information is to be supplied to Contractor by Fire Alarm Supplier, both prior to bids for inclusion in pricing and specifically in Shop Drawing.
- C. Contractor is required to review all Contract Documents for connections of other systems to Fire Alarm for Code required operations. Items such as held-open fire/smoke doors, smoke/fire dampers, elevator recall, hood suppression system, smoke evacuation fans, etc. are a part of the fire alarm system.
- D. Fire alarm system shall comply with requirements of NFPA Standard 72 for Protected Premises signaling systems and NFPA 101 Life Safe TV.
- E. Installing company must be licensed as certified employing NICET (minimum Level II Fire Alarm Technology) technicians guiding final checkout and ensure systems integrity on site.
- F. Speaker circuits controlled by NAC outputs built into amplifiers, which function as addressable points the Digital Audio Loop. Circuits and control equipment arranged such that loss of any one (1) speaker circuit will not cause the loss of other speaker circuits.
- G. NAC speaker circuits shall be arranged such that there is a minimum of one speaker



circuit per floor of the building or smoke zone which is ever is greater.

- H. Circuits shall be electrically supervised for open and short circuit conditions. A short circuit on a speaker circuit shall render that circuit inactive.
- I. Audio amplifiers and tone generating equipment shall be electrically supervised. Digital amplifiers shall provide built-in speaker circuits, field configurable as four Class B (Style Y), or two Class A (Style Z) circuits.
- J. Installing company shall furnish proof of compliance with State Requirements for having a Certified Fire Alarm Contractor License.
- K. Installing company shall employ NICET (minimum Level II Fire Alarm Technology) technicians on site to wire all devices and final checkout and to ensure the systems integrity. A NICET LEVEL III PERSON SHALL PREPARE THE INSTALLATION DOCUMENTS.

#### 1.4 SYSTEM OPERATION:

- A. System non-coded, general alarm.
- B. Electrically supervise system against both short and open wiring faults in detection circuits, alarm circuits, and internal control panel faults. Short or open wiring faults occurring in circuits will cause audible and visual trouble indication at control panel.
- C. System functions as follows when an actuation device is initiated:
  - 1. Audible alarm devices will sound continuously. Visual alarm devices will flash.
  - 2. Proper zone and fire indications will appear on main control panel and remote annunciators.
  - 3. Circuits to energize or de-energize equipment power control circuits will be actuated as indicated. Shut down HVAC Equipment.
  - 4. Circuits to electrically held smoke and fire doors will release doors.
  - 5. Digital communicator will notify the monitoring service if connected.
  - 6. Closing of sprinkler valve will cause audible and visual signal at Annunciator(s) Supervised Location, but will not initiate Fire Alarm.
  - 7. Actuation of sprinkler flow valve will initiate system.

#### 1.5 MANUFACTURER'S REQUIREMENTS:

- A. System shall be supplied, installation supervised and tested by an Authorized Factory

Dealer located within seventy (70) miles of project site. Submit evidence of same with Shop Drawings.

- B. Submit complete Shop Drawings of system for review including terminal-to-terminal connection diagram, conduit diagrams, technical information on each item of equipment, and any other information required to describe system. Identify color code and terminal numbers on Shop Drawings.
- C. Manufacturer's trained Technical Representative shall supervise installation, connections, and test. Before acceptance, Manufacturer's Representative will certify in writing system is installed and functioning properly as intended by Drawings, Specifications, and Code. Test include operation of all devices.
- D. Guarantee system in writing for one (1) year from date of acceptance. Guarantee covers parts and labor.

1.6 CODES:

- A. The Fire Alarm Systems shall comply with requirements of NFPA Standard No. 72 and NFPA 70, Article 760 for protected premises signaling systems, except as modified and supplemented by this Specification. The system shall be supervised either electrically, or by software-directed polling of field devices.
- B. The system shall also be listed by Underwriter's Laboratories under the category Control Unit System (UOJZ) and Control Unit Accessories (UOXX).
- C. The Fire Alarm System shall be manufactured by an ISO 9001 certified company and meet the requirements of BS EN9001 and ANSI/ASQC Q9001-1994.
- D. System shall comply with all local Codes. Modification of design to meet same is required and no additional compensation will be allowed for compliance. See execution section for devices to assist in this.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Entire system shall be the product of the existing fire alarm system for the respective building no exception.

2.2 SYSTEMS:

- A. System shall consist of modifications and additions to main control panel complete with increased batteries and charger to support system operation and all required components required by system expansion and factory installed surge suppression on

power input.

B. System Components:

1. Existing System Control Panel:

- a Communication module for remote monitoring and built-in surge suppressor on power feed.

2. Main Control Panels:

- a Mount all new devices in existing enclosure to prewired existing panel to terminal strips or to additions in new metal enclosure with prewired terminal strips..

- b Construct cabinets of 14 gage steel with baked paint finish.

- c Identify all devices, relays, circuit cards, etc., as to function with permanent identification.

- d Furnish function modules as follows:

- (1) [Zone Modules: Class "B" power limited; 24-volt DC, for N.O. initiating devices; two (2) initiating circuits per module; (to power detectors from initiating circuit): annunciated alarm and trouble indication; lamp (LED) test; SPDT alarm operated contact; SPDT trouble operated contact. Furnish modules for total zones (zones as shown on drawings) plus seven (7) spare zones.

- (2) System Trouble Module: Parallel 24 volts DC; open and short supervision; visual trouble indication. Furnish signal modules as required to power all signal devices shown. Provide trouble audible silence switch with trouble resound.

- (3) March Time Module: 120 beats per minute to flash visual alarm devices.

- (4) [ Upgrade Signal Circuit Module: Class B operation, to power electrically new and existing supervised signals, 24 volts, provide alarm silence switch with trouble resound, provide separate circuitry for horns and lights. ]

- (5) Rooftop unit shutdown with auxiliary contact in detector.

- (6) Battery Charger / Transfer Module: Dual rate charger,

automatic trickle charge, manual high rate charge; D.C. voltmeter and ammeter; low battery alarm, "on-battery" "indication" automatic transfer switch to supply fire alarm system from battery on failure of incoming 120-volt AC power.

- (7) Batteries: Sealed, rechargeable, gelled electrolyte, 30 ampere hours based on 20-hour discharge rate, "Gel-cell" or equal. Mount in control panel cabinet.

3. Initiation Modules:

- a Manual pull station, addressable, double action, break glass; Simplex, Protective Shield with surface mount adapter.
- b Heat detectors, addressable rate of rise for normal temperature application 135° fixed with 15° rate of rise.
- c Smoke detector, photo-electric addressable. Use detector suitable for area where applied outdoors.
- d Duct detectors, photo-electric, with sampling tubes, housing, and remote status/test station with addressable relay for air handling unit shut down.
  - (1) Appropriate length sampling tubes.
  - (2) For air conditioning units 2000 CFM and larger or where shown.
  - (3) Monitor module, addressable, to monitor devices internal to Fire Alarm such as hood fire suppression panel, fire pump operation, generator running, etc.
  - (4) Control module, addressable, to operate (turn ON or OFF) external devices such as trip elevator breaker, etc.
- e Sprinkler Flow Switch:
  - (1) Connection only to switch installed by others.
- f Where Manufacturer model numbers are not mentioned, use standard published device (modified as required by Specification) of Notifier complying with Specifications of item described.

2.3 ALARM INDICATING DEVICES:

A. Strobe Alarm Lights:

1. White lens mounted in faceplate (to meet ADA requirements), rated 24 VDC; 15 candela minimum lamps; electrically supervised, identified with lettering "FIRE" on unit.
  2. Speaker Strobe appliance shall be System Sensor SpectrAlert Advance Speaker Strobe listed UL 1971 and UL 1480 approved for fire protective signaling systems. Shall have dual-voltage transformer speaker strobe capable of operation at 25.0 or 70.7 nominal Vrms with frequency range of 400 to 4,000 Hz and operating temperature between 32°F and 120°F mounted to a 4 x 4 x 2 1/8-inch back box.
  3. Universal mounting plate shall be used for speaker strobe products. Wiring shall terminate at universal mounting plate. SpectrAlert Advance speaker strobes and Sync•Circuit™ Module MDL3 accessory, shall be powered from a non-coded notification appliance circuit output and shall operate on a nominal 12 or 24 volts (includes fire alarm panels with built in sync). When used with Sync•Circuit Module MDL3, 12-volt rated notification appliance circuit outputs shall operate between 8.5 and 17.5 volts; 24-volt rated notification appliance circuit outputs shall operate between 16.5 to 33 volts.
  4. Shall be plug-in with shorting spring wiring continuity check. Providing tamper resistance via an open circuit if the device is removed.
  5. Shall have power taps (from ¼ watt to 2 watts) and voltage selected by rotary switches. Models shall have a maximum sound output of 86 dB at 10 feet and incorporate open back construction. Strobe shall consist of a xenon flash tube with lens/reflector system and operate on either 12V or 24V. Strobe shall also feature selectable candela output, providing options for 15 or 15/75 candela when operating on 12V and 15, 15/75, 30, 75, 110, or 115 when operating on 24V.
  6. All notification appliances shall be backward compatible
- B. Where Manufacturer's model is not indicated for alarm devices, use system Manufacturer's standard published device which complies with Specification.

2.4 MISCELLANEOUS DEVICES:

- A. Sprinkler Valve Supervisory Switch/Valve Supervisory Switches:
1. Shall be provided and wired by the Electrical Contractor under this section. Valve switches shall be suitable for the application O, S & Y, or PTV Type and shall mount to the valve.
- B. Electric Door Releases:

1. 24-volt DC connection only to door hardware furnished by others.
- C. Electric Door Holders:
1. 24-volt DC door and wall device.
- D. Knox Box: 4400 with wiring for monitoring circuit.

### PART 3 - EXECUTION

#### 3.1 COMPLETE SYSTEM REQUIREMENTS:

- A. Review entire control documents for items requiring connection to or operation by the fire alarm system to meet and comply with all local and national codes. This includes Architectural, HVAC, Plumbing, and Fire Protection.

#### 3.2 SUBMITTALS:

- A. After review of documents prepare shop drawings as described. Including items not shown on drawings.
- B. Submit shop drawings to local building authorities for their review and approval. Incorporate review comments prior to submission to engineer for review.
- C. Submit Shop Drawings consisting of, but not necessarily limited to, the following:
1. 1/8-inch scale floor plans showing all devices; the required type and number of conductors with conduit size.
  2. Plans shall specifically cover:
    - a. Initiation of system by manual pull stations and automatic functions such as smoke detectors, heat detectors, flame detectors.
    - b. Initiation of systems by sprinkler system flow valves and trouble signal by sprinkler system supervisory switch.
    - c. Release of smoke doors hold-open.
    - d. Unlocking of electrically controlled exit and internal egress doors.
    - e. Each visual device shall be furnished with candela requirements for application with candela power shown by device.
    - f. Each audible device shall be furnished with Db rating required for

application with Db rating shown by device.

3. Where review of all contract documents and/or local Codes require devices not shown, use devices listed in Attic Stock to supplement drawings. If Attic Stock is exceeded, notify Architect in Shop Drawing submittal.
4. Elevation of "Fire Alarm Control Panel" (central control station), and each transponder with location of each component and Manufacturer's descriptive cutsheet of that component. Provide wiring diagrams of control panel.
5. Power / Battery Calculations.
6. Submit shop drawing to local Code Official for review and approval prior to submission to Engineer for review.
7. Shop drawings shall bear approval of authority or some other verification method to sustain review.
8. Shop drawing shall also bear stamp of review by Electrical Contractor.
9. Manufacturer's descriptive cutsheet of each initiation device, audible or visual signal and outlet box requirements for mounting. Provide symbol on cutsheet matching that shown on drawing for that device.

### 3.3 GENERAL REQUIREMENTS:

- A. Furnish and install conduit, outlet boxes, back boxes, junction boxes, terminal cabinets, accessories, wiring connections, etc., required for a complete system as intended by these Specifications, and in accordance with the Manufacturer's recommendation for the equipment supplied.
- B. The conduit and wiring requirements shall be furnished by the Manufacturer's Representative, and he shall, prior to bidding. Inform all Contractors of requirements which shall be included in the bid for this system.
- C. All Fire Alarm wiring shall be put in 2-hour fire rated plenum type cable above accessible ceilings and in exposed ceiling areas. Where ceilings are not accessible, run wiring in conduit. Wall mounted devices shall be installed on outlet box with wiring in conduit, concealed in wall, and stubbed into ceiling.
- D. All Fire Alarm wiring to be installed in conduit. Conduit and wiring shall be installed and connected by NICET II Technician. This requirement for UAB Project.
- E. All Fire Alarm conductors shall be #14 AWG minimum with type "XHHW", "THWN", or "THHN" insulation. Conductors shall be color coded in an approved manner. Each

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conductor shall be identified with T&B "E-Z" code markers at each device connection, each splice location, each junction box and terminal cabinet, and in the main control panel and remote annunciator.

- F. Multiplex system wiring for Communication channels (2):
  - 1. Two (2) 2/C #18 twisted shield cable; Belden #8760, or as recommended by Manufacturer.
- G. Provide Fire Alarm System junction boxes ("FJ") as indicated. Junction boxes shall have painted red enamel covers with "FA" on small covers "FIRE ALARM" on large covers in 1-inch high white letters. Splices in junction boxes made on identified terminal strips.
- H. Provide terminal cabinets ("FT") where indicated, size as required, complete with identified terminal strips, quantity as required for number of wires entering cabinet. The cabinets shall be flush or surface mounted as indicated with full height piano hinged door with cylinder lock, keyed same as control panel. Finish shall be white enamel inside with red enamel outside. Install engraved plastic nameplate on cabinet door to identify cabinet as indicated in 1/4 inch high red letters on white background. Attach nameplate with two (2) small screws.

END OF SECTION 28 31 11



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# **APPENDIX C**

## **JEFFERSON COUNTY ENVIRONMENTAL SERVICES DEPARTMENT MBE/DBE FORMS**

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**JEFFERSON COUNTY, ALABAMA  
ENVIRONMENTAL SERVICES DEPARTMENT**

**POTENTIAL SUBCONTRACTORS LIST  
(TO BE SUBMITTED WITH BID DOCUMENTS)**

**MBE/DBE DOCUMENTATION**

GENERAL CONTRACTOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

NAME OF PROJECT: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_

<b>List Each MBE/DBE Firm Submitting Proposals</b>	<b>Scope of Work</b>	<b>Proposal Amount (\$)</b>

**Instructions:**

1. Complete this form regarding the MBE/DBE Firms submitting proposals on the specified project.
2. Submit completed form WITH BID DOCUMENTS.
3. Submission of Form "A" is a prerequisite to awarding the Contract.

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**JEFFERSON COUNTY, ALABAMA  
ENVIRONMENTAL SERVICES DEPARTMENT**

**SUBCONTRACTORS TO BE UTILIZED  
(TO BE SUBMITTED PRIOR TO CONTRACT AWARD)**

**MBE/DBE DOCUMENTATION**

GENERAL CONTRACTOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

NAME OF PROJECT: \_\_\_\_\_

TOTAL CONTRACT AMOUNT \$ \_\_\_\_\_

TOTAL AMOUNT OF ALL SUBCONTRACTORS \$ \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_

<b>List Each MBE/DBE Subcontractor to be Utilized</b>	<b>Scope of Work</b>	<b>Contract Amount (\$)</b>
	<b>TOTAL</b>	

**Instructions:**

1. Complete this form regarding the MBE/DBE participation to be utilized on the specified project.
2. Submit completed form prior to contract award.
3. Submission of Form "B" is a prerequisite to awarding the Contract.

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**JEFFERSON COUNTY, ALABAMA  
ENVIRONMENTAL SERVICES DEPARTMENT**

**MONTHLY REPORT FORM  
(TO BE SUBMITTED WITH EACH MONTHLY PAYMENT REQUEST)**

**MBE/DBE DOCUMENTATION**

GENERAL CONTRACTOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

NAME OF PROJECT: \_\_\_\_\_

TOTAL CONTRACT AMOUNT \$ \_\_\_\_\_

SUBMITTED WITH PAYMENT REQUEST NUMBER \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_

List Each MBE/DBE Subcontractor Utilized	Original Subcontract Amount (\$)	BILLINGS		
		Previous (\$)	This Period (\$)	Total (\$)
<b>Totals</b>				

**Instructions:**

1. Complete this form regarding the MBE/DBE participation utilized on the specified project.
2. Submit completed form with each monthly payment request to Environmental Services Department.
3. Submission of this form is a prerequisite for processing the monthly payment request.



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**JEFFERSON COUNTY, ALABAMA  
ENVIRONMENTAL SERVICES DEPARTMENT**

**PROJECT CLOSE-OUT REPORT**

**MBE/DBE DOCUMENTATION**

GENERAL CONTRACTOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

NAME OF PROJECT: \_\_\_\_\_

TOTAL CONTRACT AMOUNT \$ \_\_\_\_\_  
(BID AMOUNT)

FINAL CONTRACT AMOUNT \$ \_\_\_\_\_  
(FINAL AMOUNT INCLUDING CHANGE ORDERS)

DATE SUBMITTED: \_\_\_\_\_

<b>List Each MBE/DBE Subcontractor Utilized</b>	<b>Original Subcontract Amount (\$)</b>	<b>Final Subcontract Amount (\$)</b>	<b>Changes in Original and Final Subcontract Amounts (\$)</b>
<b>Totals</b>			

**Instructions:**

1. Complete this form regarding the MBE/DBE participation utilized upon completion of the specified project.
2. Submit completed form to Environmental Services Department with request for release of retainage.

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**ENVIRONMENTAL SERVICES DEPARTMENT (ESD)  
MBE/DBE BID SOLICITATION NOTICE**

**FORM "E"**

ESD PROJECT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_  
BID DATE: \_\_\_\_\_

To: Birmingham Construction Industry Authority (BCIA)  
3600 4<sup>th</sup> Avenue South  
Birmingham, Alabama 35222  
BCIA Fax: 205/324-6210  
ESD Fax: 205/325-5981

We hereby request assistance from the BCIA in securing proposals from MBE/DBE Subcontractors/ Suppliers per the below listing of construction specialties. In order to be considered, proposals must be received in the Office of the General Contractor on or before the below listed date and time.

Please contact the following for additional information and assistance:

General Contractor/Contact: \_\_\_\_\_  
Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

**DEADLINE FOR RECEIPT OF PROPOSALS FROM MBE/DBE'S**

Date: \_\_\_\_\_ Time: \_\_\_\_\_

\_\_\_\_\_  
General Contractor Signature and Date

<b>FOR BCIA USE ONLY</b>
Date Received: _____
By: _____

Check all categories that apply to the referenced project:

- |   |   |
|---|---|
| <input type="checkbox"/> Demolition                       | <input type="checkbox"/> Wood Cabinets              |
| <input type="checkbox"/> Dewatering                       | <input type="checkbox"/> Asphalt Shingle Roofing    |
| <input type="checkbox"/> Geotechnical Work                | <input type="checkbox"/> Built-up Roofing           |
| <input type="checkbox"/> Material Testing                 | <input type="checkbox"/> Metal Roofing              |
| <input type="checkbox"/> Site Clearing and Grubbing       | <input type="checkbox"/> Gutters and Downspouts     |
| <input type="checkbox"/> Grading/Earthwork                | <input type="checkbox"/> Waterproofing/Dampproofing |
| <input type="checkbox"/> Erosion Control/Silt Fence       | <input type="checkbox"/> Insulation                 |
| <input type="checkbox"/> Fencing                          | <input type="checkbox"/> Glass & Glazing            |
| <input type="checkbox"/> Grassing                         | <input type="checkbox"/> Gypsum Wall Board System   |
| <input type="checkbox"/> Landscaping/Planting             | <input type="checkbox"/> Ceramic/Quarry Tile        |
| <input type="checkbox"/> Asphalt Paving                   | <input type="checkbox"/> Resilient Flooring         |
| <input type="checkbox"/> Pavement Striping/Marking        | <input type="checkbox"/> Acoustical Ceilings        |
| <input type="checkbox"/> T.V. Inspection                  | <input type="checkbox"/> Carpet                     |
| <input type="checkbox"/> Prep Manholes for Rehabilitation | <input type="checkbox"/> Wall Coverings             |
| <input type="checkbox"/> Pipe Point Repairs               | <input type="checkbox"/> Painting                   |
| <input type="checkbox"/> Hauling/Trucking                 | <input type="checkbox"/> HVAC                       |
| <input type="checkbox"/> Concrete Curb & Gutter           | <input type="checkbox"/> Plumbing                   |
| <input type="checkbox"/> Concrete Sidewalks               | <input type="checkbox"/> Electrical                 |
| <input type="checkbox"/> Pour & Finish Concrete Flat Work | <input type="checkbox"/> Underground Duct Banks     |
| <input type="checkbox"/> Concrete Formwork                | <input type="checkbox"/> Material Supply            |
| <input type="checkbox"/> Install Reinforcing Steel        | <input type="checkbox"/> _____                      |
| <input type="checkbox"/> Point, Patch & Rub Concrete      | <input type="checkbox"/> _____                      |
| <input type="checkbox"/> Cementitious Coatings            |   |
| <input type="checkbox"/> Masonry Work                     |   |

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# **APPENDIX D**

## **State of Alabama Resident Status Form**

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**JEFFERSON COUNTY, ALABAMA  
ENVIRONMENTAL SERVICES DEPARTMENT**

**STATE OF ALABAMA RESIDENT STATUS FORM**

\_\_\_\_\_ is a Resident Contractor in the State of Alabama as defined  
Individual or Firm Name of Bidder in Section 39-2-12, Code of Alabama (1975) as amended.

\_\_\_\_\_ is a Non-Resident Contractor in the State of Alabama.  
Individual or Firm Name of Bidder

THE ATTENTION OF BIDDERS IS CALLED TO THE PROVISIONS OF ALABAMA CODE SECTION 39-3-5 (1975) AS AMENDED, REGARDING PREFERENCE TO RESIDENT CONTRACTORS.

**Instructions:**

- 1. Submit this form regarding State of Alabama Resident Status WITH BID DOCUMENTS**
- 2. Submission of this form is a prerequisite to awarding the Contract.**



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# **APPENDIX E**

## **Jefferson County, Alabama**

### **Equal Employment Opportunity Certification Form**

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**ADMINISTRATIVE ORDER**  
**OF THE**  
**JEFFERSON COUNTY COMMISSION**  
**08- 4**

PURSUANT to the authority vested in the Jefferson County Commission by law, the following Administrative Order is hereby issued:

**PURPOSE**

To give notice to potential contractors that Jefferson County is an equal opportunity employer in accordance with Title VII, Civil Rights Act of 1964, 42 U.S.C. §§ 1981, 1983, 1986 and amendments, and it is the policy of Jefferson County to require contractors, vendors and suppliers (hereinafter "Contractor") providing goods and services to the County to afford equal opportunity for employment to all individuals regardless of race, color, sex, age, religion, national origin, disability or veteran status.

**I. PROCEDURE**

The clause set forth below which requires Contractor compliance with federal law shall be incorporated in each bid or offer to do business with the County and in all contracts and subcontracts with the County as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, disability or veteran status pursuant to the provisions of Title VII of the Civil Rights Act of 1964, 42 U.S.C. §§ 1981, 1983, 1986 and all amendments thereto relative to discriminatory employment practices. The Contractor will ensure that qualified applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, national origin, age, disability or veteran status. Such action shall include, but not be

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limited to the following: employment, promotion, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

2. In the event of the Contractor's non-compliance with the equal employment opportunity clause of this contract, this contract may not be awarded or may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further County contracts.

3. The Contractor will include the provisions of paragraph (1) in every subcontract or purchase order.

4. The Contractor shall certify to the County its compliance with this policy prior to receipt of any contract or business with the County. (Form attached.)

II. **EFFECTIVE DATE**

This Administrative Order shall be effective upon adoption.

ORDERED at the Jefferson County Courthouse this 17 day of June,

2008.

*Bettye Fine Collins*

BETTYE FINE COLLINS, President  
Jefferson County Commission

APPROVED BY THE  
JEFFERSON COUNTY COMMISSION  
DATE: 6-17-08  
MINUTE BOOK: 156  
PAGE(S): 128-129

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**JEFFERSON COUNTY, ALABAMA**  
**EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION FORM**

Contractor/Vendor Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The Contractor acknowledges receipt of Jefferson County's Equal Employment Opportunity Contractor Compliance Administrative Order (attached hereto) and certifies that it is an equal opportunity employer and agrees to the requirements of the Policy and the Equal Employment Opportunity Clause therein. It further certifies that it will require all subcontractors to execute an Equal Employment Opportunity statement and certification of compliance.

The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, disability or veteran status. The Contractor will ensure that qualified applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, national origin, age, disability or veteran status. Such action shall include, but not be limited to the following: employment, promotion, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.

The Contractor will furnish to the County, upon request, reports, notices, policies and/or information certifying compliance with this policy.

In the event of the Contractor's non-compliance with the equal employment opportunity clause of this contract, this contract may not be awarded or may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further County contracts.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title



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