

**STANDING ROCK SIOUX TRIBE**  
**STANDING ROCK RURAL WATER SYSTEM**



**CONTRACT DOCUMENTS  
FOR CONSTRUCTION OF**

**MR&I OFFICE REMODEL  
CONTRACT 2-6**

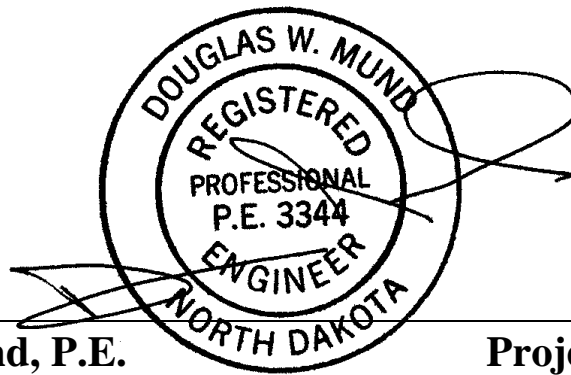
**DECEMBER 2024**

**Bartlett & West**

(888) 200-6464 ■ [www.bartlettwest.com](http://www.bartlettwest.com)

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**STANDING ROCK RURAL WATER SYSTEM**  
**MR&I OFFICE REMODEL**  
**CONTRACT 2-6**  
**DECEMBER 2024**



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**Douglas W. Mund, P.E.**

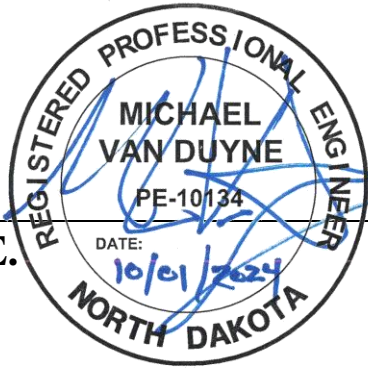
**Project Manager**



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**Joseph P. Larrivee, R.A.**

**Project Architect**



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Michael S. Van Duyne, P.E.

MEP Engineer



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<u>TITLE</u>	<u>COLOR</u>
ADVERTISEMENT FOR CONSTRUCTION BIDS	WHITE
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BID	WHITE
BID BOND	WHITE
AGREEMENT	WHITE
STANDARD EJCDC CONDITIONS	GOLDENROD
SUPPLEMENTARY CONDITIONS	GOLDENROD
BOR SUPPLMENTARY PROVISIONS	GOLDENROD
PAYMENT BOND	WHITE
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NOTICE OF AWARD	WHITE
NOTICE TO PROCEED	WHITE
PARTIAL PAYMENT ESTIMATE	WHITE
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**STANDING ROCK RURAL WATER SYSTEM  
MR&I OFFICE REMODEL  
CONTRACT 2-6**

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the **MR&I Office Remodel Contract 2-6** will be received, by Standing Rock Rural Water System at the Standing Rock MR&I Building, 9410 11<sup>th</sup> Avenue Slaughter House Bay Road, Fort Yates, ND 58538, until **1:30 PM** local time on **January 29, 2025**, at which time the Bids received will be publicly opened and read. The Project consists generally of the following scope of Work.

The scope of WORK generally consists of the following as required by the Contract Documents and General Requirements:

Your firm is invited to submit a single prime bid offer under seal to Standing Rock Rural Water System for improvements to the Standing Rock MR&I building located in Fort Yates, ND. Contract 2-6 has an estimated cost of \$1,500,000 to \$2,000,000, includes a vestibule addition, remodel of approximately 3,000 sf of office space, replacement of the existing metal roof and related accessories, furnishing allowance, and all other related appurtenances as required by the Project Drawings, Specifications, and Contract Documents. Contract 2-6 is located in Sioux County, ND, within the exterior boundaries of the Standing Rock Reservation. Final Completion of the entire Contract 2-6 will be prior to December 12, 2025.

Each Bid must be accompanied by a separate envelope containing a copy of a current and valid North Dakota Contractor's License issued at least ten (10) days prior to Bid opening, and a Bidder's Bond in a sum equal to five percent (5%) of the full amount of the Bid, executed by the Bidder as Principal and by a Surety, conditioned that if the Principal's Bid is accepted and the Contract awarded to Principal, the Principal, within ten (10) days after notice of award, shall execute a Contract in accordance with the terms of the Bid and a Contractor's Bond as required by law and regulations and determinations of the Standing Rock Rural Water System.

BIDDERS shall follow the Standing Rock Sioux Tribal Employment Rights Office (TERO) regulations. CONTRACTORS awarded projects within the exterior boundaries of the Standing Rock Reservation are responsible for payment of TERO Fee in the amount of two and a half percent (2½%) of the gross receipts from each Prime Contract. CONTRACTORS are also responsible for the payment of a 1% Tribal EPA Permit Fee. Arrangements for the payment of these fees is to be made prior to beginning work with the SRST TERO Director and Tribal EPA Director. Prior to beginning work on any contract or subcontract, the CONTRACTOR and any SUBCONTRACTORS shall contact the TERO Office and complete a SRST TERO compliance plan.

Any interested BIDDER shall contact the SRST TERO Director Anna Cotanny (acotanny@standingrock.org) at 701-854-7295. BIDDER shall be responsible for meeting all requirements of Standing Rock Sioux Tribe Ordinance No. 165. Any questions regarding the SRST TERO Ordinance shall be directed to the TERO Office. BIDDER shall follow all requirements as directed by SRST TERO.

Standing Rock Sioux Tribe  
Tribal Employment Rights Office  
112 Bald Eagle Ave, PO Box D  
Fort Yates, ND 58538

The Issuing Office for the Bidding Documents is:

**Bartlett & West, Inc.**  
**3456 East Century Avenue**  
**Bismarck, ND 58503**  
**701.258.1110**

Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 8 AM and 5 PM and may obtain copies of the Bidding Documents from the Issuing Office as described below.

Bidding Documents may be obtained from the Issuing Office during the hours indicated above. Bidding Documents are available online (as portable document format (PDF) files) for a non-refundable charge of \$50 at [www.questcdn.com](http://www.questcdn.com) by entering the Quest project number **9460696**. Please contact QuestCDN.com at 952.233.1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance. Printed Bidding Documents may be obtained from the Issuing Office either via in-person pick-up or via mail, upon Issuing Office's receipt of payment for the Bidding Documents. The non-refundable cost of printed Bidding Documents is \$250 per set. Upon Issuing Office's receipt of payment, printed Bidding Documents will be sent via the prospective Bidder's delivery method of choice; the shipping charge will depend on the shipping method chosen.

Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

All Bids will be made on the basis of cash payment for such Work. The Standing Rock Sioux Tribe, acting through the Standing Rock Rural Water System, reserves the right to award the Contract, if awarded, based on the lowest responsive Bid(s) that is in the best interest and most advantageous to the Owner, with or without Alternate Bid Items, to reject any and all Bids, to consider other factors in selecting the Bid which is in the best interest of the Owner, and to waive any and all irregularities in any Bid. The Owner reserves the right to hold all Bids for a period of sixty (60) calendar days after the date of the Bid opening to complete financial arrangements.

Owner: **Standing Rock Sioux Tribe**

By: **Janet Alkire**

Title: **Chairwoman**

Date: **December 13, 2024**

+ + END OF ADVERTISEMENT FOR BIDS + +

# ~~SUGGESTED~~ INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACTS

Prepared by



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~~SUGGESTED~~ **SUGGESTED INSTRUCTIONS TO BIDDERS**

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## ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued. **The Issuing Office is:**

**Bartlett & West, Inc.  
3456 East Century Avenue  
Bismarck, ND 58503  
701-258-1110**

## ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid. **The non-refundable fee, if any is stated in the Advertisement for Bids.**

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

## ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Bidder's ~~state or other contractor license number, if applicable.~~

B. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

## ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of

materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

#### 4.02 *Existing Site Conditions*

##### A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

###### 1. The Supplementary Conditions identify:

- a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
- b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
- d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

#### 4.03 *Site Visit and Testing by Bidders*

A. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

B. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

- C. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- D. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

#### 4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

#### 4.05 *Other Work at the Site*

- A. Reference is made to Special Conditions Section 01010 – Coordination of Work and Contract Drawings for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

### **ARTICLE 5 – BIDDER'S REPRESENTATIONS**

#### 5.01 It is the responsibility of each Bidder before submitting a Bid to:

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;
- E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### **ARTICLE 6 – PRE-BID CONFERENCE**

6.01 A pre-Bid conference will **not** be held **for this Contract.** ~~at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.~~

#### **ARTICLE 7 – INTERPRETATIONS AND ADDENDA**

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

#### **ARTICLE 8 – BID SECURITY**

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **Five (5)** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a ~~certified check, bank money order, or a Bid bond~~ (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions. **The five (5) percent Bid Bond (on the form provided), Power of Attorney, Acknowledgement of Surety, and Acknowledgement of Principal shall be in a separate envelope attached to the outside of the Bid envelope. All signatures must be notarized. The envelope containing the Bid Bond shall include a copy of the Bidder's North Dakota Contractor's License as described in Article 15.**

- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

#### **ARTICLE 9 – CONTRACT TIMES**

- 9.01 The number of days within which, or the dates by which, Milestones (**if any**) are to be achieved and the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

#### **ARTICLE 10 – LIQUIDATED DAMAGES**

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

#### **ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS**

- 11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder's sole risk.

#### **ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 12.01 ~~A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.~~
- 12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

- 12.03 ~~The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner~~ **Bids shall include** a list of the Subcontractors or Suppliers proposed for the following portions of the Work: **Bidder shall provide evidence that all Subcontractors have a current and valid North Dakota Contractor's License before Subcontractors begin work.**
- ~~If requested by Owner,~~ Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity.
- A. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will **NOT** be increased (or decreased) by the difference in cost. ~~occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.~~
- 12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will **not** constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.
- 12.05 **The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06.**

#### **ARTICLE 13 – PREPARATION OF BID**

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
- B. If the Bid Form **expressly indicates** that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), **accompanied by evidence of authority to sign.** The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.
- 13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.
- 13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

- 13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.
- 13.07 All names shall be printed in ink below the signatures.
- 13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.10 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, ~~if any~~, shall also be shown on the Bid Form.

#### **ARTICLE 14 – BASIS OF BID**

##### **14.01 Lump Sum**

- A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

##### **14.02 Unit Price**

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.
- B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

##### **14.03 Allowances**

- A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

#### **ARTICLE 15 – SUBMITTAL OF BID**

- 15.01 With each **printed** copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.

- A. **The name of the Project.**
- B. **Each BID must be accompanied by a BIDDER'S BOND in a separate envelope in an amount equal to five percent (5%) of the BID with notarized Acknowledgement of Surety and notarized Acknowledgement of Principal. Such bonds shall be in compliance with Section**

**48.1.205 of the North Dakota Century Code as amended. Signatures of all parties must be notarized. Bidders must use the form included in the Bid Documents.**

- C. **All BIDS must be placed in a sealed envelope upon the outside of which there is disclosed the following information:**
1. **WORK covered by the BID.**
  2. **Name of person, firm or corporation submitting the BID, and their address and license number.**
  3. **A BIDDER'S BOND with notarized signatures within a separate envelope attached to the BID envelope.**
  4. **A copy of a current and valid North Dakota Contractor's license, or certificate of renewal. The license must have been issued to the Bidder at least ten (10) calendar days in advance of the bid opening date. THE CONTRACTOR'S LICENSE MUST BE INCLUDED IN THE BID BOND ENVELOPE.**
  5. **Acknowledgement of receipt of addenda.**
  6. **Subcontractors, Suppliers, and manufacturers as listed in paragraph 7.06 of the Supplemental Conditions and on the Bid Form.**

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to **the Owner at the following address:**

**Standing Rock Sioux Tribe  
Standing Rock Rural Water System  
MR&I Building  
9410 11th Avenue Slaughter House Bay Road  
Fort Yates, ND 58538**

Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

- A. **Within 15 days of the Bid Opening, the apparent low bidder shall submit a proposed Schedule of Values for Lump Sum Bid Items breaking out the work as identified in Part 1.02 of Section 012000.**

#### **ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID**

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 ~~If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a~~



~~material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work. No withdrawal or modification will be permitted after the date and time for opening Bids.~~

#### **ARTICLE 17 – OPENING OF BIDS**

- 17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.
- 17.02 **A conditional or qualified Bid will not be accepted.**

#### **ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. **Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Owner to make an award to that Bidder.** If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid **determined to be in the best interest of the Owner.**
- 19.03 Evaluation of Bids
- A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
  - B. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.
  - C. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.
  - D. For the determination of the apparent low Bidder when cost-plus bids are submitted, Bids will be compared on the basis of the Guaranteed Maximum Price set forth by Bidder on the Bid Form.
- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for

those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

- 19.05 Owner may conduct such investigations, **including Bidder's contract litigation, mediation, and arbitration history**, as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

## **ARTICLE 20 – BONDS AND INSURANCE**

- 20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

## **ARTICLE 21 – SIGNING OF AGREEMENT**

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within ~~15~~ **10** days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

## **ARTICLE 22 – SALES AND USE TAXES**

- 22.01 ~~Owner is exempt from [ ] state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. [ ]). Said taxes shall not be included in the Bid. Refer to Paragraph SC 7.09 of the Supplementary Conditions for additional information.~~

## **ARTICLE 23 – ADDITIONAL ITEMS**

- 23.01 **The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT.** Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve him from fulfilling any of the conditions of the contract.
- 23.02 Attorneys in fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their power of attorney.
- 23.03 Bidders on this work will be required to comply with the President's Executive Order No. 11246 as amended, including specifically to provisions of the equal opportunity clause set forth in the Supplementary Conditions.
- 23.04 **All bidders shall refer to the Special Conditions in Division 1 for specific requirements which are special to the project.**
- 23.05 **Refer to Executive Order 11246 in the Appendix for Federal Requirements associated with Small, Minority, and Women's Businesses.**
- 23.06 **Refer to Article 13 of the Bureau of Reclamation Supplemental Provisions for requirements associated with Buy American.**

**TRIBAL EMPLOYMENT RIGHTS OFFICE (TERO) INFORMATION**

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TERO ORDINANCE

NO. 165

STANDING ROCK SIOUX TRIBE

Jesse Taken Alive  
Chairman

Wilbur Red Tomahawk  
Vice Chairman

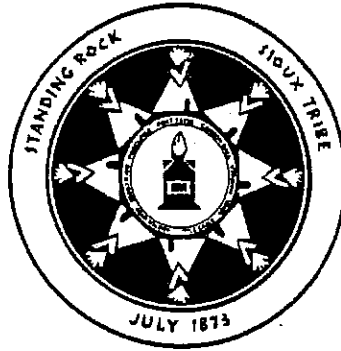
Joe McLaughlin  
Secretary

Carol White Eagle  
Cannonball District

Tom Kuntz  
Fort Yates District

Leonard Bearking  
Wakpala District

Samuel "Chuck" Claymore  
Kenel District



Joe White Mountain, Sr.  
Bear Soldier District

Kenneth Red Bear  
Rock Creek District

Jim Jamerson  
Little Eagle District

Luella Harrison  
Porcupine District

AT LARGE

Charles W. Murphy

Joe Keepsaule

Dave Archambault

Terry Yellow Face

Reva Gates

Sharon Two Bears

October 4, 1996

Mr. Bobby Thompson  
Superintendent  
Bureau of Indian Affairs  
Standing Rock Agency  
Fort Yates, North Dakota 58538

Dear Mr. Thompson:

Transmitted herewith is Ordinance No. 165 approved by the Standing Rock Sioux Tribal Council on October 3, 1996, for your review.

This ordinance approved by Resolution No. 259-96 amends the Code of Justice of the Standing Rock Sioux Tribe by adding a new Title XXX, Tribal Employment and Contracting Rights, TERO.

Sincerely,

Jesse Taken Alive  
Chairman

Enclosure

xc: TERO  
Tribal Court

Ordinance No. 165

BE IT RESOLVED that the Code of Justice of the Standing Rock Sioux Tribe be and the same is hereby amended to add a new Title XXX, Tribal Employment and Contracting Rights, TERO.

Pages i-iii and 1-49 Attached

RESOLUTION NO. 259-96

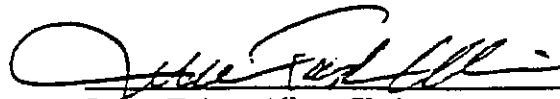
BE IT RESOLVED, that pursuant to the power vested in the Standing Rock Sioux Tribal Council under the Constitution of the Standing Rock Sioux Tribe, the foregoing Ordinance No. 165, amending the Code of Justice of the Standing Rock Sioux Tribe by adding Title XXX, Tribal Employment and Contracting Rights, TERO be and the same is hereby approved.

BE IT FURTHER RESOLVED, that the Chairman and Secretary of the Tribal Council be authorized and instructed to sign this resolution for and on behalf of the Standing Rock Sioux Tribe.

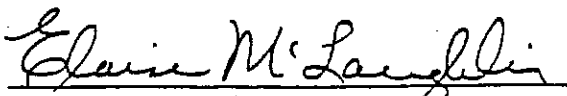
CERTIFICATION

We, the undersigned Chairman and Secretary of the Standing Rock Sioux Tribal Council, do hereby certify that the Tribal Council is composed of 17 members, of whom 12 constituting a quorum, were present at a meeting thereof, duly and regularly called, noticed, convened, and held on the 3rd day of October, 1996, and that the foregoing resolution was duly adopted by the affirmative vote of 9 members, with 2 opposing, and with 1 not voting. The Chairman's vote is not required except in case of a tie.

Dated this 4th day of October, 1996.

  
\_\_\_\_\_  
Jesse Taken Alive, Chairman  
Standing Rock Sioux Tribal Council

ATTEST:

  
\_\_\_\_\_  
Elaine McLaughlin, Secretary  
Standing Rock Sioux Tribal Council

(Official Seal)





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## CHAPTER 1. GENERAL PROVISIONS

### **Sec. 101. Legislative Finding and Purpose.**

The powers to regulate trade and commerce and levy taxes within its Reservation are aspects of the retained sovereignty of an Indian Tribe except where limited or withdrawn by federal authority. The Standing Rock Sioux Tribe is a sovereign Indian Tribe recognized by the United States. Pursuant to the Constitution, the Standing Rock Sioux Tribal Council is the governing body of the Standing Rock Sioux Tribe. This Ordinance is enacted pursuant to the inherent sovereign Tribal powers expressly delegated to the Tribal Council in the Constitution of the Standing Rock Sioux Tribe, for the purpose of requiring Indian preference in employment, training, contracting, subcontracting, and other economic opportunities. In enacting this Ordinance, the Standing Rock Sioux Tribal Council finds as Follows:

(1) Discrimination and other barriers have limited the employment, contracting and other economic opportunities for members of the Standing Rock Sioux Tribe and other Indians, and their businesses, thereby injuring not only the individual Indians but the Tribe as a whole, and hindering the economic development and growth on the Standing Rock Reservation.

(2) Employment and contracting opportunities in the private sector for Tribal members and other Indian people on the Standing Rock Reservation are opportunities to which Tribal members and other Indian people have unique and special rights under federal and Tribal law. This Ordinance is adopted to protect and enforce those rights.

(3) Indians are entitled to the protection of the laws that the federal government has adopted to combat employment discrimination, and those laws expressly recognize that Indian preference with respect to employment on and near reservations is authorized. In addition, federal law specifically mandates that federal contracts with, or grants to, Indian organization, or for the benefit of Indians, require to the greatest extent feasible Indian preference in training, employment, and subcontracting. This Ordinance is adopted to enforce those rights and to enhance them by establishing additional rights under Tribal law.

(4) This Ordinance imposes Employment Rights Fees to raise revenue for the operation of the Tribal Employment and Contracting Rights Office. The fees are imposed on construction contractors because such contractors pose substantially greater enforcement burdens and costs than other types of employers on the Reservation, because, among other things, construction contractors (a) frequently hire a substantial number of employees for relatively short periods, and (b) frequently are present on the Reservation for only the relatively short duration of their contracts.

**Sec. 102. Definitions.**

The following definitions apply throughout this Ordinance except where an inconsistent definition is expressly set forth:

- (1) "Certified firm" means an entity certified, pursuant to Chapter 3, Subchapter B of this Ordinance, as eligible for the preference in the awarding of contracts and subcontracts provided for in Chapter 3, Subchapter A of this Ordinance.
- (2) "Chairman" means the Chairman of the Tribal Employment and Contracting Rights Commission of the Standing Rock Sioux Tribe.
- (3) "Commission" or "TERO Commission" means the Tribal Employment and Contracting Rights Commission of the Standing Rock Sioux Tribe established pursuant to this Ordinance.
- (4) "Commissioner," "TERO Commissioner," "Commissioner member," or "member of the Commission" means a member of the Tribal Employment and Contracting Rights Commission of the Standing Rock Sioux Tribe.
- (5) "Covered contract" means any contract or subcontract for supplies, services, labor, or materials, in the amount of \$500.00 or more, subject to the jurisdiction of the Standing Rock Sioux Tribe, where the majority of the work on the contract or subcontract will occur within the exterior boundaries of the Standing Rock Reservation.
- (6) "Covered Employer" means any employer subject to the jurisdiction of the Standing Rock Sioux Tribe, employing two or more employees who, during any 30-day period, spend, cumulatively, more than 24 hours performing work within the exterior boundaries of the Standing Rock Sioux Reservation. The federal, state and Standing Rock Tribal government and their agencies and subdivisions are not covered employers. However, contractors or grantees of such governments who otherwise meet this definition are covered employers. Entities chartered by the Standing Rock Sioux Tribe which otherwise meet this definition are covered employers.
- (7) "Covered Entity" means any entity other than the United States, the State of North Dakota, the State of South Dakota and the Standing Rock Sioux Tribe, and their agencies and subdivisions. Corporations chartered by the Standing Rock Sioux Tribe are covered entities.
- (8) "Director" means the Director of the Tribal Employment and Contracting Rights Office.
- (9) "Employee" means any person employed for remuneration.
- (10) "Employer" means any person, partnership, corporation, or other entity that employs, for remuneration, two or more employees.

(11) "Employment within the Standing Rock Reservation" means any position in which the employee spends more than six hours per month performing work within the exterior boundaries of the Standing Rock Reservation.

(12) "Entity" means any person, partnership, corporation, joint venture, governmental enterprise, receiver, assignee, trustee in bankruptcy, trust, estate, firm, club, company, joint stock, company, business trust, municipal corporation, association, society, political entity, any group of individuals acting as a unit, whether mutual, cooperative, fraternal, non-profit, or otherwise, or any other natural or artificial person or organization. The term "entity" is intended to be as broad and all-encompassing as possible to ensure this Ordinance's coverage over all employment and contract activities within the jurisdiction of the Standing Rock Sioux Tribe, and the term shall be so interpreted by the Commission and the Courts.

(13) "Indian" means any individual who is an enrolled member of an Indian Tribe recognized by the United States. "Indian Tribe" includes any Indian, Eskimo, or Aleut Tribe, band, village, community, pueblo, or organization.

(14) "Local Indian" means any Indian who has resided within the boundaries of the Standing Rock Reservation as defined by the Act of March 2, 1889, 25 Stat. 888, for not less than the preceding 60 days.

(15) "Office" or "TECRO Office" means the Tribal Employment and Contracting Rights Office Established pursuant to this Ordinance.

(16) "Reservation" means the Standing Rock Sioux Reservation, including all lands within the exterior boundaries of the Standing Rock Sioux Reservation, regardless of ownership of such lands.

(17) "Tribal Council" or "Council" means the Standing Rock Sioux Tribal Council, established pursuant to Article III of the Constitution of the Standing Rock Sioux Tribe, as governing body of the Tribe.

(18) "Tribal member" or "member" means an individual Indian who is enrolled in the Standing Rock Sioux Tribe.

(19) "Tribe" means the Standing Rock Sioux Tribe.

Throughout this Ordinance, words in the singular shall include the plural, and word in the plural shall include the singular, unless the context requires otherwise. Throughout this Ordinance, words in one gender shall include the other genders.

**Sec. 103. Scope of Coverage.**

This Ordinance shall apply to all areas within the exterior boundaries of the Standing Rock Reservation subject to the jurisdiction of the Standing Rock Sioux Tribe. It shall be binding on all covered employers as to all employment within the Standing Rock reservation, and on all covered entities as to all covered

contracts that are subject to the jurisdiction of the Standing Rock Sioux Tribe. Such employers and entities are covered regardless of whether their headquarters or principal place of business is on or off the Reservation, and regardless of whether they were already engaged in commerce on the Reservation after the date of enactment.

**Sec. 104. Sovereign Immunity.**

The Standing Rock Sioux Tribe, and all its constituent parts, including the Tribal Employment and Contracting Rights Office, Director, and Commission established pursuant to this Ordinance, are immune from suit in any jurisdiction except to the extent that such immunity has been expressly and unequivocally waived by the Tribe or the United States. Nothing in this Ordinance shall be construed as waiving the sovereign immunity of the Standing Rock Sioux Tribe or any of its constituents parts, including but not limited to the Tribal Employment and Contracting Rights Office, Director, and Commission, except that after exhaustion of administrative remedies as provided herein, a party aggrieved by a decision of the Commission may appeal to the Standing Rock Sioux Tribal Court as provided herein. Such appeal shall be for injunctive relief only. Nothing in this Ordinance shall be construed as a waiver of sovereign immunity for any claim for damages. Nothing in this Ordinance, and no enforcement action taken pursuant to it, including the filing of a petition in the Tribal Court, shall constitute a waiver of sovereign immunity, as to any counterclaim, regardless of whether the counterclaim arises out of the same transaction or occurrence, or in any other respect.

**Sec. 105. Saving Clause.**

In the event that any provision of this Ordinance shall be found or declared to be invalid, the remaining provisions of this Ordinance shall be unaffected thereby, and shall remain in full force and effect.

**Sec. 106. Tribal Employment and Contracting Rights Commission**

There is hereby established the Tribe Employment and Contracting Rights Commission of the Standing Rock Sioux Tribe.

(1) The Commission shall consist of six (6) members appointed by the Standing Rock Sioux Tribal Council as follows: one (1) member from each standing committee of the Council; two (2) persons, one (1) whom shall be the secretary of the Judicial Committee and one (1) who shall be Secretary of the Economics Committee; and one (1) member who shall be the Chairman of the Standing Rock Sioux Tribe or the Vice-Chairman in the Chairman's absence, and shall preside over all meetings of the Commission.

(2) The six members of the Commission shall serve term consistent with their term of office. No member of the Council shall serve beyond his or her term of office on the Council. If a vacancy shall occur during a term of any member, it shall be filled by the member elected to serve the unexpired term.

(3) A quorum of the Commission shall consist of four (4) members. The Chairman or Acting Chairman of the Commission shall not vote except necessary to break a tie. Action by the Commission shall be by majority vote of those Commissioners present and voting.

(4) The Commission shall select one of its members to serve as Vice-Chairman. Whenever the Chairman of the Commission is absent or unavailable, the Vice-Chairman shall serve as Acting Chairman of the Commission. If the Vice-Chairman is also unavailable, the Commission shall designate another of its members to serve as Acting Chairman.

(5) Any Commission member may be permanently removed from office on the same basis and under the same procedures that apply to removal of a member of the Tribal Council.

(6) The Tribal Council, the Tribal Chairman, the Commission, TERO, its Director and employees, shall not be liable for monetary damages for its actions taken in their official capacity under this Ordinance.

**Sec. 107. Recusal of Commission Members.**

(1) For the purpose of this section, "immediate family" means brother, sister, son, daughter, mother, father, husband, wife, aunts, uncles, grandparents, step-brother, step-sister, foster parents, half-brother, half-sister, or brother, sister, son, daughter, mother, or father by adoption, including traditional adoption.

(2) No member of the Commission shall participate in any action or decision by the Commission directly involving himself/herself, or a member of his/her immediate family, or any person, business or other entity of which he/she or a member of his/her immediate family is an employee, or in which he/she or a member of his/her immediate family has a substantial ownership interest, or with which he/she or a member of his/her immediate family has a substantial contractual relationship.

(3) Nothing in this section shall preclude a Commissioner from participating in any action or decision by the Commission which:

- (a) Generally affects a class of persons, regardless of whether of the Commission member or a member of his/her immediate family is a member of the affected class.
- (b) Affects the Standing Rock Sioux Tribe, a Tribal enterprise, or a person or entity in a contractual relationship with the Tribe or a Tribal enterprise.

(4) A Commission may voluntarily recuse himself/herself and decline to participate in any action or decision by the Commission when the Commission, in his/her discretion believes:

- (a) That he/she cannot act fairly or without bias; or

- (b) That there would be an appearance that he/she could not act fairly or without bias.

**Sec. 108. Powers of the Commission.**

The Commission shall be responsible for carrying out the purpose of this Ordinance, and shall have the following powers:

- (1) To promulgate and enforce, and to amend and rescind, such rules, regulations, and guidelines as are necessary to carry out the provision of this Ordinance, as provided in Section 109.
- (2) To require each covered employer or covered entity to submit to the Commission an acceptable compliance plan indicating how it will comply with this Ordinance, before the covered employer or entity may commence work within the exterior boundaries of the Standing Rock Sioux Reservation, or within a reasonable time as ordered by the Commissioner where the covered employer or entity was already engaged in work within the Reservation prior to the effective date of this Ordinance;
- (3) To impose 100% Indian hiring goals and timetables that specify the minimum number of Indians a covered employer must promote or advance, by craft or skill level;
- (4) To require cover employers to establish or participate in such job training programs as the Commission determines necessary in order to increase, as quickly as possible, the pool of qualified Indians available for employment on the Standing Rock Reservation;
- (5) To assist in and monitor the establishment and operation of a Tribal Hiring Hall or skills bank and impose a requirement that no covered employer may hire a non-Indian until the Tribal hiring hall or skills bank has certified that no qualified Indian, in accordance with the preference priorities set forth in Sec. 202, is available to fill the vacancy;
- (6) To prohibit covered employers from using job qualification criteria or other personnel requirements that serve as barriers to Indian employment unless the employer can demonstrate that such criteria or requirements are required by business necessity. In developing regulations to implement this requirement, the Commission may adopt requirements in addition to or in lieu of the federal employment guidelines when necessary to address qualification problems that are unique to Indian or to the Reservation;
- (7) To impose contract and subcontract preference requirements which provide preference to Indian owned firms, and to establish and operate a system for certifying firms as eligible for such preference, as provided in Chapter 3 of this Ordinance;
- (8) To consult with affected employees and to consider their input and recommendations, particularly with respect to the establishment of 100% Indian



hiring goals, numerical advancing goals, training programs, and requirements for submission of reports by employers;

(9) To require covered employers to submit reports and to take all action deemed necessary by the Commission for the fair and rigorous implementation of this Ordinance;

(10) To enter into cooperative agreements with federal employment and contracting rights agencies such as EEOC and OFCCP to aid in the elimination of discrimination against Indians both on and off the Standing Rock Sioux Reservation;

(11) To administer oaths and conduct hearings in accordance with this Ordinance;

(12) To examine, under oath, either orally or in writing, any person with respect to any matter related to this Ordinance;

(13) To make, or cause to be made by its agents or employees, an examination or investigation of the place of business of any employer or other entity, during normal business hours, or at any other time agreed to by such employer or entity, or at any time whatsoever pursuant to a search warrant issued by the Tribal Court;

(14) To recommend the hiring of Commission employees and to pay salaries in accordance with the Standing Rock Sioux Tribe Personnel Policies and Procedures;

(15) To expend funds appropriated by the Tribal Council for the Tribal Employment and Contracting Rights Office and Commission, and to obtain and expend funding from federal, state, or other sources, when authorized by Tribal Council resolution;

(16) To delegate to the Director of the Tribal Employment and Contracting Rights Office such duties as it finds necessary, in order to carry out effectively and efficiently the provisions of this Ordinance; provided, that the Commission may not delegate its authority to:

- (a) promulgate, amend and rescind rules, regulations, or guidelines;
- (b) conduct hearings and impose sanctions pursuant to Section 119-125 of this Ordinance;

(17) To exercise all other authority delegated to or conferred upon it by law, or as may be reasonably necessary in the administration or enforcement of any provision of this Ordinance.

**Sec. 109. Commission Rules and Regulations.**

(1) The Commission shall promulgate and enforce such written rules, regulations and guidelines as are necessary to carry out the provisions of this

Ordinance and the orderly performance of the Commissions' duties, including but not limited to rules and regulations relating to:

- (a) internal operational procedures of the Tribal Employment and Contracting Rights Commission, Office, Director, and staff;
- (b) interpretation and application of this Ordinance so as to fully and fairly carry out its provisions;
- (c) the filing of any reports required by, or necessary to implement, this Ordinance; and
- (d) the conduct of inspections, investigations, hearings, enforcement actions, and other authorized activities of the Commission.

(2) Except in cases where the Commission finds that an emergency situation exists:

- (a) Copies of all proposed rules, regulations, and guidelines shall be transmitted to the Tribal Council, and shall be posted once in a public place on the Reservation and kept in a file in the Tribal Employment and Contracting Rights Office which is open to public inspection during regular business hours, for no less than a 20-day comment period.
- (b) The Commission shall accept comments from any interested party during the comment period.
- (c) Final rules, regulations, and guidelines adopted by the Commission shall go into effect upon being approved by the Tribal Council. Upon Tribal Council approval, the rules, regulations, and guidelines shall be posted once in a public place on the Reservation, and shall take judicial notice of all rules and regulations of the Commission promulgated pursuant to this Code.

**Sec. 110. Tribal Employment and Contracting Rights Office and Director.**

(1) The Director of the Tribal Employment and Contracting Rights Office shall be hired by the Tribal Council. The Director shall have primary responsibility for day-to-day oversight of the operation of the Tribal Employment and Contracting Rights Office and its employees, and shall represent the Office in enforcement hearing before the Commission. The Director shall on a monthly basis report directly to the Commission and the Judicial Committee of the Tribal Council, and shall be subject to immediate supervision by the Tribal Chairperson.

(2) The Director shall have authority: to supervise staff in accordance with the Standing Rock Sioux Tribe Personnel Policies and Procedures; to expend, subject to prior approval by the Tribal Council, funding from federal, state, or other sources to carry out the purpose of this Ordinance, and in compliance with the Tribe's financial management policies and procedures.

(3) The Director shall administer the policies, authorities, and duties prescribed for him/her in this Ordinance, and such other duties as may be delegated to him/her by the Commission pursuant to Sec. 108(18).

**Sec. 111. Employment and Contracting Rights Fees.**

(1) In order to raise revenue for the operation of the Tribal Employment and Contracting Rights Office and Commission, an employment and contracting rights fee is hereby imposed as follows:

- (a) With respect to each construction contract of \$500.00 or more on the Standing Rock Sioux Reservation, the construction contractor shall pay a one time fee of 2.5% of the total amount of the contract, plus a fee of 2.5% of any increases in the contract amount. If a contractor initially enters into a construction contract of less than \$500.00, but subsequent increases result in a total contract amount of \$500.00 or more, the fee shall apply to the total contract amount, including increases. One percent (1%) shall be dedicated to Vocational Training by line item in the TERO Budget.
- (b) The primary liability for the fee imposed by this section shall lie with the prime contractor, except where the Tribe is the prime contractor in which case the subcontractor shall be liable. A subcontractor shall be subject to the fee on his subcontract only to the extent that the prime contractor has failed to pay the fee on the prime contract under which the subcontract is issued.
- (c) If the Commission determines that an entity has broken what would normally be one construction project into multiple contracts, for the purpose, in whole or in part, of evading the fee imposed by this section, all of the entity's contractors shall be liable for the fee, notwithstanding the fact that their individual contracts may be for contract amount of less than \$500.00.
- (d) For purposes of this section, construction contractors include without limitation those enumerated in the Standard Industrial Classification Manual of 1972, prepared by the Statistical Policy Division of the Office of the President, under: Building Construction--General Contractors and Operative Builders (Major Group 15); Construction Other Than Building Construction--General Contractors (Major Group 16); Construction--Special Trade Contractors (Major Group 17).

(2) The fee provided in Sec. 111 is due and shall be paid in full by the contractor prior to commencing work on the Reservation, unless other arrangement are agreed to by the Commission.

Immediately upon becoming aware that a contractor subject to the fee is intending to engage in work on the Reservation, the Director shall mail to the contractor by registered mail, a notice informing the contractor of the nature and purpose of the fee, the percentage, the specific amount due, if known, the date due, and the possible consequences if the contractor fails to comply. Said notice shall be accompanied by a formal notice of fees due. Failure to receive the notice shall not relieve the contractor of his obligation to pay the fee.

(3) The Director shall be responsible for collecting all employment and contracting rights fees pursuant to any rules and regulations that may be adopted by the Commission.

(4) All fees shall be paid to the Standing Rock Sioux Tribal Finance Officer and shall be credited to the Tribal Employment and Contracting Rights Office account of the Standing Rock Sioux Tribe.

(5) Any contractor who fails to pay the fee imposed by this section shall be subject to the remedial actions provided for in this chapter.

**Sec. 112. Collection of Fees.**

If the contractor fails to pay the fee by the day it commences work on the Reservation, interest shall begin accruing on that date at the rate of 18% per annum, compounded daily. Further, as soon as possible following the day on which the contractor commences work, the Director shall send a notice to the contractor by registered mail, informing him that his payment is overdue and of the consequences that will result if the fee is not paid immediately.

If the fee is not paid by the 15th day after the contractor commenced work, the Director shall file a formal charge of non-compliance, and shall schedule a Commission hearing to be held within five days or as soon thereafter as the Commission can meet, and shall inform the contractor of the schedule hearing.

At the hearing, to be held whether or not the contractor attends, the Commission shall determine whether the contractor has failed to comply. If it finds non-compliance, it shall:

- (a) Impose penalties of up to 10% of the amount due; and
- (b) Petition the Tribal Court to uphold the decision of the Commission and to enforce it through confiscation proceedings as provided for in Sec. 129 of this Ordinance.

Where the Director or Commission has reasonable cause to believe that an employer will flee the jurisdiction before the procedures set out above can be completed, they may apply any of the procedures provided for in Section 120 and 128 of the Ordinance, notwithstanding the above procedures.

(2) The Director, in his discretion, may, upon receipt of a written request, authorize a contractor to pay the required fee in installment over the course of the contract, when:

- (a) the total annual fee exceeds \$10,000; and
- (b) the contractor demonstrates hardship or other good cause.

The decision whether to authorize an alternative arrangement, which, is allowed, shall be in writing, shall rest solely with the discretion of the Director and is not appealable to the Commission or the Courts.

The contractor shall pay interest at 12% per annum, compounded daily, on all amounts paid after the day he commences work on the Reservation, when paying under this alternative arrangement. The Director is authorized to terminate any alternative payment arrangement authorized under this subsection (2) and to declare such fees immediately due and payable on the day following the date on which any installment payment is not timely made.

(3) The fee collected from the contractor pursuant to this section shall be increased in accordance with any increase in the contract amount as follows:

- (a) The contractor shall be liable for the payment of fees on each contract amount increase to the same extent he is liable for payment of the fee on the original contract amount. Fee payment attributable to contract amount increases are due and shall be paid on the date the contractor is notified of the allowance of such increase. Interest on unpaid fees due under this subsection (3) shall be computed in the same manner as interest on unpaid fees attributable to the original contract amount under subsection (1) of this section;
- (b) The Director may authorize the contractor to pay the fee required under this subsection (3) in installments as provided in subsection (2) of this section.

**Sec. 113. Reports and Monitoring.**

All entities engaged in any aspect of business activity on the Reservation shall submit reports and such other information as are requested by the Tribal Employment and Contracting Rights Office. Employees of the Office shall have the right to make-on-site inspections during regular working hours, or as otherwise authorized pursuant to Sec. 108(15), in order to monitor an entity's compliance with these regulations. Employees of the Office shall have the right to inspect and copy all relevant records of an entity, of the entity's signatory unions or subcontracts, to speak with workers on the job site, and to engage on similar investigatory activities. All information collected by the Office shall be kept confidential, unless disclosure is required during a hearing or appeal as provided for in these regulations.

**Sec. 114. Complaints.**

(1) Non-Compliance by an Entity. Any Indian, group of Indians, representatives of a class of Indian, certified firm, group of certified firms, or other person or entity who believes that they have been discriminated against by any employer or any other entity because they are Indian, may file a complaint with the Director. Persons may file whether or not they can show that they were personally harmed by the entity's non-compliance.

(2) Non-Compliance by the Tribal Employment and Contracting Rights Office or Commission. Any entity, group of entities, non-certified firms, group of non-certified firms, non-Indian worker, group of non-Indian workers to other person or entity who believes that an action of the Office or Commission is in violation of this Ordinance, rules, regulations, or guidelines of the Commission, the Standing

Rock Sioux Tribal Code, or federal law or regulations, may file a complaint with the Director. Persons may file whether or not they can show they were personally harmed by the action of the Office or Commission.

**Sec. 115. *Complaint Procedures.***

All complaints filed pursuant to Sec. 114 shall be in writing and shall provide such information as is necessary to enable the Director to carry out an investigation. Within twenty days after receipt of the complaint, and on a regular basis thereafter, the Director shall provide the complaining party with a written report on the status of the complaint.

**Sec. 116. *Investigations.***

On his own initiative or pursuant to complaint, the Director or any field compliance officer designated by the Director shall make such public or private investigations as he or the Commission deems necessary to determine whether any covered employer or other entity has violated any provision of this Ordinance, or any rule, regulation, guideline, or order hereunder, or to aid in prescribing rules, regulations and guidelines hereunder. The Director or his delegate may enter, during business hours or as otherwise authorized pursuant to Sec. 108(14), the place of business or employment of any entity for the purpose of such investigations, and may require the covered employer or entity to submit such reports as he deems necessary to monitor compliance with the requirement of this Ordinance or any rule, regulation, guideline or order hereunder.

**Sec. 117. *Power to Require Testimony and Production of Records.***

For the purpose of investigations or hearing which, in the opinion of the Director or the Commission, are necessary and proper for the enforcement of this Ordinance, a Commissioner, the Director, or any field Compliance Officer designated by the Director may administer oaths or affirmations, and take evidence, and may seek an order of the Tribal Court to require by citation, the production of books, papers, contracts, agreements or other documents, records, or information to the inquiry.

**Sec. 118. *Informal Settlement.***

When, after conducting an investigation initiated by a complaint pursuant to Sec. 116, the Director has reason to believe a violation of this Ordinance or rules, regulations, guidelines or orders issued pursuant to it has occurred, the Director shall notify the covered employer or entity in writing, specifying the alleged violations. He may withhold the name(s) of the complaining party if he has reason to believe such party shall be subject to retaliation. If the covered employer or entity so notified is a contractor, notice shall also be provided to the entity which let the contract. If the covered employer so notified is a subcontractor, notice shall also be provided to both the entity that let the prime contractor that let the subcontract. In either case, the entities receiving such notice, if within the jurisdiction of the Tribe, shall be parties to all further negotiations, hearing, and appeals. The Director shall seek to achieve an informal settlement of the alleged violation.

**Sec. 119. Formal Notice of Alleged Violation and Rights to Hearing.**

If the Director, pursuant to Sec. 118, is unable to achieve an informal settlement of the alleged violation, he shall issue a formal notice of alleged violation, which shall also advise the covered employer or entity of his right to request a compliance hearing.

The formal notice shall set out the nature of the alleged violation and the steps that must be taken to come into compliance. It shall provide the employer or entity with a reasonable time, which in no event shall be less than five days from the date of receipt of such notice, to comply, unless the Director has reason to believe irreparable harm will occur during that period, in which case he may require that compliance occur within fewer than five days. If the party fails or refuses to comply, he may request a compliance hearing before the Commission, which shall be held no sooner than five days and no later than 30 days after the date for compliance set forth in the Director's notification to the party charged of a violation, unless an expedited hearing is necessary by the Commission to avoid irreparable harm. If a party fails or refuses to comply and does not request a hearing, the Commission may proceed pursuant to Sec. 124.

**Sec. 120. Bonds and Interim Relief.**

(1) If the party notified pursuant to Sec. 119 requests a compliance hearing, and the Director has good cause to believe that there is a danger that the party requesting that hearing will remove itself or its property from the jurisdiction of the Tribe prior to the hearing, he may seek and order of the Tribal Court to require the party to post a bond with the Commission in an amount sufficient to cover possible monetary damages that may be assessed against the party at the hearing.

(2) Good cause includes, but is not limited to, the following circumstances:

(a) The party has no permanent place of business on the Standing Rock Sioux Reservation; and the amount of the sanctions exceeds or likely will exceed \$1,000; and the project on which the party is employed will be substantially completed within 60 days, such that it may be difficult to locate property of the party on the Reservation that would be available for attachment or confiscation if the party fails to pay any sanction imposed on it; or

(b) The party has failed to comply with an order of the Commission or the Courts in the past, and the entity has engaged in behavior that demonstrates a blatant disregard for the authority and requirements of the Commission, such that the Director or the Commission has good reason to believe the entity will not comply with the orders of the Commission or the Court.

(3) If the party fails or refuses to post the bond, the Commission may proceed pursuant to Sec. 124. The Director may also petition the Standing Rock Sioux Tribal Court for such interim and injunctive relief as to appropriate to protect the rights of the commission and other parties

during the pendency of the complaint and hearing proceedings, as provided in Sec. 125.

**Sec. 121. Compliance Hearing.**

The compliance hearing provided for in Sec. 119 shall be conducted by the Commission, pursuant to Section 122 and 123 and such rules of practice and procedures as may be adopted by the Commission. The Commission shall not be bound by technical rules of evidence in the conduct of hearing under this Ordinance, and no informality in any aspect of the proceeding, such as the manner of taking testimony, shall invalidate any order, decision, rule or regulation made, approved, or confirmed by the Commission. No stenographic record of the proceedings and testimony shall be required except upon arrangement by, and at the cost of, the party charged with the violation.

**Sec. 122. Pre-Hearing Procedures for Compliance Hearings.**

(1) Review of Files. The respondent (the employer or entity against whom a charge has been filed) shall have the right to review the case file of the Director by scheduling a visit to the Office during regular working hours at any point after receiving notice alleged violation. The Director shall have the right to delete any portion of the file necessary to protect confidential information. The deletions shall be made in a manner that causes the loss of the least amount of relevant information from the files. All deleted information shall be retained by the Director in a confidential file.

(2) List of Witnesses. At least 10 days prior to the hearing (or as soon as possible if the hearing is to be held within 10 days of the notice) the respondent and the Director shall submit to the Commission Chairman a list of witnesses each intends to call at the hearing, the approximate length of their testimony, and the subject matter and relevance of their testimony. The list shall indicate any witnesses that must be subpoenaed. The Director shall then submit the list to the Tribal Court which may issue the subpoenas.

(3) Pre-Hearing Interviews of Witnesses. The respondent and the Director shall have the right to interview the witnesses of the other party, prior to hearing. The Director's witnesses shall be interviewed in the presence of the Director or his delegate. The respondent's witnesses shall be interviewed under such reasonable conditions as are established by the respondent. Either party may appeal to the Chairman of the Commission if cooperation is not forthcoming on this matter and the Chairman is empowered to require such steps as are necessary to resolve the problem.

(4) Subpoenas of Documents and Things. At least 10 days prior to the hearing (or as soon as possible if the hearing is to be held within 10 days of the notice) the respondent shall provide the Director with a list of items it wishes to have subpoenaed and the relevant items listed. The Director shall submit the list to the Tribal Court which may issue subpoenas. Any disputes shall be brought to the Chairman of the Commission who shall resolve such disputes.



(5) Postponements. Any request for a postponement of the hearing must be submitted in writing to the Chairman of the Commission no fewer than three days prior to the hearing. However, if the Director and respondent jointly submit a request for a postponement because there is possibility of settling the matter, the request for a postponement may be submitted at any time.

**Sec. 123. Compliance Hearing Procedures.**

(1) Presiding Officer. As presiding officer, the Chairman of the Tribal Employment and Contracting Rights Commission shall control the proceeding, and shall take whatever action is necessary to insure an equitable, orderly, and expeditious hearing. Parties shall abide by the presiding officer's ruling. The presiding official has the authority, among others, to: administer oaths or affirmations; regulate the course of the hearing; rule on offers of proof; limit the number of witnesses when testimony would be unduly repetitious; and exclude any person from the hearing for contemptuous conduct or misbehavior that obstructs the hearing.

(2) Director. The Director shall represent the Tribal Employment and Contracting Rights Office on all hearings before the Commission, even if the hearing is on a charge that was initiated by a complaint filed by a private individual.

(3) Respondent. The respondent shall be present for the entire hearing and he/she shall represent himself/herself, or his/her representative (other than an attorney) shall represent him/her, during the proceedings.

(4) Attorneys. Either party may have an attorney present as an advisor.

(5) Recording of the Hearing. The Commission shall have the hearing tape recorded in full and shall retain the recording for no less than one year after the hearing. The respondent shall also be permitted to record the hearing.

(6) Prohibition Against Reprisals. All parties shall have a right to testify on their own behalf, without reprisal.

(7) Starting Time. The hearing shall be opened promptly at the time specified by the Commission.

(8) Opening Statement. Both parties will be afforded the opportunity present opening statement with respect to what they intend to prove at the hearing.

(9) Order of Proceeding. The Director will present the Office's case first.

(10) Examination and Cross-Examination of Witnesses. Both parties may subpoena and examine friendly and hostile witnesses and may cross-examine such witnesses. However, no harassment or efforts to intimidate witnesses shall be permitted. The Commission members may examine witnesses at any point in their testimony. The testimony of all witnesses shall be under oath or affirmation.

(11) Irrelevant Testimony. Parties may object to clearly irrelevant material, but technical objections to testimony as used in a court of law will not be entertained. The Commission shall prohibit any testimony that it deems clearly irrelevant in order to maintain control of the hearing.

(12) Written Testimony. Written testimony will be admitted into evidence during the hearing only when a witness cannot appear in person. When a party wishes to use the written testimony of a witness who cannot appear, the party must submit to the Commission, in advance of the hearing, a written explanation for the non-appearance of interrogatories. When, for reasons satisfactory to the Commission, interrogatories cannot be used. A signed, but un-sworn, statement will be admitted into evidence only under unusual circumstances and when the Commission is satisfied that the testimony is reliable and cannot be obtained otherwise.

(13) Closing Statement. Both parties will be afforded the opportunity to make closing statements.

(14) Audience. Enforcement hearings shall be open to the public, unless the parties agree that the hearing shall be closed.

**Sec. 124. *Decision and Civil Sanctions.***

If, after notice and hearing as provided for herein, the Commission determines that the alleged violation or violations have occurred and that the party charged has no adequate defense in law or fact, or after notice and without hearing, if no hearing is requested, or if the party fails to post any bond required pursuant to Sec. 120, the Commission may impose any or all of the following sanctions and any other sanctions authorized by this Ordinance:

- (a) deny the right of such party to conduct any further business within the Standing Rock Sioux Reservation;
- (b) suspend such party's operation with the Standing Rock Sioux Reservation;
- (c) terminate such party's operation with the Standing Rock Sioux Reservation;
- (d) deny the right of such party to conduct any further business within the Standing Rock Sioux Reservation;
- (e) impose a monetary civil penalty on such party of up to \$500.00 for each violation. Each day during which a violation exists shall constitute a separate violation;
- (f) order such party to make payment of back pay or other damages to any aggrieved Indian or aggrieved Indian-preference certified firm;
- (g) order such party to dismiss any employees hired in violation of the Tribe's employment rights requirements;
- (h) order such party to take such other action as is necessary to ensure compliance with this Ordinance or to remedy any harm caused by a violation of this Ordinance, consistent with the requirements of 25 U.S.C. 1301 et seq.

The Commission's decision shall be in writing and shall be served on the charged party by registered mail or in person no later than 30 days after the close of the compliance hearing. Where the party's failure to comply immediately with the Commission's orders may cause irreparable harm, the Commission may move the Tribal Court, and the Tribal Court may grant, such injunctive or other relief as is necessary to preserve the rights of the beneficiaries of the Ordinance, pending the party's appeal or expiration of the time for appeal.

**Sec. 125. Irreparable Harm.**

A finding of irreparable harm, such that the Director, pursuant to Sec. 120, or the Commission, pursuant to Sec. 124, may petition the Court for injunctive relief, which shall be granted only upon a showing that damage will occur that cannot be adequately remedied through the payment of monetary damages. Such a showing includes, but is not limited to, the following:

(1) That a contractor or subcontractor is about to or has begun work on a contract or subcontract entered into in violation of the provisions of this Ordinance or Commission rules, regulations or guidelines requiring contract or subcontract preferences, when there are one or more Indian firms available to perform the contract or subcontract. In this circumstance it may be impossible to measure in monetary terms the damages suffered by an Indian firm's failure to obtain a contract or subcontract.

(2) That an entity or its subcontractors is about to or has hired four or more persons in violation of the provision of this Ordinance or Commission rules, regulations or guidelines requiring Indian employment preference, and there are Indians available to fill those positions. In this circumstance it is difficult to identify the specific Indians who would fill those positions once the number of positions at issue is four or greater, making the payment of back pay difficult to achieve.

(3) That an entity refuses to submit a preference plan in the time required and indicates through word or action that it intends to disregard the requirements imposed by this Ordinance or Commission rules, regulations, or guidelines.

**Sec. 126. Appeals.**

(1) An appeal to the Tribal Court may be taken from any final order of the Commission by any party adversely affected thereby, except as otherwise expressly provided herein. The appeal must be filed no later than 20 days after the party receives a copy of the Commission's decision. The Tribal Court shall uphold the decision of the Commission unless it is demonstrated that the decision of the Commission is arbitrary, capricious or in excess of the authority of the Commission. The appeal shall be taken by filing a written notice of appeal with the Tribal Court, and delivering a copy to the Director, within 20 days after the date on which the party received a copy of the Commission's decision. The notice of appeal shall:

- (a) set forth the order from which appeal is taken;

- (b) specify the grounds upon which reversal or modification of order is sought;
- (c) be signed by appellant.

(2) The Tribal Court may, for good cause shown, issue a stay of the order of the Commission pending the determination on the merits the Tribal Court. The Director may petition and, for good cause shown, as provided in Sec. 120, the Court may order the party taking an appeal to post a bond sufficient to cover monetary damages that the Commission assessed against the party or to assure the party's compliance with other sanctions or remedial actions imposed by the Commission's order, if the order is upheld by the Court.

(3) If the order of the Commission is reversed or modified, the Court shall by its mandate specifically direct the Commission as to what further action shall be taken by the Commission in the matter, including the making and entering of any orders in connection therewith, and the limitations, or conditions to be contained therein.

**Sec. 127. Enforcement of Commission's Order.**

If the Commission's order is upheld by the Tribal Court on appeal, or if no appeal is sought within 20 days from the date of the respondent's receipt of the Commission's order, the Commission may petition the Tribal Court and the Court shall grant such orders as are necessary and appropriate to enforce the ordered of the Commission and the sanctions imposed by it.

**Sec. 128. Attachment.**

(1) If at any stage in the enforcement process, the Commission has reason to believe there is a danger that a party will remove itself or its property from the jurisdiction of the Tribal Court, such that the Commission or the Court will not be able to collect monetary damages or Employment and Contracting Rights Fees that are owed by that party pursuant to any outstanding order of the Commission or Court, or which may be owed if the charges set out in any outstanding notice of violations are upheld, the Commission may petition the Tribal Court pursuant to the rules and procedures of that Court to attach and hold sufficient property of the party to secure compliance or for such other relief as is necessary and appropriate to protect the rights of the Commission and other affected parties.

(2) Grounds upon which the Commission may petition the Tribal Court to attach and hold property include, but are not limited to, the following:

- (a) the entity has refused or failed to post a bond after being so ordered to do, as provided herein, or
- (b) the Commission has good reason to believe that entity will remove itself or its property from the Reservation before the Commission can complete its effort to require the entity to post a bond; or
- (c) the entity has demonstrated, through its behavior, an intent to disregard the requirements and orders of the Director, Commission or Court.

**Sec. 129. Confiscation and Sale.**

If, 21 days after the date on which respondent received a copy of the decision by the Commission pursuant to Sec. 124, no appeal has been filed, or 30 days after a decision by the Court on an appeal pursuant to Sec. 126 from a decision by the Commission, the respondent has failed to pay monetary damages imposed on it or has otherwise failed to comply with an order of the Commission or the Court, the Commission may petition the Court to order an official or employee of the TERO, accompanied by a law enforcement officer of the Tribe or Bureau of Indian Affairs, to confiscate, and hold for such sale, such property of that respondent as is necessary to ensure payment of said monetary damages or to otherwise achieve compliance. The petition shall be accompanied by a list of property belonging to that respondent which the Commission has reason to believe is within the jurisdiction of the Tribal Court, the value of which approximates the amount of monetary damages at issue. If the Court finds the petition to be valid, it shall order an official or employee of the TERO office, accompanied by a law enforcement officer of the Tribe or the Bureau of Indian Affairs, to confiscate and hold such property or as much as is then available. The official or employee of the TERO office shall deliver in person or by certified mail, a notice to the party informing it of the confiscation and of its right to redeem the confiscated property by coming into compliance with the order outstanding against it. If, 30 days after confiscation, the party has not come into compliance, the property shall be used to pay any outstanding monetary property, and the proceeds shall be used to pay any outstanding monetary damages imposed against the party by the Commission or the Court, and all costs incurred by the Court, TERO office, and police in the confiscation and sale. Any proceeds remaining shall be returned to the party.

**CHAPTER 2. INDIAN PREFERENCE IN EMPLOYMENT**

**Sec. 201. Employment Preference Required.**

All covered employers, for all positions involving employment within the Standing Rock Reservation, shall give preference to qualified Indians in the order of priority set forth in Sec. 202, in all hiring, promotion, training, layoffs, and all other aspects of employment. Such employers shall comply with all other applicable rules, regulations, guidelines, and orders of the Tribal Employment and Contracting Rights Commission. The requirements of this Chapter shall not apply to any direct employment by the federal, state or Standing Rock Sioux Tribal governments or their agencies, subdivisions, but shall apply to all contractors or grantees of such governments who meet the definition of covered employer in Sec. 102 and to all entities chartered by the Standing Rock Sioux Tribe that meet the definition of covered employer in Sec. 102.

**Sec. 202. Priority of Employment Preferences.**

(1) Except provided in subsection (2) of this section, the employment preference provided for in this Chapter shall be given according to the following priority: first preference to enrolled members of the Standing Rock Sioux Tribe ("Tribal members"); second preference to local Indians who are not members of the Standing Rock Sioux Tribe; third preference to other Indians; and fourth to all other applicants.

(2) In any instance in which applicable federal law or regulations prohibit a preference based upon membership in a particular Tribe, the employment preference provided for in this Chapter shall be given according to the following priority, instead of the priority in subsection (1) of this section: first preference to local Indians; second preference to other Indians; and third to all other applicants.

**Sec. 203. *Employment Preference Compliance Plan.***

Every covered employer must submit an acceptable employment preference compliance plan to the Tribal Employment Rights and Contracting Rights Office ("Office"). No new employer may commence work on the Reservation until it has met with Director or his delegate and developed an acceptable plan for meeting its obligations under this Ordinance. The employment preference compliance plan shall show the number of man hours, by craft and skill category, needed on the project. The employer shall also identify those persons it wished to have approved as permanent and key employees (see Sec. 205). The plan shall also describe how the employer will participate in the Tribe's training programs.

**Sec. 204. *Tribal Hiring Hall.***

A covered employer may recruit and hire workers from whatever sources are available to him and by whatever process he so chooses; provided, that except as allowed by Sec. 205, he may only employ a Tribal member (or local Indian in cases where federal law or regulations prohibit preference based on membership in a particular Tribe) until they have given the Tribal Employment and Contracting Rights Office 72 hours to locate and refer a qualified Tribal member (or local Indian). However, in cases where a worker is needed in a shorter period of time, the employer may request from the Office a reduction of the 72 hour waiting period, and said request shall be granted so long as the employer can demonstrate that the need exists.

Where the employer or the Office cannot locate a qualified STANDING ROCK Tribal member or local Indian, they shall make best faith effort to locate, refer and hire an Indian who is not a Tribal member or does not qualify as a local Indian, but who is a member of another Tribe.

**Sec. 205. *TERO Wage Rates.***

The TERO Commission sets the minimum wage rates for work for the Standing Rock Sioux Tribe unless higher wage rates are set under the Davis Bacon Act, in which the Davis-Bacon wage rates control. In the event of conflict, the higher of the TERO wage rates, or the Davis-Bacon wage rates now or hereafter or prior set by the Department of labor control.

**Sec. 206. *Permanent and Key Employees.***

Prior to commencing work on the Reservation, a prospective covered employer (including contractors or subcontractors) shall identify key, regular, permanent employees. Such employees may be employed on the project whether or not they are Tribal members or local Indians. A regular, permanent employee is one who is and has been on the employer's or subcontractor's annual payroll, or is an

owner of the firm (in contrast with one who is hired on a project-by-project basis). A key employee is one who is in a top supervisory position or who performs a critical function such that an employer would risk likely financial damage or loss if that task were assigned to a person unknown to the employer. The fact that an employee had worked for the employer on previous projects shall not qualify that employee as a regular, permanent employee; provided, that exceptions for superintendents and other key personnel who are not permanent, regular employees may be granted by the Director on a case-by-case basis. Any covered employer which fills vacant employment positions in its organization immediately prior to undertaking work on the Reservation shall set forth evidence acceptable to the Director that his/her actions were not intended to circumvent these requirements. The Office shall issue a permit to each key or key regular permanent employee that it approves.

**Sec. 207. Work Permits.**

(1) No person who is not a Standing Rock Tribal member shall be employed by a covered employer until he has obtained a work permit from the Office.

(2) Work permits shall be granted under the following circumstances:

- (a) To all key regular permanent employees listed in the employer's preference plan who are certified by the Director as meeting the criteria for key and regular permanent employees. Upon approving the plan, the Office shall issue work permits to the approved key regular permanent employees.
- (b) To all local Indians referred to the employer by the Office pursuant to Sec. 204.
- (c) To all local Indians hired by the employer in any instance in which applicable federal law or regulations prohibit a preference based on membership in a particular Tribe.
- (d) To local Indians, non-local Indians, or non-Indians hired after the employer has asked the Office to locate and refer a qualified Tribal member or local Indian and the Office has been unable to do so within the time provided by this Ordinance. When the Office has been unable to do so within the time provided by this Ordinance. When the Office has been unable to locate and refer a Tribal member or local non-Indian within the time provided, the employer shall request and the Office shall issue such work permits.
- (e) To a person employed by a covered employer where the person is employed on the Reservation in a permanent position and he began his employment before the effective date of this Ordinance.
- (f) To an owner of an entity that is a covered employer, where such owner will be performing work for his entity. Prior to commencing work, such person shall demonstrate that he is a legitimate owner of the entity and shall request a work permit. Upon the Director's finding that the person is a legitimate owner, the Office shall issue the person a work permit.

- (g) To such other persons that the Commission determines are entitled to a permit.

(3) **Emergency hire provision:** Under extreme circumstances where an employee is needed to fill a vacancy during off business hours when the TERO is unavailable, the employer will be allowed to hire employees necessary to meet the emergency for a minimum of three days or until TERO can be notified of the circumstances and approve the individual or dispatch another Preferred Employee.

Emergency hires will be limited by the Director and will be allowed on a case by case basis. Any abuse concerning this provision will result in sanctions as given in Sec. 207.

**Sec. 208. *Civil Sanctions for Work Permit Violations.***

(1) Except as provided in subsection (2), any non-member of the Standing Rock Sioux Tribe who does not have a valid work permit and is found to be employed by a covered employer shall be summarily removed from the job, and the employer shall be subject to such additional sanctions under this section, the Commission shall consider such factors as whether:

- (a) the violation as unintentional;
- (b) the employer acted quickly to remove the employee at issue; and
- (c) the employer has not been cited for other work permit violations in the past.

(2) Subsection (1) shall not apply if (a) applicable federal law or regulations prohibit the covered employer from complying with a preference based on membership in a particular Tribe, and (b) the employee is a local Indian, and (c) the employee promptly applies for and receives a work permit.

**Sec. 209. *Termination.***

The preference priorities set forth in Sec. 202 shall be observed in terminating employment. Thus, within particular craft or position classification, so long as the remaining workers meet the threshold qualification for the position: non-Indians who are not members of the Standing Rock Sioux Tribe, then local Indians who are not members of the Tribe, prior to termination of a Tribal member. Provided, that in any instance in which applicable federal law or regulation prohibits a preference based on membership in a particular Tribe, the order of termination shall be as follows: first, non-Indians, and then non-local Indians regardless of the Tribe of which they are a member, before local Indians are terminated. Further, if the employer lays off by crews, transfers of workers entitled to preference in accordance with Sec. 202. shall be made between crews, so that the foregoing order of termination is observed.

**Sec. 210. *Unions.***

A covered employer who has a collective bargaining agreement with one or more labor unions must obtain a written agreement from each such union indicating that it will comply with these Indian preference requirements. Specifically, the



employer may make initial job referral requests to the union. However, if the union does not have qualified Tribal member (or a qualified local Indian when applicable federal law or regulations prohibit preference based on membership in a particular Tribe) on any of its out-of-work lists, the union shall contact the Office. If the Office can identify a qualified Tribal member (or local Indian), that worker shall be referred through the union hiring hall to the job site. Until the union has so contacted the Office, the union may only refer a Tribal member (or local Indian when federal law or regulations prohibit preference based on membership in a particular Tribe). Before referring the non-Tribal member, non-local Indian, or non-Indian to the job site, the union shall request and the Office shall issue a work permit for that worker.

No Indian worker shall be required to travel to a site off the Reservation to be processed by the union hiring hall. Such processing shall be done in person on the Reservation, or by telephone or mail.

Any Indian worker who does not wish to become a member of the union shall be granted a temporary permit for the duration of the project. Such worker shall not pay union dues and shall not be required to pay an initiation fee, but have the benefits added into their wages.

**Sec. 211. Training.**

All covered employers, as requested by the Office, shall participate in training programs to assist Indians in becoming qualified in the various job classification used by the employer. Employers engaged in construction shall participate in a Tribe's certified training program or a union apprenticeship program. All trainees or apprentices shall be Tribal members or local Indians. Where an employer is not presently participating in a union apprenticeship program, the Tribe shall make a best effort to bear the costs of such training programs, but employers may also be required to bear part of such costs. Employers with collective bargaining agreements with unions may use union apprenticeship programs, so long as they obtain bargaining agreement from the unions to use only Indian apprentices on the program.

**Sec. 212. Job Qualifications, Personnel Requirements and Religious Accommodation.**

A covered employer may not use any job qualification criteria or personnel requirements which serve as barrier to the employment of Indians and which are not required by business necessity. In any action challenging such job qualification criteria or personnel requirements, the burden shall be on the Director or his delegate to demonstrate that a criterion or personnel requirement is a barrier to Indian employment. The burden shall then be on the employer to demonstrate that such criterion or requirement is to eliminate the criterion or personnel requirement at issue. Employers shall also make reasonable cultural accommodation to the religious beliefs and traditions of Indian workers. In implementing these requirements, the Director or his delegates shall be guided by the principles established by the Equal Employment Opportunity Commission Guidelines, particularly 29 CFR Parts 1604 through 1607. However, the Director

or his delegates reserves the right to go beyond the EEOC principles in order to address employment barriers that are unique to Indians.

Where the Director or his delegates and the employer are unable to reach agreement on the matters covered in this section, the Director shall seek an informal settlement as provided in Sec. 118. If an informal settlement is not reached the Director shall make a determination on the issues and shall order such actions as he deems necessary to bring the employer into compliance with this section, as provided in Sec. 119. The employer may then pursue his hearing and appeal rights, as set forth in Sections 119-129.

**Sec. 213. Promotion.**

Covered employers shall comply with the preference priorities set forth in Sec. 202 in considering employees for all promotion opportunities and shall encourage Tribal members and local Indians to seek such opportunities. For all supervisory positions filled by anyone other than a Tribal member (a local Indian in instances where federal law or regulations prohibit preference based on membership in a particular Tribe), the employer shall file a report with the Office stating which Tribal members (or local Indians), if any, applied for the job, the reasons why they were not given the job, and what efforts were made to inform Tribal member employees (or local Indian employees) about the opportunity.

**Sec. 214. Student Employment.**

Employers shall make every effort to promote after-school, weekend, and vacation employment for Indian youth. Covered employers shall give preference in the hearing of student help in accordance with the preference priorities set forth in Sec. 202.

**Sec. 215. Retaliation.**

No employer shall punish, terminate, harass, or otherwise retaliate against any employee or other person who has exercised his right under this Ordinance or has assisted another in doing so. Further, any employer who harasses or abuses an employee of the Office who is carrying out official duties under this Ordinance shall be subject to removal from the Reservation pursuant to the Tribe's Exclusion Ordinance. An employer shall be responsible for the actions of all of its employees, supervisory or otherwise, and for the actions of its contractors and subcontractors and their employees in regard to the prohibitions contained in this section.

**Sec. 216. Counseling and Support Programs.**

The Office, in conjunction with other Tribal and federal offices, will provide counseling and other support services to Indians employed by covered employers to assist such Indians in retaining employment. Employers shall be required to cooperate with such counseling and support services.

## CHAPTER 3. INDIAN PREFERENCE IN CONTRACTING AND SUBCONTRACTING

### Subchapter A. Contracting and Subcontracting Preference Requirements

#### **Sec. 301. Contracting and Subcontracting Preference Required.**

Every covered entity awarding any contract or subcontract in an amount of \$500.00 or more, where the majority of the work on the contract or subcontract will occur within the exterior boundaries of the Standing Rock Sioux Tribe, including but not limited to contract or subcontracts for supplies, services, labor, and materials, shall give preference in contracting and subcontracting to qualified entities that are certified by the Commission as 100% Indian owned operated, managed and controlled, so long as there are certified firms that are technically qualified and willing to perform the work at a reasonable price, as defined in Sec. 308. These requirements shall not apply to the award of contracts by the federal, state, or Standing Rock Sioux Tribal governments, and agencies and subdivisions, but shall apply to all contractors and grantees of the federal, state, or Tribal governments or their agencies and subdivision thereof, with respect to all subcontractors awarded by such contractors or grantees, and to entities chartered by the Standing Rock Sioux Tribe. If the covered entity determines that certified firms lack the qualifications to perform all of the work required under a contract or subcontract, the entity shall make a good faith effort to divide the work so that certified firms can qualify for at least a portion. A list of firms certified as Indian preference eligible by the Commission may be obtained from the Tribal Employment and Contracting Rights Office ("Office").

#### **Sec. 302. Priority of Contracting and Subcontracting Preference.**

First preference shall be given to Indian preference certified firms, certified by the Commission pursuant to Subchapter B of this Chapter as being 100% owned, operated, managed and controlled by Indians. Second preference shall be given to Indian preference certified firms that are 51 percent or more Indian owned, operated, managed and controlled by Indians. If no Indian preference certified firms are available, Indian/non-Indian joint ventures approved by the Commission shall be given preference over wholly non-Indian owned firms or wholly non-Indian joint ventures.

#### **Sec. 303. Compliance with Federal Law.**

If any requirement of this Chapter is inconsistent with applicable requirements of federal law or regulations, the latter shall take precedence.

#### **Sec. 304. Contracting and Subcontracting Preference Compliance Plan.**

Every covered entity, contractor, and subcontractor intending to engage in a business activity on the Reservation must, prior to the time it commences work on the Reservation, submit a contracting and subcontracting compliance plan to the Office. No covered entity, contractor or subcontractor may commence work on the Reservation until it has met with the Director or his/her delegate and has

developed an acceptable plan for meeting its obligations under these regulations. The contracting and subcontracting plan shall indicate all contracts that will be entered into by the entity and projected dollar amounts thereof. If the entity has already selected a firm to perform any contract or subcontract work, it shall list the name of that firm and indicate whether or not it is a firm certified as Indian preference eligible by the Commission pursuant to Subchapter B of this Chapter. If it is not a certified firm, the entity shall further indicate why each certified firm, if any, registered with the Office, that was technically qualified to perform the work, was not selected. The plan shall also indicate how the entity intends to comply with this Chapter when awarding contracts and subcontracts not yet awarded at the time the plan is submitted.

**Sec. 305. Responsibility for Compliance.**

The covered entity letting the contract shall be responsible for the compliance by all its contractors and subcontractors with these regulations; provided, that if the entity letting the contract is the United States, the State, the Tribe, or an agency or subdivision thereof, the prime contractor shall be responsible for such compliance.

(1) Construction. The entity awarding the construction contract shall be responsible for compliance with the requirement that preference be given in the award of the prime contract and for ensuring that the prime contractor is in compliance with the requirement that preference be given in the selection of subcontractors; provided, that when the prime contract is awarded directly by the United States, the State, or the Tribe, or any agency or subdivision thereof, the prime contractor shall be responsible entity; and provided further, that pursuant to Sec. 303, where the entity is an Indian Housing Authority (IHA), it shall not be subject to any monetary sanctions provided in this Ordinance or in the rules, regulations and guidelines of the Commission, and shall be exempt from any requirements of these regulations that are inconsistent with the Department of Housing and Urban Development's Indian preference regulations.

The Tribe shall not be liable for any losses incurred by the entity letting the prime contract because it has entered into a contract with a prime contractor which, because of its failure to provide adequate proof that it will fully comply with the subcontract preference requirements of this Chapter (e.g., through the submission of an acceptable subcontractor plan as required by Sec. 304), is not permitted to commence work on the Reservation.

(2) Natural Resource Development (Oil, Gas, Hard Rock Mineral, Timber, etc.). The entity obtained the authorization from the Tribe or other landowner to engage in development activities on the reservation shall be responsible for compliance with these regulations by all of its contractors and subcontractors.

**Sec. 306. Requirements in Contracting.**

Preference shall be given to certified firms in the award of all covered contracts. An entity may select its contractor in any manner or procedure it so chooses; provided that:

- (1) Competitive Award. If the entity uses competitive bidding or proposal, competition shall be limited to certified firms, as provided herein. If the entity is unsure if there are any qualified certified firms, it may first publish a prior invitation for certified firms to submit a Statement of Intent to respond to such a limited advertisement when published, and to furnish, with the Statement of Intent, evidence sufficient to establish their technical qualifications. If the entity fails to receive any Statement of Intent from a technically qualified certified firm, it may, after so notifying the Office, advertise for bids or proposals without limiting competition to certified firms, and may award the contract to the low bidder. If only one certified firm submits a bid or Statement of Intent, the entity (unless otherwise prohibited by federal law or regulations) shall enter into negotiations with that firm and shall award the contract to that firm so long as the firm is technically qualified and is willing to perform the work at a reasonable price, as defined in Sec. 308.
  
- (2) Negotiated Award. If the entity selects its contractor through negotiations or other informal process, it may not enter into a contract with a non-certified firm unless it has contracted every certified firm in the relevant field and has determined that there is no certified firm available that is technically qualified to perform the work at a reasonable price as defined in Sec. 308. So long as a certified firm meets the minimum threshold qualifications and the reasonable price requirement, no non-certified firm may be selected.

**Sec. 307     *Requirements in Subcontracting.***

(1) General Requirements. Preference shall be given to certified firms in the award of all covered subcontractors. The contractor may select its subcontractors in any manner it so chooses; provided that:

If the contractor uses competitive bidding or proposal, competition shall be limited to certified firms as provided herein. If the contractor is unsure if there are any qualified certified firms, it may first publish a prior invitation for certified firms to submit a Statement of Intent to respond to such a limited advertisement when published, and to furnish, with the Statement of Intent, evidence sufficient to establish their technical qualifications. If the contractor fails to receive any Statement of Intent from a technically qualified firm, it may after so notifying the Office, advertise for bids or proposals without limiting competition to certified firms, and may award the subcontract to the low bidder. If only one certified firm submits a bid or Statement of Intent, the contractor shall enter into negotiations with that firm and shall award the subcontract to that firm so long as the firm is technically qualified and is willing to perform the work at a reasonable price, as defined in Sec. 308.

If the contractor selects its subcontractor through negotiations or other informal process, it may not enter into a contract with a non-certified firm unless it has contacted every certified firm in the relevant field and has determined that there is not a certified firm available that is technically qualified to perform the work required at a reasonable price, as defined in Sec. 308. So long as a certified

firm meets the minimum threshold qualifications and the reasonable price requirement, no non-certified firm may be selected to perform the work.

(2) Special Requirements for Construction Subcontracting. All entities awarding construction contracts shall comply with the following special requirements in the award of subcontracts:

- (a) The bid notice shall require that each bidder submit, as part of its bid, a subcontract plan as provided for in Sec. 304. The subcontract price information for each bidder shall be made available to the Office and shall be used to ensure that a contractor has not engaged in bid shopping as a means to discourage certified firms or to force them to accept a subcontract at an unreasonable low price.
- (b) It shall be illegal for any contractor or bidder to engage in work on the Reservation or, if engaged in work, shall be liable for treble damages for any losses suffered by a certified firm as a result of the contractor's bid shopping practices. The Office reserves the right to require any contractor to demonstrate that a reasonable relationship exists between the dollar amount of a proposed subcontract and the reasonable costs of supplies, materials, and labor.
- (c) The contractor shall not be prohibited from the requiring that a subcontractor provide some form of security. However, if a subcontractor bonding requirements has been imposed and an Indian firm is unable to obtain a bond, the prime contractor must permit the Indian subcontractor to provide another adequate form of security. Acceptable bonding alternatives include: no bond required on amounts up to \$25,000; surety bonds; cash bonds up to 25% held in escrow by a bank; increased retainers up to 25% instead of normal; letter of credit for 100%; letter of credit for 10% with cash monitoring system; cash monitoring system; other options may be considered as they arise. The final decision on whether an alternative form of security is sufficient shall rest with the Commission.
- (d) If it is determined that there is no certified available and qualified to perform a particular subcontract because the subcontract is too large for the capacity of any one certified firm, the contractor shall make a good faith effort to divide that subcontract into smaller pieces so that several certified firms may qualify to perform the work.

***Sec. 308. Responsibility of Evaluating Technical Qualifications and Reasonable Price.***

(1) Technical Qualifications. The covered entity and its contractors and subcontractors shall have the discretion to determine technical qualifications. If

the entity determines that there are no certified firms that are technically qualified, the entity must provide to each certified firm it rejects a description, in writing, of areas in which it believes the firm is deficient and steps it could take to upgrade its qualifications.

If a certified firm that was disqualified on the grounds of technical qualification believes that the disqualification was the result of an improper effort by an entity, contractor, or subcontractor, to circumvent its preference responsibilities under this Ordinance, the certified firm may file a complaint with Director. The complaint shall be filed within 20 days after the firm was notified of its non-qualification. The burden shall be on the complaining firm to demonstrate that it is qualified and that its disqualification was the result of an effort to circumvent this Ordinance. The complaint and subsequent proceeding shall be governed by Sections 114-129.

**(2) Reasonable Price.** An entity may use any process it so chooses for determining what constitutes a reasonable price, including, but not limited to, competitive bidding (open or closed), private negotiations, or the establishment of a prototype cost ceiling before bidding or negotiations commence. Before an entity may reject all technically qualified certified firms on the basis of price, it must enter into price negotiations with one or more such firms and must contract with one such firm an entity must enter into price negotiations with such firm and must contract with that firm if a reasonable price can be negotiated. No entity may reject a certified firm on the grounds that the price is not reasonable and subsequently contract with a non-certified firm at the same or higher price. Any contract modification executed between an entity and non-certified firm during the course of a project, which results in a higher price, will be subject to review by the Office to assure that the modification in price is justified and not a circumvention of this section. Any entity found to have violated this requirements by such circumvention shall be liable for treble damages for any losses suffered by a certified firm as a result of the entity's action.

***Sec. 309. Operation Under the Contract or Subcontract.***

Once an entity enters into a contract or subcontract with a certified firm, the Office will not intervene in any way in the relationship between the parties unless a certified firm demonstrates that action taken against it was intended primarily to circumvent the requirements of this Ordinance.

Subchapter B. Criteria and Procedures for Certifying Firms as Indian Preference Eligible

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***Sec. 350. Definitions.***

For purpose of this Subchapter, "Indian owner" means one or more Indian owners, and "non-Indian owner" means one or more non-Indian owners.

**Sec. 351. General Statement of Policy.**

The Indian contract preference requirements of this Ordinance are one tool for promoting the economic development of the Reservation. When used properly, Indian preference in contracting can assist in the development of Indian businesses and thereby assist the Tribe and its members to achieve economic self-sufficiency. However, if the preference is abused, it will undermine this development and discredit the preference tool. Because of this, it is the policy of the Tribe to require that an applicant for Indian contract preference certification provided rigorous proof that it is a legitimate Indian owned and controlled firm.

In evaluating an applicant, a number of specific criteria will apply. These criteria are set out in Sec. 352. However, experience has shown that persons interested in abusing the Indian preference program are able to structure firms to get around most specific criteria. Therefore, in addition to applying the specific criteria, the Commission shall evaluate a firm under the following general criterion: applying sound management principles, would the firm have been structured in the manner it is, and would the Indian owner have been given the amount of ownership and control he received, if there were no Indian preference program in existence? If the Commission determines that it has good reason to believe that the firm has been structured managerially or financially in a manner that is convoluted or inconsistent with sound business practices in order to enable the firm to qualify for Indian preference certification, the firm will be denied such certification, even if it meet the specific criteria, unless the firm is able to demonstrate beyond a reasonable doubt that it was not structured to manipulate the Indian preference criteria.

The specific criteria require that the ownership, operation, control, and management arrangements of a firm make sense from a sound business perspective. The Indian owner must own and control 100% of the firm to be certified for first preference, or 51% or more for second preference. One primary consideration in applying this criterion will be what the Indian owner brought to the firm in consideration for the extent of ownership given, and whether sound business practice would justify giving such an ownership share were Indian preference not a consideration. For example, assume the Indian owner paid for his firm through a promissory note to the previous non-Indian owner. In the ordinary course of business, such a transaction would not occur unless the new owner brought something of value, such a managerial or technical expertise, capital and equipment, or marketing opportunities. (The ability to qualify for Indian preference is not considered such a market opportunity.) Therefore, such an arrangement would preclude Indian preference certification unless some other sound business reason for the arrangement could be demonstrated. Where an Indian owner can demonstrate that he was unable to provide good value for his firm because the usual sources of capital were closed off to them because of being an Indian, that person shall be required to demonstrate that they extended a capital-raising ability as far as possible, such that they are "at risk" in a significant way--for instance, by mortgaging a house or vehicle.

For the firm to qualify for certification, the Indian owner must be directly involved in the firm's management. While it is not required that the Indian owner be Chief



Operating Officer of the firm, the Indian owner will have to be involved in the day-to-day operations of the firm on a full-time basis and in a senior level position. The Indian owner in this position must have the experience or expertise in the area of business the firm is engaged in (or in management generally) to make the senior level role a legitimate one. The Indian owner must also have sufficient knowledge about the firm to be accountable for the firm's activities.

There is virtually no benefit to the Indian community from passive ownership, other than profits to the owners. It could take several years for a firm to show a profit, if one in fact materializes. Yet during that time the non-Indian managers can benefit at the expense of the Indian community. The limited benefits to the Indian owner do not justify the risk.

Joint venture will not be granted certification as Indian preference firms. However, an Indian/Non-Indian joint venture will be given preference over a Non-Indian firm if there is no certified Indian preference unitary firm available and qualified.

Such rigorous criteria, giving substantial discretion to the reviewing body, are necessary and appropriate for the Indian community benefits from the establishment of "bogus" Indian firms, while the certification of such firms undercuts the credibility of the Tribe's Indian preference program. An Indian firm or individual that is unable, on its own, to qualify as the prime contractor on a large project has other options open to it besides participating in the development of a bogus firm. For example, the firm or individual can seek work at the subcontractor or employee level and benefit from the Tribe's requirement that preference be given to Indian subcontractors and employees.

The procedural requirements for certification provide that applications shall be reviewed by the staff of the Tribal Employment and Contracting Rights Office, which shall request any additional information it believes appropriate. It will then submit the application, along with its recommended finding, to the Commission. The Commission shall review the application and findings, interview the principals of the firm, request additional information as appropriate, and then make a determination on whether certification should be granted. The firm will have a right of appeal to the Tribal Court, as provided in Chapter 1 of this Ordinance. The Tribal Court shall reverse the decision only if it finds that the decision was arbitrary or capricious.

A firm shall first receive a probationary certification, to be made at the end of one year; or a longer period where the Commission believes such is necessary. The Office and the Commission shall have the right, at any time, either on their own initiative or upon the filing of a complaint by any party, to conduct an investigation of a firm to determine if its certification should be suspended or withdrawn.

***Sec. 352. Criteria for Indian Contract Preference Certification.***

To receive certification as a firm eligible for Indian contracting and subcontracting preference, an applicant must satisfy all of the criteria set out in this section.

(1) **Ownership.** The firm must be 100% Indian owned for first preference and 51% or more Indian owned for second preference. The applicant must demonstrate the following:

- (a) Formal Ownership. The one or more Indians own the required percentage of the partnership, corporation, or other arrangement for which the application is being submitted. Such ownership must be embodied in the firm's organic documents, such as its stock ownership or partnership agreement.
- (b) Value. That the Indian owner provided real value for his ownership by providing capital, equipment, real property, or similar assets commensurate with the value of their ownership share. It will not be considered "real value" if the Indian purchased his ownership share, directly or indirectly, through a promissory note, the ultimate creditor of which is a previous non-Indian owner of the firm or an immediate relation, thereof, or any similar arrangement unless a convincing showing can be made that the Indian owner brought such special skills, marketing connections, or similar benefits to the firm that there is a good reason to believe the arrangement would have been entered into even if there were not an Indian preference program in existence. Where the Indian owner can demonstrate that he could not pay real value for Indian ownership because the normal capital sources were closed to them because of being Indian that he/she extended their capital raising capability as far as possible, such that the Indian participant clearly is at risk in the business in relationship to their means.
- (c) Profit. That the Indian owner will receive 100% of all profits for first preference and 51% or more of all profits for second preference. If there is any provision that gives a Non-Indian a greater share of the profits, in whatever form and under whatever name, such as through management fees, equipment rental fees, to bonuses tie to profits, certification will be denied. Salary scales will be reviewed to ensure the relative salaries being paid Indian owners and non-Indian managers are consistent with the skills of the parties and are not being used to circumvent the requirement that the Indian owner receives the required percentage of the profits.

(2) Management and Control.

- (a) The firm must be under significant Indian management and control. The firm must be able to demonstrate one or more Indian owners are substantially involved, as a senior level official, in the day-to-day management of the firm as their primary employment activity. The Indian owner must have through prior experience or training, substantial occupational ties to the area of business in which the firm is engaged such that they are qualified to serve in the senior level position and is sufficiently knowledgeable about the firm's activities.

- (b) No joint ventures will be certified. However, an Indian/non-Indian joint venture that otherwise satisfies the requirements of these criteria shall be given preference over wholly non-Indian firms when no certified Indian firm is available.

**(3) Integrity of Structure.** There must be good reason to believe that the firm was not established solely or primarily to take advantage of the Indian preference program and in questionable cases shall deny certification. The Commission should consider:

- (a) History of the Firm. Whether the history of the firm provides reason to believe it was established primarily to take advantage of the Indian preference program, and in particular whether the firm, a portion of the firm, or key actors in the firm originally were associated with a non-Indian owned business that gained little of business value in terms of capital, expertise, equipment, etc., by changing ownership or by merging with an Indian firm;
- (b) Employees. Where key non-Indian employees of the applicant are former employees of the non-Indian firm with which the Indian firm is or has been affiliated, through a joint venture or other arrangement, such that there is reason to believe the non-Indian firm is controlling the application; and whether Indians are employed in all or most of the positions for which qualified Indians are available. A high percentage of non-Indian employees in such positions will provide reason to believe the firm was established primarily to benefit non-Indians;
- (c) Relative Experience and Resources. Whether the experience, expertise, resources, etc., of a previous non-Indian owner who now is in management position with the firm, is so much greater than that of the Indian owner that there is little sound business reason for the non-Indian manager to accept a junior role in the firm other than to be able to take advantage of the Indian preference program.

**(4) Brokers.** Brokers will be certified only if they are dealers who own, operate, or maintain a store, warehouse, or other establishment in which the commodities being supplied are bought, kept in stock, and sold to the public in the usual course of business; provided, that this requirement shall not apply where the firm demonstrates that it is customary and usual in the trade for a broker/dealer not to maintain an establishment and to keep the commodities in stock.

### **Sec. 353. Certification Procedures.**

**(1) Application for Certification.** A firm seeking certification as an Indian preference eligible firm shall submit a completed application to the Office on a form which may be obtained at the Office. Office staff will be available to assist a firm in filling out the application. Within 21 days after receipt of a completed application, the staff shall review the application, request such additional information as it believes appropriate, conduct such investigations as it deems appropriate, and submit an analysis and recommended disposition to the

Commission. Copies of the analysis and recommended disposition, the Commission shall hold a hearing on the application, posting notice of the hearing time at the Tribal Office, another public place on the Reservation, and the Tribal Employment and Contracting Rights Office at least five days prior to the hearing. Only the Indian owner of the firm shall be present at the hearing; provided, that any other party wishing to present information to the Commission shall be entitled to do so, by requesting, no less than one day prior to the hearing, an opportunity to participate. A party may not be represented by counsel. Hearing shall be conducted as provided for in the Sections 121-123 to the extent those sections are not inconsistent with this section.

(2) Probationary Certification. An application granted certification shall be issued a one-year probationary certificate. During that period, the TERO Office staff and the Commission shall monitor the firm's activities to ensure that the firm is operating in the manner described in its application. During the probationary period, the Office and the Commission shall have the rights to request and receive such information and documents as they deem appropriate.

(3) Final Certification. At the end of the probationary period, the Commission, after receiving recommendations from the Office staff, shall either:

- (a) grant full certification;
- (b) continue the probationary period for up to six months; or
- (c) deny certification.

(4) Withdrawal or Suspension of Certification. From the information provided in reports required by this Ordinance and any rules, regulations, and guidelines of the Commission, on the basis of a written grievance filed by any other firm or person, or on its own initiative, the Office may initiate proceedings to withdraw or suspend the certification of any firm. The Office shall prepare an analysis and recommend disposition for the Commission and shall send the firm notice, by registered mail, that its certification is being examined, along with the grounds therefore. The Commission shall then set a date for a hearing, which shall be held within 21 days after it receives the analysis and recommended disposition from the Office. At the hearing, the Director and Office staff shall present the case for suspension or withdraw, and the hearing shall be conducted as set out in Sections 121-123. After the hearing, the Commission may:

- (a) withdraw certification;
- (b) suspend certification for up to one year;
- (c) put the firm on probation, and/or
- (d) order that corrective action be taken within a fixed period.

A firm that has had its certification withdrawn may not reapply for a period of one year.

(5) Change in Status and Annual Reports. Each certified firm shall report to the Office, in writing, any changes in its ownership or control status within 60 days after such changes have occurred. Each certified firm, on the anniversary of its

receipt of permanent certification, shall update the information provided in its initial application on an Annual Report form provided by the office. Failure to provide information pursuant to these requirements shall constitute grounds for withdrawal of certification.

## **CHAPTER 4. MISCELLANEOUS PROVISIONS**

### ***Sec. 401. Compliance with EPA Ordinance.***

The Standing Rock Sioux Tribe has an Environmental Code in place which shall be applied to every project within the exterior boundaries of the Reservation.

### ***Sec. 402. Repeal of Prior Ordinance.***

Ordinance No. 97 (TERO), Ordinance No. 112 (Privilege of Operating Construction Business Tax) and all other ordinances, resolutions, and Tribal Council actions inconsistent with the provisions of this Ordinance are hereby repealed.



# Tribal Employment Rights Office



## Standing Rock Sioux Tribe

### COMPLIANCE PLAN AGREEMENT

ALL COVERED CONTRACTORS/SUBCONTRACTORS AND/OR COVERED EMPLOYERS ARE REQUIRED TO MEET WITH THE TERO DIRECTOR AND/OR HER DELEGATE PRIOR TO COMMENCING WORK.

Any covered entity and/or employer not submitting a **PROPOSED** completed compliance plan will be denied the right to commence work and/or business on the Standing Rock Indian Reservation. A **PROPOSED** completed compliance plan should be submitted at least two (2) weeks in advance. All contractors are required to submit a copy of the contract with the compliance plan to TERO.

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PRIME CONTRACTOR

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SUBCONTRACTOR

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PROJECT

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DATE

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START DATE

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COMPLETION DATE

#### Indian Preference Requirement:

Section 7(b) of the Indian Self-Determination and Assistance Act (25 U.S.C 450e (b)) will apply to contracts, subcontracts, grants or sub grants.

This agreement is entered into on this \_\_\_ day of \_\_\_\_\_, 20\_\_\_, between the **Standing Rock Sioux Tribe, Tribal Employment Rights Office(TERO)** and covered employer/entity \_\_\_\_\_ with respect to employment practices on the Standing Rock Sioux Indian Reservation on:

**Contract/Project Title Name:** \_\_\_\_\_

**Contract Number:** \_\_\_\_\_ **Location Site:** \_\_\_\_\_

1. **EMPLOYMENT PRIORITY:**

An employer shall notify TERO of all job vacancies, positions, or negotiated positions. TERO will use its Job Skills Bank to assist the employer in meeting the stipulated hiring goal for this project.

Any employer with two (2) or more employees must meet the hiring goals of TERO. TERO will maintain a Job Skills Bank listing available resident Indians by job classifications based on skill level as indicated in their TERO application to be used to fill vacancies, new positions, or any negotiated positions under this agreement.

The TERO Director shall be given **at least forty eight (48) hours advance notice** to locate and refer a qualified Indian applicant for any vacancies or new positions.

2. **PRE-EMPLOYMENT STANDARDS:**

For the purpose of this agreement, pre-employment standards are those direct job-related standards of fairness and ability which indicates that with a reasonable amount of job training a person would be capable of satisfactorily performing the entry job as well as jobs at a higher level, which, with a reasonable amount of further training, are normally filled by progression from the entry job. This provision applies to those persons who at the time of application for employment are not fully qualified for the available job but has general potential for becoming qualified through a reasonable amount of training.

a. **EMPLOYMENT RETENTION:**

Whenever an Indian employee referred by TERO is not performing adequately, as determined by the employer, the employer will contact the TERO office immediately. The employer agrees not to terminate until TERO has been given the



opportunity to explore the reasons. The employer will make good faith effort to give those hired every opportunity to retain employment.

3. **TRAINING AND SALARY:**

The employer agrees all local Indian employees will receive adequate training for the position for which they are hired. All Indian employees will be evaluated and paid in accordance with a training plan set forth between the covered contractor and/or employer and the Tribal Employment Rights Office.

4. **DISCRIMINATION:**

There shall be no actions taken against the **Fair Labor Standards Act, Equal Pay Act, Age Discrimination Act, Civil Rights Act, (SBA)Small Business Act 8(a), (ADA) Americans with Disabilities Act, Vietnam Veterans Readjustment Assistant Act, (DBE)Disadvantage Business Enterprise Program, (OSHA)Occupational Safety & Health Act, Rehabilitation Act, Immigration Reform & Control Act**, or any other employment related violations related to the Tribal Employment Rights Office of the Standing Rock Sioux Tribe.

5. **PREFERENCE:**

The employer agrees that Indians will be given preference for 100% of the project. All labor positions shall be given preference to Indians. The employer agrees to contact the TERO office to locate qualified Indian applicants for core crew positions and other skilled positions. Dismissals must be in writing and a copy to the TERO office including layoffs.

6. **EMPLOYMENT RIGHTS FEE:**

The employer (prime contractor) or subcontractor who contracts as a prime shall pay a TERO fee of 2.5% of the total contract dollar amount and change order(s) above and beyond initial contract amount in accordance with the following:

*This fee shall be made payable by check to the Tribal Employment Rights Office STANDING ROCK SIOUX TRIBE, PO Box D, Fort Yates ND 58538. The fee will be deposited in a specific account by the Finance Officer of the SRST Finance Department.*

7. **INSPECTION:**

TERO Director and/or her designee shall have the right to inspect all sites where employment is taking place under the provisions of this agreement upon the Standing Rock Sioux Reservation to insure that Indians (enrolled members) are not discriminated against under Title (XXX) Tribal Code of Justice and Title (VII) Civil Rights Act as amended and Wage and Hour Act. The Director or designee has the right to address any item of quality control to the owner and contractor.

8. **RECORDS:**

The employer agrees to submit official certified payroll reports:

- a. One copy of the official payroll
  - C – Core Crew
  - T – TERO Referrals
  - TR - Trainee

9. **ASSISTANCE:**

If the employer deems that an employee's performance is such that he/she is in danger of suspension or termination, the employer must contact TERO for assistance in resolving the problem.

10. **LAYOFF:**

If a layoff is required, the employer shall conduct a layoff consistent with its obligation under Section 5 of this agreement, any layoff must be justified.

11. **PRIME RESPONSIBILITY FOR COMPLIANCE OF SUBCONTRACTORS:**

The prime contractor is responsible and will be accountable for assuring that any of its subcontractors let under a contract have an approved compliance plan showing the subcontractor meets the Indian preference requirements and shall follow all stipulations under this compliance plan.

All covered contractors/employers must have a W-4 form with (2) forms of identification attached of the person hired through the TERO Office; I-9 forms are optional.



### TRAINING POSITIONS

(On all covered contracts 30 days or more)

Classification	Experience	Description of work	Hourly Wage

**13. EPA & WATER REGULATIONS:**

Tribal (EPA) Environmental Protection Act applies to all contracts.

Water Permits must be obtained by the covered contractor if water is to be used in the covered contract/Project.

**14. DURATION:**

This agreement shall be for the life of this specific project, plus a warranty period of two (2) years. **This compliance plan shall serve as an invoice - payment must be paid from this compliance form. No other invoice or statement will be sent.**

Contract Amount \$ \_\_\_\_\_ TERO fee (2.5%) Amount: \$ \_\_\_\_\_

Contractor/Employer Name: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Website: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

P.O. Box - Street

City State Zip

**AGREEMENT SIGNATURES:**

\_\_\_\_\_  
Contractor/Employer Authorized Representative Date

\_\_\_\_\_  
Anna Cotanny, Director Date

"General Decision Number: ND20240053 08/30/2024

Superseded General Decision Number: ND20230053

State: North Dakota

Construction Type: Heavy  
HEAVY CONSTRUCTION PROJECTS

Counties: Oliver and Sioux Counties in North Dakota.

#### HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<p>. Executive Order 14026 generally applies to the contract.</p> <p>. The contractor must pay all covered workers at least \$17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.</p>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<p>. Executive Order 13658 generally applies to the contract.</p> <p>. The contractor must pay all covered workers at least \$12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.</p>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number      Publication Date

0 01/05/2024  
 1 07/26/2024  
 2 08/30/2024

CARP1091-004 05/01/2024

	Rates	Fringes
MILLWRIGHT.....	\$ 45.57	29.20

\* ELEC0714-014 07/01/2024

	Rates	Fringes
ELECTRICIAN.....	\$ 38.94	13.21+11.5%

ENGI0049-022 10/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Bulldozer).....	\$ 32.40	20.65

ENGI0049-026 05/01/2022

	Rates	Fringes
POWER EQUIPMENT OPERATOR Crane.....	\$ 38.30	21.60
Forklift.....	\$ 35.05	21.60

ENGI0049-027 10/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR Mechanic.....	\$ 32.40	20.65
Scraper.....	\$ 32.40	20.65

IRON0512-033 04/30/2023

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 37.95	21.75
IRONWORKER, STRUCTURAL.....	\$ 37.95	21.75

TEAM0638-003 10/01/2023

	Rates	Fringes
TRUCK DRIVER (Dump Truck).....	\$ 32.40	16.90

SUND2017-016 07/31/2020

	Rates	Fringes
CARPENTER.....	\$ 24.05	4.59
CEMENT MASON/CONCRETE FINISHER...	\$ 23.83	2.87
LABORER: Common or General.....	\$ 20.47	0.00

LABORER: Pipelayer.....	\$ 24.26	0.00
OPERATOR:		
Backhoe/Excavator/Trackhoe.....	\$ 32.48	13.05
OPERATOR: Bobcat/Skid		
Steer/Skid Loader.....	\$ 28.00	0.00
OPERATOR: Grader/Blade.....		
	\$ 26.20	0.00
OPERATOR: Loader.....		
	\$ 29.25	15.61
OPERATOR: Roller.....		
	\$ 28.00	0.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

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The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

#### State Adopted Rate Identifiers

Classifications listed under the "SA" identifier indicate that the prevailing wage rate set by a state (or local) government was adopted under 29 C.F.R. 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination.



01/03/2024 reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.  
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**SRST TERO PREFERENCE CONTRACTORS & SUPPLIER LIST**

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**TRIBAL EMPLOYMENT RIGHTS OFFICE  
STANDING ROCK SIOUX TRIBE  
PO BOX D  
112 BALD EAGLE AVE  
FORT YATES, ND 58538  
OFFICE:701-854-7295  
FAX:701-854-3771**



**INDIAN PREFERENCE**  
**CERTIFIED CONTRACTOR/BUSINESS LIST**

100% INDIAN OWNED  
&  
51% INDIAN OWNED

**PLEASE NOTE: LIST IS SUBJECT TO CHANGE**

BUSINESS/CONTRACTOR	TYPE OF BUSINESS/SERVICES	CREDENTIAL(S)
<p>Meyer Contracting Inc.  11000 93<sup>rd</sup> Ave N.  Maple Grove, MN 55369  763-391-5940  Meyerci.com  Paul Meyer or Verlyn Schoep</p>	<ul style="list-style-type: none"> <li>• Earthwork</li> <li>• Demolition</li> <li>• Underground Utilities</li> <li>• Pile driving</li> </ul>	<p>100% Indian Owned  Tribe: <u>White Earth Tribe</u>  51% Indian Owned  Tribe: _____  Non Indian Owner(s)  Name: _____  Name: _____  ND Contractor's License#:  # 40415  Class: <u>X</u> A – Up to \$500,000  <u>B</u> – Up to \$150,000  <u>C</u> – Up to \$75,000  <u>D</u> – Up to \$50,000</p> <p>Workman's Compensation  Policy # K1C008605602  Expiration Date: 01/01/2018</p> <p>Federal ID and/or DUNS  # 41-1584157</p> <p>SD Excise Tax I.D.  # 1030-7093-ET</p> <p>Liability Insurance:  Policy # 2052851199  Expiration Date: 1/1/2018  DBE Certification: _____  8(A) Status: _____</p>

BUSINESS/CONTRACTOR	TYPE OF BUSINESS/SERVICES	CREDENTIAL(S)
<p>Aaron Swan &amp; Associates 301 West Capitol Avenue Pierre, SD 57501 605-224-1742 <a href="mailto:aaronswan@DIE.midco.net">aaronswan@DIE.midco.net</a> Aaron Swan</p>	<ul style="list-style-type: none"><li>• Engineering Consulting</li><li>• Surveying</li><li>• Materials testing</li><li>• Architecture</li></ul>	<p>100% Indian Owned Tribe: Rosebud Sioux Tribe 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ ND Contractor's License#: 291C Class: _____     A – Up to \$500,000     B – Up to \$150,000     C – Up to \$75,000     D – Up to \$50,000 Workman's Compensation Policy # XVZKUB-3342T29-A-16 Expiration Date: 11/1/2017 Federal ID and/or DUNS #46-0326637 SD Excise Tax I.D. #1014-7396-ST Liability Insurance: Policy #680-4H088507-16-47 Expiration Date: 11/1/2017 DBE Certification: _____ 8(A) Status: _____</p>

<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>ICC 2910 Arizona Drive Bismarck, ND 58503 505-634-8791 701-955-2334 Dicky Toledo, Jorge Rodriguez</p>	<ul style="list-style-type: none"><li>• Residential</li><li>• Commercial</li><li>• Renovations</li><li>• Additions</li><li>• Concrete</li><li>• Fencing</li></ul>	<p>100% Indian Owned Tribe: Eastern Navajo 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ ND Contractor's License#: # 56209 Class: _____ A – Up to \$500,000           _____ B – Up to \$150,000           _____ C – Up to \$75,000           _____ X_D – Up to \$50,000 Workman's Compensation Policy # No employees Expiration Date: _____ Federal ID and/or DUNS # 81-4527889 SD Excise Tax I.D. # 1031-6503-ET Liability Insurance: Policy # 33-141272-25-1001-01 Expiration Date: 12/12/2017 DBE Certification: _____ 8(A) Status: _____</p>



<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>Traffic Services Company 11740 JB Road Black Hawk, SD 57718 605-716-0250 JD Lawrence Wetsit</p>		<p>100% Indian Owned Tribe: Assiniboine Sioux of Fort Peck 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ ND Contractor's License#: _____ # _____ Class: _____     A – Up to \$500,000     B – Up to \$150,000     C – Up to \$75,000     D – Up to \$50,000 Workman's Compensation Policy # WCPSPD0000002185 Expiration Date: _____ Federal ID and/or DUNS # 20-4255611 SD Excise Tax I.D. # HWY Contractor – 7000-0504-HC # Contractor's Excise Tax – 1011-4269-ET Liability Insurance: Policy # CMPSPD0000002185 Expiration Date: _____ DBE Certification: _____ 8(A) Status: _____</p>

<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>Bendickson Pest Control PO Box 202 McLaughlin, SD 57642 605-314-3059 <a href="mailto:bendicksonpestcontrol@yahoo.com">bendicksonpestcontrol@yahoo.com</a> Orion &amp; Myra Bendickson</p>	<ul style="list-style-type: none"><li>• Certified Penst Control</li><li>• Insect/rodent termination</li><li>• Fumigation services</li></ul>	<p>100% Indian Owned Tribe: Standing Rock Sioux Tribe 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ ND Contractor's License#: _____ # _____ Class: _____     A – Up to \$500,000     B – Up to \$150,000     C – Up to \$75,000     D – Up to \$50,000 Workman's Compensation Policy # WC-40-80-017052-00 Expiration Date: _____ Federal ID and/or DUNS # 46-0434270 SD Excise Tax I.D. # 1022-9090-ST Liability Insurance: Policy # CPS2577184 Expiration Date: 10/7/2017 DBE Certification: _____ 8(A) Status: _____</p>

<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
RT Housing Alliance, LLC 3491 Wiyohpeyata Street West Selfridge, ND 58538 701-540-6445 701-422-3609 Willbur Red Tomahawk	<ul style="list-style-type: none"><li>• Consulting services for affordable housing projects in Indian country</li></ul>	100% Indian Owned Tribe: Standing Rock Sioux Tribe 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ Name: _____ ND Contractor's License#: _____ # _____ Class: _____ A – Up to \$500,000 _____ B – Up to \$150,000 _____ C – Up to \$75,000 _____ D – Up to \$50,000 Workman's Compensation Policy # UB-7H511006-16-42-G Expiration Date: 11/1/2017 Federal ID and/or DUNS # 81-3834998 SD Excise Tax I.D. # _____ Liability Insurance: Policy # CUP-7H509975-16-42 Expiration Date: 11/1/2017 DBE Certification: _____ 8(A) Status: _____

<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>EH Security, LLC PO Box 7042 Bismarck, ND 58507 701-426-5653(w) 701-426-3499(c) Jeremie Meisel</p>	<ul style="list-style-type: none"><li>• Physical on-site security (armed/unarmed)</li><li>• Security Consultation</li><li>• Security system &amp; alarm installation</li><li>• Drug &amp; Alcohol testing</li><li>• Background checks</li><li>• Process service</li><li>• Fingerprinting</li></ul>	<p>100% Indian Owned Tribe: Standing Rock 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ ND Contractor's License#: 403</p> <p>Class: _____     A – Up to \$500,000     B – Up to \$150,000     C – Up to \$75,000     D – Up to \$50,000</p> <p>Workman's Compensation Policy #Law Enforcement 1349985 Expiration Date:9/13/2017</p> <p>Federal ID and/or DUNS #47-5533273</p> <p>SD Excise Tax I.D. #1031-7928-ST</p> <p>Liability Insurance: Policy #General Liability Expiration Date: 8/18/2017 DBE Certification: _____ 8(A) Status: _____</p>



<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>Temperature Technology, Inc. PO Box 9063 Rapid City, SD 57709 605-343-1144(w) 605-858-9924(c) Jenna McNabb <a href="mailto:jenam@tem-tech.com">jenam@tem-tech.com</a></p>	<ul style="list-style-type: none"><li>• Temperature Controls</li><li>• Boiler Maintenance</li><li>• Maintenance Contracts</li><li>• Air filter sales</li><li>• Belt sales</li><li>• Lighting sales</li></ul>	<p>100% Indian Owned Tribe: Rosebud Sioux Tribe 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ SD Contractor's License#: # Certificate of Incorporation Business Corp Class:    A – Up to \$500,000           B – Up to \$150,000           C – Up to \$75,000           D – Up to \$50,000 Workman's Compensation Policy # 60430134 Expiration Date: _____ Federal ID and/or DUNS #46-0367416 SD Excise Tax I.D. #1015-1712-ET Liability Insurance: Policy #60430134 Expiration Date: 5/1/2017 DBE Certification: _____ 8(A) Status: _____</p>

<b>BUSINESS/CONTRACTOR</b>	<b>TYPE OF BUSINESS/SERVICES</b>	<b>CREDENTIAL(S)</b>
<p>Red Lake Builders, Inc. PO Box 250 Hwy 89 South Red Lake, MN 56671 218-679-3891 <a href="mailto:rlbldrs@paulbunyan.net">rlbldrs@paulbunyan.net</a> Red Lake Band of Chippewa</p>	<ul style="list-style-type: none"><li>• General Construction</li><li>• Grading</li><li>• Gravel</li><li>• Culverts and small structures</li><li>• Bridges</li><li>• Water &amp; Sewer</li><li>• Rip Rap</li><li>• Curb &amp; Gutter</li><li>• Landscaping</li></ul>	<p>100% Indian Owned Tribe: 51% Indian Owned Tribe _____ Non Indian Owner(s) Name: _____ Name: _____ Name: _____ ND Contractor's License#: _____ # Certificate of Incorporation Class: XX A – Up to \$500,000       B – Up to \$150,000       C – Up to \$75,000       D – Up to \$50,000 Workman's Compensation Policy # North Dakota Workman's Comp Expiration Date 10/14/2017 Federal ID and/or DUNS # 41-1292000 SD Excise Tax I.D. # 1012-9581-ET Liability Insurance: Commercial General Liability Policy # _____ Expiration Date: 1/1/2018 DBE Certification: _____ 8(A) Status: _____</p>

**STANDING ROCK SIOUX TRIBE TRIBAL EMPLOYMENT RIGHTS OFFICE (TERO)**

**INFORMATION FOR BIDDERS ON STANDING ROCK RURAL WATER SYSTEM PROJECTS**

Bidding Contractors (BIDDERS) on all SRRWS Projects must follow the indicated requirements listed below and provide the information requested to the SRST TERO.

1. Any interested BIDDER shall contact the SRST TERO Director Anna Cotanny (acotanny@standingrock.org) at 701-854-7295.

*Standing Rock Sioux Tribe  
Tribal Employment Rights Office  
112 Bald Eagle Ave, PO Box D  
Fort Yates, ND 58538*

2. BIDDERS shall attempt to contact all SRST TERO Preference Contractors & Suppliers listed in the SRST TERO Preference List provided in these contract documents (available on contract bid website, Quest CDN, as well). BIDDERS shall document all attempts to contact Preference Contractors. Acceptable forms of contact shall be email, fax, or certified letter based on contact information provided in TERO Preference List. BIDDERS shall combine all documentation of attempts to contact Preference Contractors & Suppliers. The three (3) lowest BIDDERS shall be required to provide the SRST TERO with all documentation of contact on day of bid opening. BIDDER shall also provide price documentation of pricing used in bid and pricing received from Preference Contractors & Suppliers within 24 hours of bid IF requested by SRST TERO.
3. Per SRST TERO Ordinance Chapter 3 Sec. 307 and Sec. 308 bidding Prime Contractors (BIDDERS) may select subcontractors and suppliers in any manner it so chooses, but must determine reasonable price through the process described in the TERO Ordinance. Before all technically qualified preference subcontractors and suppliers may be rejected on the basis of unreasonable price, the BIDDER must give the preference firm a chance to negotiate and submit a reasonable price. BIDDERS may not reject a preference subcontractor or supplier on the ground that the price is unreasonable and subsequently contract with a non-preference subcontractor at the same or higher price. The BIDDER is not required to divulge what price is reasonable to preference subcontractors and suppliers, but must provide price documentation to verify compliance if requested by SRST TERO.
4. Awarded low BIDDER shall complete compliance plan and meet with Director Cotanny. Contractor shall provide Engineer with copy of signed compliance plan and evidence of meeting with SRST TERO and their agreement to move forward with construction of project prior to

## SRST TERO Guidelines

performing any work on the Contract. (TERO Ordinance Chapter 3. Sec. 303)

5. Awarded low BIDDER shall pay SRST TERO fee on awarded contract amount prior to the start of any construction or as negotiated with SRST TERO Director Cotanny. Awarded low BIDDER shall also pay additional TERO fees under contract should any change orders be agreed to with the Owner (Standing Rock Rural Water System).
6. All aspects of the SRST TERO Ordinance No.165 shall be complied with by all BIDDERS. Any questions or decisions regarding the Ordinance shall be discussed with Director Cotanny. Engineer defers all questions regarding the Ordinance and requirements to the SRST TERO.



This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

## **BID FORM FOR CONSTRUCTION CONTRACTS**

Prepared by



Issued and Published Jointly by



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**BID FORM**  
**STANDING ROCK SIOUX TRIBE**  
**STANDING ROCK RURAL WATER SYSTEM**  
**MR&I OFFICE REMODEL**  
**CONTRACT 2-6**

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**ARTICLE 1 – BID RECIPIENT**

1.01 This Bid is submitted to:

***Standing Rock Rural Water System  
MR&I Building  
9410 11th Avenue Slaughter House Bay Road  
Fort Yates, ND 58538***

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

**ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS**

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 61 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

**ARTICLE 3 – BIDDER’S REPRESENTATIONS**

3.01 In submitting this Bid, Bidder represents that:

- A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

#### **ARTICLE 4 – BIDDER'S CERTIFICATION**

##### **4.01 Bidder certifies that:**

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
  - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
  - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

**ARTICLE 5 – BASIS OF BID**

- 5.01 Bids shall include sales tax, TERO Fee, Tribal EPA Permit Fee, and all other applicable taxes and fees. TERO Fee and Tribal EPA Permit Fee is included in the contract amount.
- 5.02 The Owner reserves the right to award the Contract, if awarded, based on the Bid Schedule that is the most advantageous and in the best interest of the Owner.
- 5.03 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

<b>BID SCHEDULE 1</b>			
<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>BID PRICE</b>
1	Mobilization	LS	\$50,000.00
2	Furniture Allowance	LS	\$80,000.00
3	Office Remodel and Vestibule Addition	LS	\$
4	Replace Metal Roof and Related Accessories.	LS	
5	Replace Exterior Windows	LS	\$
	<b>SUBTOTAL OF BID SCHEDULE 1 ITEMS 1-5</b>		<b>\$</b>
6	TERO Fee (Must equal 2.5% of Items 1-5)		\$
7	Tribal EPA Permit Fee (Must equal 1.0% of Items 1-5)		\$
	<b>TOTAL OF BID SCH. 1 ITEMS 1-7</b>		<b>\$</b>

**The Owner reserves the right to add or deduct any item(s), at the cost(s) shown above, by change order after the award of the Contract.**

~~Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.~~

Bonds required under Paragraph 6.01 of the General Conditions will be based on the Contract Price.

**ARTICLE 6 – TIME OF COMPLETION**

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

## ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security **in the form of a Bid Bond as provided for in the Instructions to Bidders. The Bid Bond envelope must be separate from the envelope containing the Bid Form;**
- B. List of Proposed Subcontractors; **the Bidder shall list the subcontractor(s) who will be the subcontractor(s) on this job for each particular trade or subdivision of the WORK and will state the firm's name and principal location of the mill, shop or office of each:**  
  
**No change in Subcontractor as listed above will be allowed without written approval by Owner.**
- ~~C. List of Proposed Suppliers;~~
- D. List of Project References;
- ~~E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time of acceptance of Bids;~~
- F. Contractor's License No.: **A copy of a current and valid North Dakota Contractor's License, or certificate of renewal. The license must have been issued to the Bidder at least ten (10) calendar days in advance of the bid opening date. THE CONTRACTOR'S LICENSE MUST BE INCLUDED IN THE BID BOND ENVELOPE.**
- G. **If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplemental Bureau of Reclamation Provisions.**
- H. **If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, and Other Responsibility Matters (AD-1048).**
- I. **If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q, Certification for Contracts, Grants, and Loans.**

## ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

**ARTICLE 9 – BID SUBMITTAL**

BIDDER: *[Indicate correct name of bidding entity]*

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

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

*(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: \_\_\_\_\_

*[Signature]* \_\_\_\_\_

*[Printed name]* \_\_\_\_\_

Title: \_\_\_\_\_

Submittal Date: \_\_\_\_\_

Address for giving notices: \_\_\_\_\_

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

Telephone Number: \_\_\_\_\_

Fax Number: \_\_\_\_\_

Contact Name and e-mail address: \_\_\_\_\_

\_\_\_\_\_

Bidder's License No.: \_\_\_\_\_

*(where applicable)*



COMPLIANCE STATEMENT

This statement relates to a proposed contract with Standing Rock Rural Water System

\_\_\_\_\_  
*(Name of borrower or grantee)*

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor. I represent that:

1. I  have,  have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I  have,  have not, filed all compliance reports that I have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I  have,  have not, previously had contracts subject to the written affirmative action program requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I  have,  have not, developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either RHS, RBS, or RUS or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

Position 6  
FmHA 400-6 (Rev. 4-96)

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR  
CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Non-segregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date \_\_\_\_\_  
Signature of Bidder or Prospective Contractor

Address (including Zip Code)

# U.S. DEPARTMENT OF AGRICULTURE

---

## Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

---

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

---

Organization Name

PR/Award Number or Project Name

---

Name(s) and Title(s) of Authorized Representative(s)

---

Signature(s)

Date

FORM AD-1048 (1/92)  
INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

---

(name)

(date)

---

(title)

**CERTIFICATE OF PROCUREMENT INTEGRITY - MODIFICATION (NOV 1990)**

I, \_\_\_\_\_ (name of certifier) am the officer or employee responsible for the preparation of this modification proposal and hereby certify that, to the best of my knowledge and belief, with the exception of any information described in this certification, I have no information concerning a violation or possible violation of subsection 27(a), (b), (d), or (f) of the Office of Federal Procurement Policy Act, as amended\* (41 U.S.C. 423), (hereinafter referred to as the Act), as implemented in the FAR, occurring during the conduct of this procurement \_\_\_\_\_(contract and modification number).

As required by subsection 27(e)(1)(B) of the Act, I further certify that each officer, employee, agent, representative, and consultant of \_\_\_\_\_ (name of offeror) who has participated personally and substantially in the preparation or submission of this proposal has certified that he or she is familiar with, and will comply with, the requirement of subsection 27(a) of the Act, as implemented in the FAR, and will report immediately to me any information concerning a violation or possible violation of subsections 27(a), (b), (d), or (f) of the Act, as implemented in the FAR, pertaining to this procurement.

Violations or possible violations: (Continue on plain bond paper if necessary and label Certificate of Procurement Integrity - Modification (Continuation Sheet), ENTER "NONE" IF NONE EXISTS

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

(Signature of the Officer or Employee Responsible for the Modification Proposal and date)

\_\_\_\_\_  
(Typed name of the Offeror or Employee Responsible for the Modification Proposal)

\* Subsections 27(a), (b), and (d) are effective on December 1, 1990. Subsection 27(f) is effective on June 1, 1991.

THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF ANY AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER TITLE 18, UNITED STATES CODE, SECTION 1001

**BID BOND**

KNOWN ALL MEN BY THESE PRESENTS, that we, the undersigned,  
\_\_\_\_\_ as Principal, and  
\_\_\_\_\_ as Surety, are hereby held  
and firmly bound unto Standing Rock Rural Water System 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, successors and assigns.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

The Condition of the above obligation is such that whereas the Principal has  
submitted to Standing Rock Rural Water System a certain BID, attached hereto and  
hereby made a part hereof to enter into a contract in writing, for the MR&I Office  
Remodel Contract 2-6.

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver  
a contract in the Form of Contract attachment hereto (properly completed in  
accordance with said BID) and shall furnish a BOND for faithful  
performance of said contract, and for the payment of all persons  
performing labor furnishing materials in connection therewith, and shall in  
all other respects perform the agreement created by the acceptance of said  
BID, then this obligation shall be void, otherwise the same shall 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; 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

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

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.



**AGREEMENT  
BETWEEN OWNER AND CONTRACTOR FOR  
CONSTRUCTION CONTRACT (STIPULATED PRICE)**

Prepared by



Issued and Published Jointly by



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AGREEMENT  
BETWEEN OWNER AND CONTRACTOR  
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Standing Rock Sioux Tribe (“Owner”) and  
\_\_\_\_\_ (“Contractor”).

Owner and Contractor hereby agree as follows:

**ARTICLE 1 – WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**Contract 2-6 includes a vestibule addition, remodel of approximately 3,000 sf of office space, replacement of the existing metal roof and related accessories, furnishing allowance, and all other related appurtenances as required by the Project Drawings, Specifications, and Contract Documents.**

**ARTICLE 2 – THE PROJECT**

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

**Standing Rock Rural Water System (SRRWS) is a department of the Standing Rock Sioux Tribe, Standing Rock Indian Reservation, which is a Federally recognized Indian Tribe within the States of North and South Dakota. SRRWS provides potable water supply and service to users located within the boundary of the Standing Rock Indian Reservation. This Contract is referenced as The MR&I Office Remodel, Contract 2-6. The Owner of the project is the Standing Rock Sioux Tribe, Fort Yates, ND.**

**ARTICLE 3 – ENGINEER**

3.01 The part of the Project that pertains to the Work has been designed **by Bartlett & West, Inc.**

3.02 The Owner has retained **Bartlett & West, Inc.** (“Engineer”) to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 – CONTRACT TIMES**

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

A. The Work will be substantially completed on or before **October 3, 2025**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **December 12, 2025**.

#### 4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
1. Substantial Completion: Contractor shall pay Owner **\$250** for each calendar day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
  2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **\$250** for each calendar day that expires after such time until the Work is completed and ready for final payment.
  3. Liquidated damages for failing to timely attain Substantial Completion, and Final Completion are not additive and will not be imposed concurrently.

#### ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:
- A. For all Work, at the prices stated in Contractor's Bid, **which is included in the Contract Documents and considered an exhibit to this Agreement**, attached hereto as an exhibit.

#### ARTICLE 6 – PAYMENT PROCEDURES

##### 6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

##### 6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the **30th** day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.
1. Prior to Substantial Completion, progress payments will be made ~~in~~ **up to** an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract
    - a. **90** percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of

the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

- b. **90** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
  - c. However, retainage shall be accumulated as 10% of the first 50% of the estimated value of the Contract amount earned. When the retainage value has accumulated to 5% of the total contract value, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, no further retainage shall be held on progress payments issued during the remainder of the Contract, unless adjusted for change orders.
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to **95** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions (EJCDC C-700), and less **100** percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

#### 6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions (**EJCDC C-700**), Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

### **ARTICLE 7 – INTEREST**

- 7.01 All amounts not paid **within 30 days of fully executed Application for Payment** ~~when due~~ shall bear interest at the rate of **3** percent per annum. **However, no interest shall be paid to Contractor for monies held as retainage.**

### **ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS**

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:
- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
  - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
  - C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
  - D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

## ARTICLE 9 – CONTRACT DOCUMENTS

### 9.01 Contents

- A. The Contract Documents consist of the following:
  - 1. **Advertisement for Bids.**
  - 2. **Instructions to Bidders.**
  - 3. This Agreement (pages 1 to 7, inclusive).
  - 4. Performance bond (pages 1 to 3 inclusive).
  - 5. Payment bond (pages 1 to 4 inclusive).
  - 6. General Conditions (pages 1 to 64, inclusive).
  - 7. Supplementary Conditions (pages 1 to 18 inclusive).
  - 8. Specifications as listed in the table of contents of the Project Manual.
  - 9. Drawings (not attached but incorporated by reference) consisting of a cover sheet and sheets numbered 1 through 42, inclusive, with each sheet bearing the following general title: **Standing Rock Sioux Tribe, Standing Rock Rural Water System, MR&I Office Remodel Contract 2-6.**
  - 10. Addenda (numbers      to     , inclusive).
  - 11. Exhibits to this Agreement (enumerated as follows):
    - a. Contractor's Bid (pages 1 to 7, inclusive).

12. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
  - a. Notice to Proceed.
  - b. Work Change Directives.
  - c. Change Orders.
  - d. Field Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

## **ARTICLE 10 – MISCELLANEOUS**

### 10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions (**EJCDC C-800**).

### 10.02 *Assignment of Contract*

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

### 10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

### 10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

### 10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
  1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to

establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

#### 10.06 *Other Provisions*

- A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or “track changes” (redline/strikeout), or in the Supplementary Conditions.



IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.  
This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

**Standing Rock Sioux Tribe**

By: **Janet Alkire**

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

Title: **Chairwoman**

Title: \_\_\_\_\_

*(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Address for giving notices:

Address for giving notices:

**PO Box 429**

**Fort Yates, ND 58538**

License No.: \_\_\_\_\_

*(where applicable)*

*(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

## STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  5. *Bidder*—An individual or entity that submits a Bid to Owner.
  6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
  7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
  8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
  9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
  10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision

regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. (“CERCLA”); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. (“RCRA”); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor’s plan to accomplish the Work within the Contract Times.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.
33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day:*
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents; or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. *Furnish, Install, Perform, Provide:*
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words

“furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2 – PRELIMINARY MATTERS**

### **2.01 *Delivery of Bonds and Evidence of Insurance***

- A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

### **2.02 *Copies of Documents***

- A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
- B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

### **2.03 *Before Starting Construction***

- A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

#### 2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

#### 2.05 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
  - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

#### 2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.



## ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

### 3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

### 3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
  - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

### 3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*
  - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents:* If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
  3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.
- B. *Resolving Discrepancies:*
1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
    - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
    - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

### 3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

### 3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
  - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
  - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

## **ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

### 4.01 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

### 4.02 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

### 4.03 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

### 4.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
  - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  2. abnormal weather conditions;
  3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
  4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

## ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

### 5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

### 5.02 *Use of Site and Other Areas*

- A. *Limitation on Use of Site and Other Areas:*
  - 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
  - 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste

materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

- C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

#### 5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
  - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
  - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
  - 3. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

#### 5.04 *Differing Subsurface or Physical Conditions*

- A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
  - 1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
  - 2. is of such a nature as to require a change in the Drawings or Specifications; or
  - 3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
  1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
    - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
  2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
    - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
    - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site

and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

#### 5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
  1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
  2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
    - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
    - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
    - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.
- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and



recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
    - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
    - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
    - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
    - d. Contractor gave the notice required in Paragraph 5.05.B.
  2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
  3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

#### 5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
  2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer,

or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## **ARTICLE 6 – BONDS AND INSURANCE**

### **6.01 *Performance, Payment, and Other Bonds***

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond

signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

#### 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor

to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

#### 6.03 *Contractor's Insurance*

- A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
  - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
  - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
  - 4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
  - 1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
  - 2. claims for damages insured by reasonably available personal injury liability coverage.
  - 3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
  - 1. Products and completed operations coverage:
    - a. Such insurance shall be maintained for three years after final payment.

- b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
  2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
  3. Broad form property damage coverage.
  4. Severability of interest.
  5. Underground, explosion, and collapse coverage.
  6. Personal injury coverage.
  7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
  8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial

Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

- I. *General provisions:* The policies of insurance required by this Paragraph 6.03 shall:
  1. include at least the specific coverages provided in this Article.
  2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
  3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
  4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
  5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

#### 6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

#### 6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
  3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
  4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
  5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
  6. extend to cover damage or loss to insured property while in transit.
  7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
  8. allow for the waiver of the insurer's subrogation rights, as set forth below.
  9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
  10. not include a co-insurance clause.
  11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
  12. include performance/hot testing and start-up.
  13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this



Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

- C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

#### 6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
  - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by,

arising out of, or resulting from fire or other perils whether or not insured by Owner;  
and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

#### 6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

### **ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES**

#### 7.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

#### 7.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

#### 7.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 7.04 *"Or Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

- a. in the exercise of reasonable judgment Engineer determines that:
    - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
    - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
    - 3) it has a proven record of performance and availability of responsive service; and
    - 4) it is not objectionable to Owner.
  - b. Contractor certifies that, if approved and incorporated into the Work:
    - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
    - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

#### 7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
  - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
  3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
    - a. shall certify that the proposed substitute item will:
      - 1) perform adequately the functions and achieve the results called for by the general design,
      - 2) be similar in substance to that specified, and
      - 3) be suited to the same use as that specified.
    - b. will state:
      - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
      - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
      - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
    - c. will identify:
      - 1) all variations of the proposed substitute item from that specified, and
      - 2) available engineering, sales, maintenance, repair, and replacement services.
    - d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the

Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

#### 7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.
- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. Nothing in the Contract Documents:
  - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
  - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

#### 7.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the

performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

#### 7.09 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

#### 7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if



any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

#### 7.11 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

#### 7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly

or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

#### 7.13 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 7.14 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

#### 7.16 *Shop Drawings, Samples, and Other Submittals*

- A. *Shop Drawing and Sample Submittal Requirements:*
  - 1. Before submitting a Shop Drawing or Sample, Contractor shall have:
    - a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
    - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
    - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
    - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
  - 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.
- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
1. *Shop Drawings:*
    - a. Contractor shall submit the number of copies required in the Specifications.
    - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.
  2. *Samples:*
    - a. Contractor shall submit the number of Samples required in the Specifications.
    - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
  3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. *Engineer's Review:*
1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
  2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
  3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
  4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and

Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;
  3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. use or occupancy of the Work or any part thereof by Owner;
  5. any review and approval of a Shop Drawing or Sample submittal;
  6. the issuance of a notice of acceptability by Engineer;
  7. any inspection, test, or approval by others; or
  8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### 7.19 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

### **ARTICLE 8 – OTHER WORK AT THE SITE**

#### 8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or

alter others' work with the written consent of Engineer and the others whose work will be affected.

- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

#### 8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
  - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
  - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 8.03 *Legal Relationships*

- A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual

rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.
- D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

## **ARTICLE 9 – OWNER'S RESPONSIBILITIES**

### **9.01 *Communications to Contractor***

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### **9.02 *Replacement of Engineer***

- A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

### **9.03 *Furnish Data***

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **9.04 *Pay When Due***

- A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

### **9.05 *Lands and Easements; Reports, Tests, and Drawings***

- A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
- B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
- C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.



9.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

- A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
- B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

**ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION**

10.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On

the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

#### 10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

#### 10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

#### 10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

#### 10.06 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

#### 10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

#### 10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in

contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

#### 10.09 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

### **ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

#### 11.01 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
  - 1. *Change Orders:*
    - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
    - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
  - 2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents

governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

#### 11.02 *Owner-Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

#### 11.03 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

#### 11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
  1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

#### 11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

#### 11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.
  2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

#### 11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
  2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
  3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
  4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

**ARTICLE 12 – CLAIMS**

12.01 *Claims*

- A. *Claims Process:* The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
  - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
  - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
- B. *Submittal of Claim:* The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution:* The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation:*
  - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
  - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal

and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

## **ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### 13.01 *Cost of the Work*

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
  1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing



Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or

indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee:* When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

### 13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

- B. *Cash Allowances*: Contractor agrees that:
  - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
  - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

### 13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- 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.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
  - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
  - 2. there is no corresponding adjustment with respect to any other item of Work; and
  - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

## ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

### 14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

### 14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
  - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  - 3. by manufacturers of equipment furnished under the Contract Documents;
  - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
  - 1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
  - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

#### 14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

## **ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

### 15.01 *Progress Payments*

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
  - 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
  - 3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
- C. *Review of Applications:*
  - 1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
  - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
    - a. the Work has progressed to the point indicated;
    - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon

Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

- c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
    - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
    - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
  4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
    - a. to supervise, direct, or control the Work, or
    - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
    - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
    - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
    - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
  5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
  6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
    - a. the Work is defective, requiring correction or replacement;
    - b. the Contract Price has been reduced by Change Orders;
    - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
    - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
    - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.



D. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner:*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. the Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. the Contract Price has been reduced by Change Orders;
  - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
  - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
  - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

#### 15.02 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

#### 15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
  2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
  3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

#### 15.05 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 15.06 *Final Payment*

- A. *Application for Payment:*
  1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
    - a. all documentation called for in the Contract Documents;
    - b. consent of the surety, if any, to final payment;
    - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
    - d. a list of all disputes that Contractor believes are unsettled; and
    - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
  3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. *Engineer's Review of Application and Acceptance:*
1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

#### 15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

#### 15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. correct the defective repairs to the Site or such other adjacent areas;
  - 2. correct such defective Work;
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

## ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

### 16.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

### 16.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
  - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
  - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
  - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
  - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
  - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
  - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When

exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

#### 16.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
  - 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 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 on such expenses; and
  - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

#### 16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

## ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

### 17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution:* The following disputed matters are subject to final resolution under the provisions of this Article:
1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
  2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes:* For any dispute subject to resolution under this Article, Owner or Contractor may:
1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
  2. agree with the other party to submit the dispute to another dispute resolution process; or
  3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

## ARTICLE 18 – MISCELLANEOUS

### 18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

### 18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

### 18.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.



18.04 *Limitation of Damages*

- A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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# SUPPLEMENTARY CONDITIONS

Prepared by



Issued and Published Jointly by



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These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### SC-1.01 *Defined Terms*

**SC-1.01.A.8** Add the following language at the end of last sentence of Paragraph 1.01.A.8:

The Change Order form to be used on this Project is FmHA 1924-7. Agency approval is required before change orders are effective.

**SC-1.01.A.48** Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price of Contract Times without a subsequent Change Order.

**SC-1.01.A.49** Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

**Abnormal Weather Conditions** – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

**SC-1.01.A.50** Add the following language at the end of the last sentence of Paragraph 1.01.A.49:

**Agency** – The Project is financed in whole or in part through programs administered by the US Department of Interior, Bureau of Reclamation; therefore, Agency for these documents is the Bureau of Reclamation. Refer to the Bureau of Reclamation Supplemental Provisions in the Contract Documents for additional information.

## ARTICLE 2 – PRELIMINARY MATTERS

### SC-2.04 *Preconstruction Conference; Designation of Authorized Representative*

**SC-2.04.A** Add the following at the end of Paragraph 2.0.A

Job specific requirements of Contractor's safety program must be provided to Owner and Engineer prior to preconstruction conference.

**SC-2.04.B** Add the following at the end of Paragraph 2.04.B

Contractor shall designate its on-site safety representative at the preconstruction conference. That person shall be on site on a daily basis to direct compliance with Contractor's safety program.

**ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK**

*SC-4.05 Delays in Contractor's Progress*

**SC-4.05 Amend Paragraph 4.05.C.2 by striking through the following text: “abnormal weather conditions;” and inserting the following text:**

**Abnormal Weather Conditions;**

**ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS**

*SC-5.05 Underground Facilities*

**SC-5.05 Delete Paragraphs 5.05.A, 5.05.B, 5.05.C, 5.05.D., 5.05.E. and replace with the following:**

- A. Underground facilities are not shown or indicated on the Construction Drawings or in the Contract Documents. Contractor is responsible for coordination with local utilities for location and avoidance. Such coordination, crossings, and avoidance shall be incidental to the work.**

*SC-5.06 Hazardous Environmental Conditions*

**SC 5.06 Hazardous Environmental Conditions known to the Owner are contained in the Specifications.**

**ARTICLE 6 – BONDS AND INSURANCE**

*SC-6.03 Contractor’s Insurance*

**SC 6.03 Delete Paragraph 6.03.J in its entirety as shown below:**

~~**J. The coverage requirements for specific policies of insurance must be met by such policies and not by reference to excess and umbrella insurance provided in other policies.**~~

**SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:**

- K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:**

- 1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.3 of the General Conditions:**

<b>State:</b>	<u>Statutory</u>
<b>Federal, if applicable (e.g., Longshoreman’s):</b>	<u>Statutory</u>
<b>Jones Act coverage, if applicable:</b>	
<b>Bodily injury by accident, each accident</b>	\$ <u>NA</u>
<b>Bodily injury by disease, aggregate</b>	\$ <u>NA</u>



**Employer's Liability:**

Bodily injury, each accident	\$ <u>1,000,000</u>
Bodily injury by disease, each employee	\$ <u>1,000,000</u>
Bodily injury/disease aggregate	\$ <u>1,000,000</u>

For work performed in monopolistic states,  
stop-gap liability coverage shall be endorsed to  
either the worker's compensation or  
commercial general liability policy with a  
minimum limit of:

\$ NA

Foreign voluntary worker compensation Statutory

**2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:**

General Aggregate	\$ <u>2,000,000</u>
Products - Completed Operations Aggregate	\$ <u>2,000,000</u>
Personal and Advertising Injury	\$ <u>2,000,000</u>
Each Occurrence (Bodily Injury and Property Damage)	\$ <u>2,000,000</u>

**3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:**

**Bodily Injury:**

Each person	\$ <u>1,000,000</u>
Each accident	\$ <u>1,000,000</u>

**Property Damage:**

Each accident	\$ <u>1,000,000</u>
---------------	---------------------

*[or]*

Combined Single Limit of	\$ <u>2,000,000</u>
--------------------------	---------------------

**4. Excess or Umbrella Liability:**

Per Occurrence	\$ <u>10,000,000</u>
General Aggregate	\$ <u>10,000,000</u>

5. Contractor's Pollution Liability:

Each Occurrence	\$ 5,000,000
General Aggregate	\$ 5,000,000



If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: Policies shall contain a 'Waiver of Subrogation'.

7. Contractor's Professional Liability:

Each Claim	\$ NA
Annual Aggregate	\$ NA

SC-6.05 Property Insurance

SC-6.05.A. Replace paragraph 6.05.A with the following:

- A. **Builder's Risk:** Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of one hundred and ten percent (110%) of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

SC-6.05.A.1 Add the following new subparagraph after subparagraph 6.05.A.1:

- a. In addition to Owner, Contractor, and all Subcontractors, include as additional insureds the following: Engineer.

SC-6.05.A.14 Add the following new subparagraph after subparagraph 6.05.A.13:

14. not include a sub-limit on engineering or construction management costs in an amount less than ten percent (10%) of the full insurable replacement cost of the Work.

SC-6.05.F Add the following new paragraph immediately following paragraph 6.05.F:

- G. All policies purchased in accordance with Paragraph 6.05 will include as insureds Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provision to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work;

and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as insureds (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued. Notwithstanding the above, Owner does not waive its rights to subrogate or seek compensation against Contractor, any of its subcontractors, sub-subcontractors, agents or employees, or Engineer or any of its subcontractors, sub-subcontractors, agents or employees, for damages caused to non-Work related property, real or personal or both caused by the negligent, intentional or other willful act or omission of the Contractor, any of its subcontractors, sub-subcontractors, agents or employees, or the Engineer or any of its subcontractors, sub-subcontractors, agents or employees.

## ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

### SC-7.01 *Supervision and Superintendence*

**SC-7.01.B. Add the following new paragraphs immediately after Paragraph 7.01B:**

“C. The Contract Documents contain all of the terms and conditions for construction of the Project. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve the Contractor from obligation to perform and comply with each and every term and condition of the Contract.”

### SC-7.02 *Labor; Working Hours*

**SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:**

1. Allowable working hours are 6:00 am to 8:00pm on weekdays unless otherwise approved by the owner.

**Add the following new paragraph immediately after paragraph 7.02.B:**

“C. The Contractor shall be responsible for the conduct of Contractor’s employees and employees of Subcontractors and suppliers on the Work Site. The Contractor shall take immediate steps to remedy any activity that may be construed as discriminatory or which creates a hostile work environment. Activities covered by this provision include, but shall not be limited to, signs or language that is vulgar, profane, or racially or sexually derogatory.”

### SC-7.04 *“Or Equals”*

**SC-7.04.A. Amend the third sentence of Paragraph 7.04.A by striking out the following words:**

Unless the specification or description contains or is followed by words reading that no like, equivalent, or ‘or-equal’ item is permitted.

**SC-7.04.A.1 Delete Paragraph 7.04.A1.a.4 in its entirety**

*SC-7.06 Concerning Subcontractors, Suppliers, and Others*

**SC-7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the Paragraph:**

**The Contractor shall not award work valued at more than fifty percent (50%) of the Contract Price to Subcontractor(s), without prior written approval of the Owner.**

**SC-7.06.B Delete paragraph 7.06.B in its entirety.**

**SC-7.06.E Amend the second sentence of Paragraph 7.06.E by striking out "Owner may also require Contractor to retain specific replacements; provided, however, that".**

**Add the following after the end of Paragraph 7.06.E:**

**Contractors shall provide the identity of the Subcontractors at the time of bidding.**

**No change in such Subcontractors as listed above will be allowed without written approval by Owner.**

**SC-7.06.F Replace Paragraph 7.06.F with the following:**

**F: If Owner requires the replacement, prior to the Award of the Contract, of any Subcontractor, Supplier or other individual listed in Paragraph 7.06.E then Contractor shall NOT be entitled to an adjustment in Contract Price or Contract Times or both, with respect to the replacement. If Owner requires the replacement of any Subcontractor, Supplier or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.**

*SC-7.12 Safety and Protection*

**SC-7.12 Insert the following after Paragraph 7.12.G.**

**H. Contractor shall provide Owner and Engineer with a completed confined space pre-entry checklist that complies with 29 CFR 1910.146 and 29 CFR 1926.1200 AA standards for construction as amended and applicable state laws and regulations. Contractor, at its expense, shall obtain any and all permits required. Contractor shall determine if job requires anyone to enter manholes, vaults, lift stations, piping, tanks or other confined spaces. Before Work commences, Contractor must ensure that a competent person identifies all confined spaces in which one or more of the persons it directs may work, and identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.**

**If the job site contains one or more permit spaces, the Contractor who identifies, or who receives notice of, a permit space must:**

**(1) Inform exposed persons by posting danger signs or by any other equally effective means, of the existence and location of, and the danger posed by, each permit space; and**

**A sign reading "DANGER – PERMIT REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement for a sign.**

- (2) Inform, in a timely manner and in a manner other than posting, its employees' authorized representatives and the controlling contractor of the existence and location of, and the danger posed by, each permit space.

If Contractor determines any person will enter a permit space, that host employer must have a written permit space program that complies with §1926.1204 implemented at the construction site. Contractor shall provide appropriate air monitoring equipment, employee training, permit forms, rescue procedures, personnel, and other means necessary to safely and independently enter confined spaces. The written program and permit must be made available prior to and during entry operations for inspection by person/s who need to enter the space for work or inspection.

- I. In the event personal fall arrest systems are used, the following rescue considerations shall apply. When personal fall arrest systems are used, Contractor must assure that persons can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment should be evaluated. In some situations, equipment that allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices that have descent capability. All new persons on site shall be given instructions on the proper use of fall protection devices before they begin work, as well as rescue procedures. The written fall protection plan will be reviewed before Work commences on the job site. Fall protection equipment use will be reviewed regularly at the weekly safety meetings.

## ARTICLE 10 – ENGINEER’S STATUS DURING CONSTRUCTION

### SC-10.03 *Project Representative*

#### SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

- B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.
  1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
  2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
  3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.
  4. Liaison:
    - a. Serve as Engineer’s liaison with Contractor. Working principally through Contractor’s authorized representative or designee, assist in providing

- information regarding the provisions and intent of the Contract Documents.
- b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
  - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
6. Shop Drawings and Samples:
- a. Record date of receipt of Samples and Contractor-approved Shop Drawings.
  - b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
  - c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.
7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
8. Review of Work and Rejection of Defective Work:
- a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
  - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
9. Records:
- a. When present on-site, prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions,

observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

- b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- c. Maintain records for use in preparing Project documentation.

**10. Reports:**

- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
- b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
- c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

**11. Payment Requests:** Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

**12. Completion:**

- a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
- b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.
- c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

**C. The RPR shall not:**

- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
- 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
- 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.
5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize Owner to occupy the Project in whole or in part.

#### **ARTICLE 11 – AMMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK**

##### *SC-11.07 Execution of Change Orders*

**SC 11.07.C Add the following new Paragraph after Paragraph 11.07B:**

**All Contract Change Orders must be concurred by United States Bureau of Reclamation before they are effective.**

#### **ARTICLE 12 – CLAIMS**

##### *SC-12.01 Claims*

**SC 12.01.D.1 Amend the first sentence of Paragraph 12.01.D.1 to read as follows:**

**At the conclusion of the Contract, Owner and Contractor may mutually agree to mediation of the underlying dispute.**

#### **ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

##### *SC-13.01 Cost of the Work*

**SC 13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:**

**c. Construction Equipment and Machinery:**

- 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
- 2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the FHA Blue Book. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation,



loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than \$1,000 will be considered small tools.

*SC-13.02 Allowances*

**SC 13.02.C** Delete Paragraph 13.02.C. in its entirety

**ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD**

*SC-15.01 Progress Payments*

**SC 15.01.B** Amend the second sentence of Paragraph 15.01.B.1 by striking out the following text: “a bill of sale, invoice, or other.”

**SC-15.01.B.3** Add the following language at the end of paragraph 15.01.B.3

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage or invest the retainage for the benefit of the Contractor.

**SC-15.01.B.4** Add the following new paragraph after Paragraph 15.01.B.3:

The Application for Payment Form to be used on this Project is FmHA Form 1924-18.

*SC-15.02 Contractor’s Warranty of Title*

**SC 15.02.A** Amend Paragraph 15.02.A by striking out the following text: “no later than seven days after the time of payment by Owner” and insert “no later than the time of payment by Owner.”

*SC-15.03 Substantial Completion*

**SC 15.03.B** Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

**SC-15.03** Add the following paragraph immediately after Paragraph 15.03.F:

- G. Manual operation of portions of the project intended to operate automatically shall not constitute substantial completion.

**ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION**

**SC-16.05** Add the following new paragraph after Paragraph 16.04.B

**16.05** *Suspension of Work for Historical or Archeological Finds*

If, during the course of construction, evidence of deposits of historical or archeological interest is found, Contractor shall cease operations affecting the immediate area of the find and notify the Owner.

## ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

### SC-17.02 *Attorneys' Fees*

**SC-17.02** Add the following new paragraph immediately after Paragraph 17.01, as Paragraph 17.02 with the Title "Attorney's Fees".

For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

## ARTICLE 18 – MISCELLANEOUS

### SC-18.07 *Controlling Law*

**SC-18.07** Delete paragraph 18.07.A. and replace with the following:

A. This Contract is to be governed and construed in accordance with the laws of the Standing Rock Sioux Tribe, except wherein a dispute directly concerns matters of federal regulation. Any dispute shall be decided in the Tribal Court of the Standing Rock Sioux Tribe, which shall maintain jurisdiction for dispute resolution and/or remedy. Nothing herein shall be construed as a waiver of the sovereign immunity of the Standing Rock Sioux Tribe.

## ARTICLE 19 – FEDERAL REQUIREMENTS

### SC-19.01 *Agency Not a Party*

**SC-19.01** Add the following language as Paragraph 19.01 with the title "Agency Not a Party.

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

### SC-19.02 *Contract Approval*

**SC-19.02** Add the following sections after 19.01 as Paragraph 19.02 with the title "Contract Approval":

A. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

### SC-19.03 *Conflict of Interest*

**SC-19.03** Add the following language after Article 19.02 as Paragraph 19.03 with the title "Conflict of Interest":

- A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of the immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

*SC-19.04 Gratuities*

**SC-19.04** Add the following language after Article 19.03A as Paragraph 19.04 with the title "Gratuities":

- A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.
- B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

*SC-19.05 Audit and Access to Records*

**SC-19.05** Add the following language after Article 19.04B as Paragraph 19.05 with the title "Audit and Access to Records":

- A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

*SC-19.06 Small, Minority and Women's Businesses*

**SC-19.06** Add the following language after Article 19.05A as Paragraph 19.06 with the title "Small, Minority and Women's Businesses":

- A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks, or quantities to permit maximum participation of small, minority, and women's businesses (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. department of commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

*SC-19.07 Anti-Kickback*

**SC-19.07** Add the following after Article 19.06A as Paragraph 19.07 with the title "Anti-Kickback":

- A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing b, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

*SC-19.08 Clean Air and Pollution Control Acts*

**SC-19.08** Add the following after Article 19.07A as Paragraph 19.08 with the title "Clean Air and Pollution Control Acts":

- A. If this Contract exceeds \$100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Air Act (42 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738 and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and Regional Office of the EPA.

*SC-19.09 State Energy Policy*

**SC-19.09** Add the following after Article 19.08 as Paragraph 19.09 with the title "State Energy Policy":

- A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

*SC-19.10 Equal Opportunity Requirements*

**SC-19.10** Add the following after Article 19.09 as Paragraph 19.10 with the title "Equal Opportunity Requirements":

- A. If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."
- B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed.
- C. Contractor shall provide written notification to the Director of the Office of Federal contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

*SC-19.11 Restrictions on Lobbying*

**SC-19.11** Add the following after Article 19.10.C with the title "Restrictions on Lobbying":

- A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontract that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in

connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Over. Necessary certification and disclosure forms shall be provided by Owner.

*SC-19.12 Environmental Requirements*

**SC-19.12 Add the following after Article 19.11.A with the title "Environmental Requirements":**

**When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:**

- A. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.**
- B. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.**
- C. Historical Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).**
- D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.**

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# **BUREAU OF RECLAMATION SUPPLEMENTAL PROVISIONS**

## **1.0 — Equal Employment Opportunity (41 CFR Part 60)**

For all contracts in excess of \$10,000, unless otherwise exempted under 41 CFR §60-1.5, the contractor shall, during the performance of this contract, comply with Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60 "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor". The contractor shall comply with the Equal Opportunity Clause as follows:

During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. such action shall include, but not be limited to the following: Employment, upgrading, 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 to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked



as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: *Provided, however,* That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided,* That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

## **2.0 — Copeland “Anti-Kickback” Act (18 U.S.C. 874), as supplemented by 29 CFR Part 3**

The contractor or sub-recipient must comply with the Copeland “Anti-Kickback” Act (18 U.S.C. 874), as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. Violations shall be reported to the Federal awarding agency.

## **3.0 — Contract work hours and Safety Standards Act (40 U.S.C. 3701-3708)**

For all contracts in excess of \$100,000 that involve the employment of mechanics or laborers the Contractor shall comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under Section 3702 of the Act, each contractor shall compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than 1 ½ times the basic rate of pay for all hours worked in excess of 40 hours in the work week. Section 3704 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

## **4.0 — Clean Air Act & Federal Water Pollution Control Act**

For all contracts in excess of \$150,000, the Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

## **5.0 — Byrd Anti-Lobbying Amendment**

For contracts in excess of \$100,000, Contractors that apply or bid must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress,

or an employee of a member of Congress in connection with obtaining any Federal Contract, grant or any other award covered by 31 U.S.C 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

## **6.0 — Debarment and Suspension**

A contract award must not be made to parties listed on the government-wide Excluded Parties List System in the System for Award Management (SAM) in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR Part 1986 Comp., p.189) and 12689 (3 CFR Part 1989 Comp., p. 235). SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

## **7.0 — Records**

On all contracts (except those of \$10,000 or less) awarded by the Owner, the Owner, Agency, Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the contractor for the purpose of making audits, examinations, excerpts, and transcriptions. The Contractor shall maintain all required records for 3 years after making final payment and all other pending matters are closed.

## **8.0 — Preservation of Historical and Archeological Data**

(a) Except as provided for an equitable adjustment, include cost of complying with this section in prices offered in the schedule for other items of work.

(b) Definitions.

- (1) Cultural items: Native American cultural items (i.e., funerary objects, sacred objects, objects of cultural patrimony, or human remains) for which protection is prescribed under the Native American Graves Protection and Repatriation Act (NAGPRA) - Public Law 101-601; 104 Stat. 3042, Section 3(d); and 43 CFR Part 10.4.
- (2) Human remains: Physical remains of the body of a person.
- (3) Funerary objects: Native American items that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed intentionally at the time of death or later with or near individual human remains.
- (4) Native American: Of, or relating to, a tribe, people, or culture that is indigenous to the United States.

- (5) Sacred Objects: Native American items that are specific ceremonial objects needed by traditional Native American religious leaders for the practice of traditional Native American religions by their present-day adherents. These items are specifically limited to objects that were devoted to a traditional Native American religious ceremony or ritual and which have religious significance or function in the continued observance or renewal of such ceremony.
- (6) Objects of cultural patrimony: Native American items having ongoing historical, traditional, or cultural importance central to the Indian tribe itself, rather than property owned by an individual tribal member. These objects are of such central importance that they may not be alienated, appropriated, or conveyed by any individual tribal member.

(c) Project Conditions

- (i) Federal legislation provides for protection, preservation, and collection of scientific, prehistorical, historical, and archeological data, including relics and specimens, which might otherwise be lost due to alteration of terrain as a result of any Federally funded construction project.
- (ii) Any person who, without permission, injures, destroys, excavates, appropriates, or removes any historical or prehistorical artifact, object of antiquity, or archeological resource on public lands of the United States is subject to arrest and penalty of law.
- (iii) Comply with state laws when operating on non-Federal and non-Indian lands.
- (iv) Discovery of Resources
  - (A) When the Contractor, or any of the Contractor's employees, or parties operating or associated with the Contractor, in performance of this contract discover cultural resources on any lands:
  - (B) Immediately cease work at that location.
  - (C) Immediately notify the Engineer and the designated representative of the U. S. Bureau of Reclamation orally, giving the location and nature of the findings.
  - (D) Follow with written confirmation to the Engineer and the designated representative of the U. S. Bureau of Reclamation within 2 days.
- (v) In addition to notifying the U. S. Bureau of Reclamation; where the discovery occurs on state, municipal, or private lands, notify the appropriate state officials as prescribed by state law.
- (vi) Exercise care so as not to disturb or damage cultural resources uncovered during construction activities and provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the designated representative U. S. Bureau of Reclamation.
- (vii) Do not resume work in the area of discovery until receipt of written notice to proceed from the designated representative U. S. Bureau of Reclamation.

(d) Where appropriate by reason of discovery, the designated representative U. S. Bureau of Reclamation after consultation with the appropriate State Historic Preservation Officer may order delays in time of performance or changes in work, or both. When such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with applicable clauses of the contract.

(e) The Owner has made, or caused to be made, cultural resources inventories of the lands owned and rights-of-way acquired. The Contractor will provide the Engineer and the designated representative of the U.S. Bureau of Reclamation with the legal descriptions of any potential borrow areas and plot these locations on the appropriate, county atlas. Materials produced from borrow areas for the purpose of this contract include, but are not limited to, pipe zone and pipe base sand, engineered fill, gravel base, riprap, gravel surfacing. For those borrow areas where new ground-disturbance is necessary (i.e. where the material is not stock-piled and must be excavated), the Contractor will allow sufficient time for the designated representative of the U.S. Bureau of Reclamation consult with the appropriate State Historic Preservation Officer (SHPO) as to the necessity for a cultural resources inventory and, if necessary, complete that inventory. At a minimum, this consultation requires 30 days. If an inventory is necessary, this may require an additional 45 days. The Contractor will take no action to use or alter the proposed locations until written approval for site use is received from the Engineer and the designated representative of the U.S. Bureau of Reclamation.

(f) Include permission for the designated representative of the U.S. Bureau of Reclamation access in arrangements for use of private lands for use areas or borrow sources. The designated representative of the U.S. Bureau of Reclamation's access to the private land shall be to identify cultural resources and conduct appropriate inspections.

(g) Insert this section in subcontracts which involve performance of work on project terrain.

## 9.0 — Drug-Free Workplace

(a) *Definitions.* As used in this clause--

"Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812) and as further defined in regulation at 21 CFR 1308.11 - 1308.15.

"Conviction" means a finding of guilt (including a plea of *nolo contendere*) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession, or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the Contractor in connection with a specific contract where employees of the Contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a Contractor directly engaged in the performance of work under a contract with Owner.

"Directly engaged" is defined to include all direct cost employees and any other Contractor employee who has other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

(b) The Contractor, if other than an individual, shall-- within 30 days after award, or as soon as possible for contracts of less than 30 days performance duration--

- (1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;
- (2) Establish an ongoing drug-free awareness program to inform such employees about--
  - (i) The dangers of drug abuse in the workplace;
  - (ii) The Contractor's policy of maintaining a drug-free workplace;
  - (iii) Any available drug counseling, rehabilitation, and employee assistance programs; and
  - (iv) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace;
- (3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (b)(1) of this clause;
- (4) Notify such employees in writing in the statement required by subparagraph (b)(1) of this clause that, as a condition of continued employment on this contract, the employee will--
  - (i) Abide by the terms of the statement; and
  - (ii) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than 5 days after such conviction;
- (5) Within 30 days after receiving notice under subdivision (b)(4)(ii) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:
  - (i) Taking appropriate personnel action against such employee, up to and including termination; or
  - (ii) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency; and
- (6) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (b)(1) through (b)(6) of this clause.

(c) The Contractor, if an individual, agrees by award of the contract or acceptance of a purchase order, not to engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance while performing this contract.

## **10.0 — Davis-Bacon Act, as amended (40 U.S.C. 3141-3148)**

All prime construction contracts in excess of \$2,000 must comply with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148), as supplemented by Department of Labor regulations (29

CFR Part 5, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction”)

In accordance with that statute, the contractor is required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week.

A copy of the current prevailing wage determination issued by the Department of Labor must be included within this solicitation. The decision to award must be conditioned upon acceptance of the wage determination. All suspected or reported violations must be reported to the Federal awarding agency.

The Contractor shall submit Contractor and subcontractor signed certified payroll weekly using form WH-347 or equivalent form. The certified payroll will be reviewed by the Owner or their designated representative and any deficiencies will be resolved by the Contractor prior to approving applications for payment.

## **11.0 — Endangered Species**

The Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of the Contractor, and the Contractor will immediately report this evidence to the Engineer and the designated representative of the Bureau of Reclamation. Construction shall be temporarily halted pending the notification process and further directions issued by the Bureau of Reclamation after consultation with the U.S. Fish and Wildlife Service.

## **12.0 — Energy Policy and Conservation Act (42 U.S.C. 6201)**

Standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201).

## **13.0 — Buy American**

Pursuant to Section 501 of the Energy and Water Development Appropriations Act, 1995 (PL 103-316, 108 Stat. 1723), it is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with Contract funds are American-made;

## 14.0 — Funds Available for Project Construction Earnings

*(For use when sponsor does not have all the necessary funds available to complete the project in one fiscal year.)*

Funds for earnings under this construction contract will be made available to the extent that funds are provided to the Owner from Congressional appropriations allocated to it and made available by the United States of America acting through the Department of Interior, Bureau of Reclamation, Billings, Montana, Regional Office and funds allocated from the Owner's non-Federal cost share, which are contributions of \_\_\_\_\_ System and/or from appropriations from the State of \_\_\_\_\_. Funds for earning under this contract will be made available as provided in this paragraph.

(a) The sum of \$\_\_\_\_\_ has been reserved for Contract \_\_\_\_\_ and is available for payment to the Contractor to cover earnings during fiscal year 200\_ (through September 30, 200\_ under the schedule of items, materials delivered to the site which are properly stored and protected, and all other earnings, which may be due under the contract, or any contract adjustments required, including retained percentages, change orders, and liquidated damages. It is anticipated the remaining funds needed to complete this contract will become available during the first quarter of fiscal year 200\_ (beginning on October 1, 200\_).

(b) For work that is to be completed within the funds identified in 13(a), the Contractor agrees to perform up to the point at which the total amount payable by the Owner approximates the total amount currently allotted to the contract. The Contractor shall not be obligated to continue performance of work beyond that point. The Owner shall not be obligated in any event to reimburse the Contractor in excess of the amount allotted to the contract for this work notwithstanding any contrary provisions of the Termination for Convenience of the Owner clause of this contract.

(c) Should it become apparent to the Contractor that existing fund reservations will be exhausted within the next 60 days, the Contractor shall at that time give written notice to the Owner. The notification shall state (1) the estimated date when that point will be reached and (2) an estimate of additional funding, if any, needed to continue performance of the work up to the next scheduled date for allotment of the remaining funds identified in paragraph 13(a). If additional funds can be made available, the Owner may issue an additional fund reservation. It is expressly understood, however, that the Owner has no obligation to provide funds in addition to those currently reserved in writing. The Contractor is also cautioned that the prosecution of the work at a rate that will exhaust funds reserved before the end of the fiscal year will be at the Contractor's own risk.

If the Contractor so elects the Contractor may continue work under the conditions and restriction of this contract after funds have been exhausted, so long as there are funds for inspection and administration, concerning which the Contractor will be notified in writing. No payment will be made for any work done after funds have been exhausted unless and until sufficient additional funds have been provided by Congress. If and/or when funds again become available, the Contractor will be notified in writing as to the amount reserved for payments under this contract. However, if the Contractor so elects, the work may be suspended when the available funds have been exhausted. If funds for federal fiscal year 200\_ are being made available for interim periods prior to the enactment of a final funding bill through a continuing resolution, the Contractor will be so advised in writing, and will be further advised in writing as to the amount available (if any) to fund continued work on this contract, as determined by the Owner in its sole and exclusive discretion.



(d) As to any work which may be done in excess of the amount for which funds have been reserved under the provisions of paragraph 13(a), the liability of the Owner is contingent upon the future appropriations necessary to cover such amounts being made by the United States Congress and an appropriate reservation of funds thereunder. Further, the Contractor hereby releases the Owner from any and all liability for delays in payment for work done beyond the current fund reservation due to the failure of Congress to appropriate sufficient funds in fiscal year 200\_ in a timely manner.

(e) The Contractor hereby specifically acknowledges and agrees that it may not rely upon any oral representations by the Owner or engineer or any of their officers, employees, agents or representatives or by any agency of the United States Government concerning the availability of future funds, whether for FY 200\_ or other out-year funding, and that Contractor may only rely upon a formal notification of availability of funds issued by the Owner and approved by the U. S. Bureau of Reclamation in order to proceed with work or to purchase materials to be used in work to be funded with FY 200\_ funds.

(f) Anything in any of the contract documents to the contrary notwithstanding, in the event that the Contractor chooses to continue work after funds have been exhausted and funds thereafter become available, the Contractor shall not be entitled to interest on any payments delayed as a result of the unavailability of funds.

(g) If the amount appropriated and allocated to this project, both by Reclamation and the Owner, for federal fiscal year 200\_ is less than the amount needed to complete the project, the Owner will take one of two possible courses of action. Either the scope of the contract shall be scaled back such that the remaining work activities identified can be completed within the funds made available for fiscal year 200\_, or the contract completion date will be extended. Either action will be accomplished through the change order process to allow for appropriate consideration of contract price adjustments.

(h) Change orders directing additional work under this contract shall not be considered authorization to exceed the amount allotted by the Owner as specified in paragraph 13(a) unless the amount is increased by inclusion of a statement contained in the change order.

(i) Nothing in this clause affects the right of the Owner to terminate this contract pursuant to the Termination for Convenience of the Owner clause of this contract.

## **14.0 – Funds Available for Project Construction Earnings**

*(For use when sponsor does have all the necessary funds available to complete the project in one fiscal year.)*

Federal funds for earnings under this construction contract will be made available to the extent that funds are available to the Owner from U.S. Congressional appropriations allocated to it and made available by the United States of America acting through the Department of the Interior, Bureau of Reclamation, Billings, Montana Regional Office and funds allocated from the Owner's non-Federal cost share, which are contributions of \_\_\_\_\_ System and/or from appropriations from the State of \_\_\_\_\_. All funds for this contract are available as provided in this clause.

(a) As to any work which may be done in excess of the amount for which funds have been reserved under the provisions of this clause, the liability of the Owner is contingent upon the necessary appropriations being made therefore by the Congress and an appropriate reservation of funds there under. Further, the Contractor hereby releases the Owner from any and all liability due to the failure of the U.S. Congress to appropriate sufficient funds, or for

delays in payments due to lack of funds. The Contractor also releases the Owner from any and all liability for damages for breach of contract as a result of the failure of the Congress to appropriate sufficient funds.

(b) If at any time the Owner finds that the balance of this reservation is in excess of the estimated amount required to meet all payments due and to become due the Contractor because of the work performed or to be performed prior to the beginning of the next fiscal year, the right is reserved to reduce said reservation by the amount of such excess. The Contractor will be notified in writing of any such reduction.

(c) If the rate of progress of the work is such that the Owner finds that the balance of the reservation is less than the estimated amount required to meet all payments due and to become due because of work performed prior to the beginning of the next fiscal year, the Owner may reserve additional funds for payments under this contract if there are funds available for such purpose. The Contractor will be notified in writing of such additional reservation

(d) The procedure described above in this clause shall be repeated as often as necessary on account of exhaustion of available funds and the necessity of awaiting the appropriation of additional funds by Congress.

**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS: That we (1) \_\_\_\_\_ of \_\_\_\_\_, a (2) \_\_\_\_\_, hereinafter called PRINCIPAL, and (3) \_\_\_\_\_ of \_\_\_\_\_ hereinafter called SURETY, are held and firmly bound unto the United States of America, as trustee for (4) Standing Rock Sioux Tribe hereinafter called OWNER, and unto all persons, firms, and corporations who or which may furnish labor or who may furnish materials to perform as described under the CONTRACT and to their successors and assigns in the total aggregate penal sum of \_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_) in lawful money of the United States to be paid in (5) Sioux County, North Dakota, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the PRINCIPAL entered into a certain CONTRACT with (6) Standing Rock Sioux Tribe is dated the \_\_\_\_\_ day of \_\_\_\_\_ 2025, a copy of which is hereto attached and made a part hereof for the construction of:

Standing Rock Rural Water System MR&I Office Remodel Contract 2-6

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such CONTRACT, and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct CONTRACT with the PRINCIPAL or its SUBCONTRACTOR.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the CONTRACT or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this CONTRACT or to the WORK or to the SPECIFICATIONS.

PROVIDE, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct CONTRACT with the PRINCIPAL shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the WORK or labor was done or performed. Such notice shall be served in any manner in which legal process may be served in the state in which the aforesaid PROJECT is located, save that such service need not be made by a public officer; (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased WORK on said CONTRACT, it being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the CONTRACT not increasing the CONTRACT price more than twenty (20) percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the CONTRACT or the loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the day of \_\_\_\_\_, 2025.

(7) \_\_\_\_\_  
 PRINCIPAL SURETY

BY: \_\_\_\_\_ BY: \_\_\_\_\_  
 (Name) (Name)

\_\_\_\_\_  
 TITLE ATTORNEY-IN-FACT

\_\_\_\_\_  
 ADDRESS ADDRESS

STATE OF \_\_\_\_\_ )  
 )ss.  
 COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ appeared before me \_\_\_\_\_, to me known to be the \_\_\_\_\_ of (8) \_\_\_\_\_, known to me to be the Attorney-in-fact for (9) \_\_\_\_\_, and each of them swore s/he signed within instrument as his/her free and voluntary act, for the purposes therein stated.

\_\_\_\_\_  
 \_\_\_\_\_  
 Notary Public, State of \_\_\_\_\_  
 My Commission expires: \_\_\_\_\_

**IMPORTANT:** SURETY companies executing BONDS must appear on the Treasury Department's most current list (Circular 570) and be authorized to transact business in the State where the PROJECT is located.

**NOTICE TO CORPORATE SURETIES:** This BOND will not be accepted unless executed by an attorney-in-fact whose name and address must be noted in the space hereinafter provided.

Full Name of SURETY Company \_\_\_\_\_  
 Home Office Address \_\_\_\_\_  
 Name of Attorney-in-Fact \_\_\_\_\_  
 Name of Local AGENCY \_\_\_\_\_  
 Address of Local AGENCY \_\_\_\_\_

A copy of the Power of Attorney of the Attorney-in-Fact showing that it remains in force as of the date of the BOND must be attached to the BOND.

.....  
**NOTE:** Date of BOND must not be prior to the date of CONTRACT.

Designations on BOND as follows:

- (1) Correct Name of CONTRACTOR
- (2) A Corporation, a Partnership or an Individual as case may be.
- (3) Correct Name of SURETY
- (4) Correct Name of OWNER
- (5) County
- (6) OWNER
- (7) If CONTRACTOR is Partnership, all partners should execute BOND.
- (8) Name of CONTRACTOR - a separate Notary may be used for each party to the BOND
- (9) Name of SURETY - a separate Notary may be used for each party to the BOND

**CORPORATE ACKNOWLEDGMENT**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

On this \_\_\_\_ day of \_\_\_\_\_ before me personally appeared \_\_\_\_\_  
\_to me known, who being by me duly sworn, that he is the \_\_\_\_\_  
of the \_\_\_\_\_, the corporation described in and which executed  
the foregoing instrument; that he knows the seal of said corporation; that the seal  
affixed to said instrument is such corporate seal; that it was so affixed by order of  
the Board of Directors or \_\_\_\_\_ of said corporation; and that he signed his name  
thereto by like order.

Notary Public \_\_\_\_\_  
(Notary Seal)

**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS: That we (1) \_\_\_\_\_  
\_\_\_\_\_ of \_\_\_\_\_, a (2)  
\_\_\_\_\_, hereinafter called PRINCIPAL, and (3)  
\_\_\_\_\_ of \_\_\_\_\_ hereinafter called SURETY, are held and firmly  
bound unto the United States of America, as trustee for (4) Standing Rock Sioux Tribe,  
hereinafter called OWNER, in the total aggregate penal sum of \_\_\_\_\_  
\_\_\_\_\_DOLLARS(\$\_\_\_\_\_) in lawful money of the United States to  
be paid in (5) Sioux County, North Dakota, for the payment of which sum well and truly to  
be made, we bind ourselves, our heirs, executors, administrators, successors and  
assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the PRINCIPAL  
entered into a certain CONTRACT with (6) Standing Rock Sioux Tribe which is dated the  
\_\_\_\_\_ day of \_\_\_\_\_ 2025, a copy of which is hereto attached and made a part  
hereof for the construction of:

Standing Rock Rural Water System MR&I Office Remodel Contract 2-6.

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties and  
all the undertakings, covenants, terms, conditions, and AGREEMENTS of said CONTRACT  
during the original term thereof, and any extensions thereof which may be granted by the  
OWNER, with or without notice to the SURETY and during the one (1) year guaranty  
period and if the PRINCIPAL shall satisfy all claims and demands incurred under such  
CONTRACT, and shall fully indemnify and save harmless the OWNER from all costs and  
damages which it may suffer by reason of failure to do so, and shall reimburse and repay  
the OWNER all outlay and expense which the OWNER may incur in making good any  
default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the liability of the PRINCIPAL AND SURETY hereunder to the  
GOVERNMENT shall be subject to the same limitations and defenses as may be available  
to them against a claim hereunder by the OWNER, provided however, that the  
GOVERNMENT may, at its option, perform any obligations of the OWNER required by the  
CONTRACT.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the CONTRACT or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the CONTRACT not increasing the CONTRACT price more than twenty (20) percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the CONTRACT or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER is the only beneficiary hereunder.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 2025.

(7) _____ <div style="text-align: center;">PRINCIPAL</div> BY: _____ <div style="text-align: center;">(Name)</div> _____ <div style="text-align: center;">TITLE</div> _____ <div style="text-align: center;">ADDRESS</div>	_____ <div style="text-align: center;">SURETY</div> BY: _____ <div style="text-align: center;">(Name)</div> _____ <div style="text-align: center;">ATTORNEY-IN-FACT</div> _____ <div style="text-align: center;">ADDRESS</div>
---	---

STATE OF \_\_\_\_\_ )  
 )ss.  
 COUNTY OF \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ appeared before me \_\_\_\_\_, to me known to be the \_\_\_\_\_ of (8) \_\_\_\_\_, known to me to be the Attorney-in-fact for (9) \_\_\_\_\_, and each of them swore s/he signed within instrument as his/her free and voluntary act, for the purposes therein stated.

\_\_\_\_\_  
 \_\_\_\_\_  
 Notary Public, State of \_\_\_\_\_  
 My Commission expires: \_\_\_\_\_



**IMPORTANT:** SURETY companies executing BONDS must appear on the Treasury Department's most current list (Circular 570) and be authorized to transact business in the State where the PROJECT is located.

**NOTICE TO CORPORATE SURETIES:** This BOND will not be accepted unless executed by an attorney-in-fact whose name and address must be noted in the space hereinafter provided.

Full Name of SURETY Company \_\_\_\_\_  
Home Office Address \_\_\_\_\_  
Name of Attorney-in-Fact \_\_\_\_\_  
Name of Local AGENCY \_\_\_\_\_  
Address of Local AGENCY \_\_\_\_\_

A copy of the Power of Attorney of the Attorney-in-Fact showing that it remains in force as of the date of the BOND must be attached to the BOND.

.....

Note: Date of BOND must not be prior to the date of CONTRACT.

Designations on BOND as follows:

- (1) Correct Name of CONTRACTOR
- (2) A Corporation, a Partnership or an Individual as case may be.
- (3) Correct Name of SURETY
- (4) Correct Name of OWNER
- (5) County
- (6) OWNER
- (7) If CONTRACTOR is Partnership, all partners should execute BOND.
- (8) Name of CONTRACTOR a separate Notary may be used for each party to the BOND
- (9) Name of SURETY - a separate Notary may be used for each party to the BOND

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**CERTIFICATE OF INSURANCE**

Name and Address of Agency	COMPANIES AFFORDING COVERAGES Company Letter <b>A</b>
Name and Address of Insured	Company Letter <b>B</b> Company Letter <b>C</b>
Name and Address of Certificate Holder Standing Rock Sioux Tribe PO Box 429 Fort Yates, ND 58538	Company Letter <b>D</b> Company Letter <b>E</b>

This is to certify that policies of insurance listed below have been issued to the insured named above and are in force at this time.

Company Letter	TYPE OF INSURANCE	POLICY NUMBER	POLICY EXPIRATION DATE	Limits in Thousands	
	GENERAL LIABILITY			General Aggregate	\$
	Commercial General Liability			Products-Comp/Op AGG.	\$
	Claims made     occur			Personal & Adv. Injury	\$
	Owner's & Contractor's Prot.			Each Occurrence	\$
				Fire Damage (any one fire)	\$
				Med. Exp. (any one person)	\$
	AUTOMOBILE LIABILITY			Combined Single Limit	\$
	Any Auto			Bodily Injury (per person)	\$
	All Owned Autos			Bodily Injury (Per Accident)	\$
	Scheduled Autos			Property Damage	\$
	Hired Autos				
	Non-Owner Autos				
	Garage Liability				
	EXCESS LIABILITY			Each Occurrence	\$
	Umbrella Form			Aggregate	\$
	Other Than Umbrella Form				
	OTHER			List Additional Insureds Under Commercial General	
				<b>Standing Rock Sioux Tribe</b>	
				<b>Bartlett &amp; West, Inc.</b>	

Description of Operations/Locations/Vehicles/Special Items

Cancellation: Should any of the above described policies be cancelled before the expiration date thereof, the issuing company shall mail a written notice 30 days prior to cancellation date to the above named certificate holder.

Date Issued: \_\_\_\_\_

\_\_\_\_\_  
 AUTHORIZED REPRESENTATIVE

**INSERT THE FOLLOWING HERE**

Acknowledgement of PRINCIPAL

Power of Attorney

Liability Insurance

Article 6 of the Standard General Conditions of the  
Construction CONTRACT, Funding AGENCY Edition (EJCDC C-700 Current Edition)

Current Worker's Compensation Certificate of Premium Paid

CONTRACTOR'S Certificate of North Dakota Income and Sales Tax Clearance

**NOTICE OF AWARD**

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT Description: Standing Rock Rural Water System MR&I Office Remodel Contract 2-6.

The OWNER has considered the BID submitted by you for the above-described WORK in response to its Advertisement for BIDs dated \_\_\_\_\_, 2025 and Information for BIDDERS.

You are hereby notified that your BID has been accepted for items in the amount of \$\_\_\_\_\_.

You are required by the Information for Bidders to execute the AGREEMENT and furnish the required CONTRACTOR's Performance BOND, Payment BOND and Certificates of Insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said AGREEMENT and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
Standing Rock Sioux Tribe  
Owner

By \_\_\_\_\_  
Janet Alkire

Title \_\_\_\_\_  
Chairwoman

**ACCEPTANCE OF NOTICE**

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by \_\_\_\_\_ the \_\_\_\_\_ day of \_\_\_\_\_, 2025.

By \_\_\_\_\_

Title \_\_\_\_\_

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**NOTICE TO PROCEED**

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_  
Project: Standing Rock Rural Water System  
MR&I Office Remodel Contract 2-6

You are hereby notified to commence WORK in accordance with the AGREEMENT dated \_\_\_\_\_, 2025, on or before \_\_\_\_\_, 2025, and you are to complete all WORK prior to \_\_\_\_\_, 2025.

\_\_\_\_\_  
**Standing Rock Sioux Tribe**  
Owner

By \_\_\_\_\_

Title Janet Alkire, Chairwoman

**ACCEPTANCE OF NOTICE**

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by \_\_\_\_\_

\_\_\_\_\_,  
on this the \_\_\_\_\_ day of \_\_\_\_\_, 2025.

By \_\_\_\_\_

Title \_\_\_\_\_

Employer Identification  
Number \_\_\_\_\_

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USDA-FmHA  
Form FmHA 1924-18

STANDING ROCK RURAL WATER SYSTEM  
MR&I OFFICE REMODEL CONTRACT 2-6

**PARTIAL PAYMENT ESTIMATE**

PARTIAL PAYMENT ESTIMATE NO. \_\_\_\_\_

PAGE \_\_\_\_\_ OF \_\_\_\_\_

OWNER:

CONTRACTOR:

PERIOD OF ESTIMATE

STANDING ROCK RURAL WATER SYSTEM

FROM \_\_\_\_\_ TO \_\_\_\_\_

CONTRACT CHANGE ORDER SUMMARY

ESTIMATE

NO.	BOR APPROVAL DATE	AMOUNT (WITH TERO)		
		ADDITIONS	DEDUCTIONS	
				1. Original Contract (with TERO & EPA) _____
				2. Change Orders (with TERO & EPA) _____
				3. Revised Contract (with TERO & EPA) (1+2) <u>\$0.00</u>
				4. Previous Payments (with TERO & EPA) _____
				5. Work Completed * (w/o TERO & EPA) _____
				6. Stored Materials (w/o TERO & EPA) <u>\$0.00</u>
				7. Subtotal (w/o TERO & EPA) (5+6) <u>\$0.00</u>
				8. Retainage (w/o TERO & EPA) <u>\$0.00</u>
				9. Previous Payments (w/o TERO & EPA) _____
				10. Subtotal (7-8-9) <u>\$0.00</u>
				11. TERO (This Estimate) @ 2.5% <u>\$0.00</u>
				12. EPA Fee (This Estimate) @ 1% <u>\$0.00</u>
				13. Amount Due (with TERO & EPA) (10+11+12) <u>\$0.00</u>
TOTALS				
NET CHANGE				

\*Detailed breakdown attached

CONTRACT TIME

Original (days) \_\_\_\_\_  
Revised \_\_\_\_\_  
Remaining \_\_\_\_\_

On Schedule  Yes  
 No

Starting Date \_\_\_\_\_  
Projected Completion \_\_\_\_\_

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of their knowledge, information and belief the work covered by this payment estimate has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for work for which previous payment estimates was issued and payments received from the owner, and that current payment shown herein is now due.

Contractor: \_\_\_\_\_

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

Date: \_\_\_\_\_

ENGINEER'S CERTIFICATION:

I hereby certify that I have inspected the work or have been advised of the results of inspections of the work made by the Engineer's Inspectors or the Owner's Resident Inspectors who have inspected the work and as a result of inspection and advisement, and to the best of my knowledge and belief, the quantities shown in this estimate are correct and the work has been performed in accordance with the Contract Documents.

Engineer: Bartlett & West, Inc.

By: Douglas W. Mund, P.E. Project Manager

Date: \_\_\_\_\_

APPROVED BY OWNER:

Owner: STANDING ROCK RURAL WATER SYSTEM

By: Randez Bailey, Director

Date: \_\_\_\_\_

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**FIELD ORDER**

**DATE** \_\_\_\_\_

**ORDER NO.** \_\_\_\_\_

**CONTRACT NO.** \_\_\_\_\_

**PROJECT** Standing Rock Rural Water System

MR&I Office Remodel Contract 2-6

**OWNER** Standing Rock Sioux Tribe

**CONTRACTOR** \_\_\_\_\_

\*\*\*\*\*

You are hereby requested to comply with the following changes from the Contract Plans and Specifications:

**DESCRIPTION OF CHANGES:**

**JUSTIFICATION:**

As a portion of the Standard General Conditions of the Construction CONTRACT (Funding AGENCY Edition) EJCDC C-710, Article 9.04 and Article 10, the CONTRACTOR shall notify the ENGINEER in writing within seven (7) calendar days after receipt of this Field Order if he believes he is entitled to a change in Contract Price or Time and shall not execute such changes pending receipt of an executed Change Order or further instructions from the OWNER.

**ORDERING ENGINEER** \_\_\_\_\_ **DATE** \_\_\_\_\_

**RECEIVED BY CONTRACTOR** \_\_\_\_\_ **DATE** \_\_\_\_\_

cc: Standing Rock Rural Water System  
Contractor  
Engineer

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**CHANGE ORDER**

STANDING ROCK RURAL WATER SYSTEM, MR&I OFFICE REMODEL CONTRACT 2-6  
 (Contract For)  
 STANDING ROCK SIOUX TRIBE  
 (Owner)

ORDER NO. \_\_\_\_\_  
 DATE \_\_\_\_\_  
 COUNTY SIOUX  
 NORTH DAKOTA  
 STATE \_\_\_\_\_

TO \_\_\_\_\_  
 (Contractor)

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

Description of Changes (Supplemental Plans & Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
		\$ 0.00
SUBTOTAL	_____	\$ 0.00
TERO @ 2.5%	_____	\$ 0.00
EPA FEE @ 1%	_____	\$ 0.00
TOTALS	_____	\$ 0.00
NET CHANGE CONTRACT PRICE	_____	\$ 0.00

JUSTIFICATION:

The amount of the Contract will be (Decreased) (Increased) By the Sum Of: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_).

The Contract Total Including this and previous Change Orders Will Be: \_\_\_\_\_ Dollars and 00/100 (\$ \_\_\_\_\_).

The Contract Period Provided for Completion Will Be (Increased) (Decreased) (Unchanged): \_\_\_\_\_ Calendar Days.

This document will become a supplement to the contract and all provisions will apply hereto.

Requested: \_\_\_\_\_  
 Standing Rock Rural Water System (Date)

Recommended: \_\_\_\_\_  
 Bartlett & West, Inc. (Date)

Accepted: \_\_\_\_\_  
 Contractor (Date)

Approved by: \_\_\_\_\_  
 United States Bureau of Reclamation (Date)

This information will be used as a record of any changes to the original construction contract.

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## RELEASE BY CLAIMANTS

The undersigned, having received payment in full for all labor, materials, supplies, or equipment supplied to \_\_\_\_\_, Contractor, or to any subcontractor, in the construction or repair of the improvements upon the property located at:

Standing Rock Rural Water System, MR&I Office Remodel Contract 2-6, located in Sioux County, ND,  
and furnished in the execution and fulfillment of contract between said Contractor and Standing Rock Sioux Tribe Owner, dated \_\_\_\_\_, do (does) hereby release and waive any and all claims, liens, and lien rights, of any kind, nature, or description whatsoever, against said property and the Owner thereof, and against said Contractor.

Lien or Claimant	Work or Materials	Amount Due	Date
Signed By Claimant:			
Signed By Claimant:			
Signed By Claimant:			
Signed By Claimant:			
Signed By Claimant:			
Signed By Claimant:			
Signed By Claimant:			

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0575-0042. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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Date \_\_\_\_\_

**To: Standing Rock Sioux Tribe  
P.O. Box 429  
Fort Yates, ND 58538**

**Standing Rock Rural Water System, MR&I Office Remodel Contract 2-6**

Dear Sir:

I hereby acknowledge the receipt of \_\_\_\_\_ dollars  
(\$ \_\_\_\_\_) in full payment of my contract dated \_\_\_\_\_ for improvement  
work which I did for you and which is described in my contract.

I certify that I have paid in full for all materials purchased and all labor employed in the performance of this contract and that there are no claims against me as an employer under this contract on account of injuries sustained by workers employed by me or by subcontractors thereunder. I hereby release you from any claims arising by virtue of this contract.

I am attaching Form RD 1924-10, "Release by Claimants," signed by all persons from whom I have purchased materials and by all subcontractors and all persons employed in connection with my contract with the above-named borrower.

**WARNING**

The statements and representations made above are made in connection with construction financed in whole or in part by the United States Department of Agriculture (USDA). The statements and representations will be used to determine the release of USDA provided funds. The making of any false statement or misrepresentation herein may be a crime punishable under Title 18 U.S.C. §1001 which provides in part: "Whoever, in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious, or fraudulent statements or representations, or makes or uses any false writing or statement or entry, shall be fined under [title 18 of the United States code] or imprisoned not more than five years, or both."

Sincerely,

\_\_\_\_\_  
CONTRACTOR

Position 6

According to the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0575-0042. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

RD 1924-9(Rev. 1-98)

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**SECTION 011000**  
**SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: MR&I Office Remodel Contract 2-6
- B. Owner's Name: Standing Rock Rural Water System
- C. Engineer's Name: Bartlett & West.
- D. The Project consists of the construction of a vestibule addition, remodel of approximately 3,000 sf of office space, replacement of the existing metal roof and related accessories, and all other related appurtenances as required by the Project Drawings, Specifications, and Contract Documents

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: Multiple prime contracts, each based on a Stipulated Price as described in Document 005000 - Contracting Forms and Supplements.
- B. The work of each separate prime contract is identified in this section and on Drawings.

**1.03 DESCRIPTION OF ALTERATIONS WORK**

- A. Scope of demolition and removal work is indicated on drawings and specified in Section 024100.
- B. Scope of alterations work is indicated on drawings.
- C. Plumbing: Alter existing system and add new construction, keeping existing shop in operation.
- D. HVAC: Alter existing system and add new construction, keeping existing shop in operation.
- E. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing shop in operation.
- F. Fire Alarm: Replace existing system with new construction.
- G. Telephone: Alter existing system and add new construction, keeping existing shop in operation.

**1.05 OWNER OCCUPANCY**

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Owner intends to occupy the Project upon Substantial Completion.
- C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- D. Schedule the Work to accommodate Owner occupancy.

**1.06 CONTRACTOR USE OF SITE AND PREMISES**

- A. Arrange use of site and premises to allow:
  - 1. Owner occupancy.
  - 2. Use of site and premises by the public.
- B. Provide access to and from site as required by law and by Owner:
  - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
  - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Existing building spaces may not be used for storage.
- D. Utility Outages and Shutdown:
  - 1. Limit disruption of utility services to hours the building is unoccupied.
  - 2. Prevent accidental disruption of utility services to other facilities.

### **1.07 WORK SEQUENCE**

- A. Construct Work in stages during the construction period:
- B. Coordinate construction schedule and operations with Engineer.

### **1.08 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS**

- A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.
- B. Section 011020 – Preservation of Historical & Archaeological Data
- C. Section 011100 – Coordination of Work
- D. Section 012000 – Measurement and Payment
- E. Section 013000 - Administrative Requirements.
- F. Section 013216 - Construction Schedules Bid Breakdown Bidder Qualifications.
- G. Section 013400 – Record Drawings and Shop Drawings
- H. Section 015100 – Construction Facilities and Temporary Utilities.
- I. Section 016116 - (VOC) Content Restrictions.
- J. Section 016600 - Storage and Protection of Materials Delivered
- K. Section 017000 - Execution and Closeout Requirements.
- L. Section 019310 – Operations Maintenance and Repair Manual.

**END OF SECTION**



**SECTION 011020  
PRESERVATION OF HISTORICAL AND ARCHAEOLOGICAL DATA**

A. Federal Legislation Requirements

Federal legislation provides for the preservation and protection of cultural resources which might otherwise be lost due to alteration or disturbance of the terrain as a result of any federally-funded, permitted, or assisted construction project. Cultural resources consist of scientific, prehistoric, archaeological, and traditional cultural data, including but not limited to, human burials, relics, and specimens. This legislation includes:

- (1) The National Historic Preservation Act of 1966 as amended through 1992 (Public Law 89-665, Public Law 91-243, Public Law 93-54, Public Law 94-422, Public Law 94-458, Public Law 96-199, Public Law 96-244, Public Law 96-515, Public Law 98-483, Public Law 99-514, Public Law 100-127, and Public Law 102-575) and its implementing regulations, 36 CFR Part 800.
- (2) The Archeological and Historic Preservation Act of 1974 (Public Law 93-291).
- (3) Archaeological Resources Protection Act of 1979 Public Law 96-95 and its implementing regulation 43CFR Part 7.
- (4) The Native American Graves Protection and Repatriation Act (Public Law 101-601).

Should the Contractor, or any of the Contractor's employees, or parties operating or associated with the Contractor, in performance of this contract discover or encounter evidence of possible cultural resources, the Contractor shall immediately cease all ground-disturbing activities at the location and notify the Owner or Owner's Representative giving the location and nature of the findings. The Contractor shall secure the discovery area from further disturbance. Work cannot resume within the vicinity until the Owner has complied with the provisions of the National Historic Preservation Act. The Owner will notify the Contractor concerning resumption of activities.

The Native American Graves Protection and Repatriation Act requires that when the disturbance involves items protected under this act (human remains, funerary items, sacred items, or items of cultural patrimony), the Owner must notify and consult with the applicable tribe concerning disposition of the items and that work cannot resume until 30 days following notification of that tribe.

The Contractor shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition.

Any person who, without permission, injures, destroys, excavates, appropriates, or removes any cultural or archaeological resource on the public lands of the United States is subject to arrest and penalty of law.

Where appropriate by reason of discovery, the Owner may order delays in the time of performance, or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of this contract.

The Contractor shall insert this paragraph in all subcontracts which involve the performance of work on the terrain of the site.

B. Cost

Except as otherwise provided above, the cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

**END OF SECTION**

**SECTION 011100  
COORDINATION OF WORK**

A. General Nature of Work

The work to be completed shall consist of furnishing and installing all materials necessary for the construction of Contract 2-6 MR&I Office Remodel for the Standing Rock Rural Water System (SRRWS). All facilities shall be constructed, completed and ready for operation in accordance with the drawings and specifications.

The Contractor is required to furnish all transportation, labor, supervision, materials, facilities, and equipment necessary to complete the work.

The Contractor must be licensed in the state of North Dakota and furnish proof Worker's Compensation and insurance coverage.

Contractor shall follow Tribal Employment Rights Office regulations. Contractors awarded projects within the exterior boundaries of the Standing Rock Reservation are responsible for payment of Tribal Fee in the amount of two and a half percent (2½%) of the gross receipts from each Prime Contract. Contractors are also responsible for the payment of a one percent (1%) Tribal EPA Permit Fee. Arrangements for the payment of this fee and permit fee are to be made prior to beginning work with the TRIBAL FINANCE OFFICER, STANDING ROCK SIOUX TRIBE, P.O. BOX D, FORT YATES, NORTH DAKOTA 58538.

B. Location of Facilities Shown on the Drawings

Facility (utility) locations are generally not shown on the Drawings. If shown, the locations of the facilities depicted on the Contract Drawings are not to be considered exact. The approximate facility locations, when shown, were derived from data obtained from generalized large scale utility supplied drawings. The Contractor shall contact all affected Utilities prior to construction on this Contract and shall make his own investigations including exploratory excavations as needed to determine the locations and type of existing facilities to be encountered. Work associated with crossing or paralleling a particular facility shall be subsidiary to the pipeline unit prices in accordance with the Standard EJCDC General Conditions and shall be made in accordance with Specification Section 02227.

The Utility Companies anticipated to be affected by this Project are listed on the Contract drawings. The Utility Company listing is not intended to be a complete and all inclusive list. Other facilities may exist in the Project area and may not be shown within the lists. The Contractor shall be responsible for contacting the "N.D. One-Call System" and all affected utilities; municipalities, local, County, State, and Federal entities whether or not they are shown or listed.

C. Historical/Archaeological Finds

If during the course of construction evidence of deposits of historical or archaeological interest is found, the Contractor shall cease operations affecting the find and shall notify the Owner, USDA, USBR, and the Standing Rock Tribal Historic Preservation Office (THPO) and follow the procedures stipulated in this section, the USDA Programmatic Agreement, and the BOR Supplemental General Provisions. No further disturbance of the deposits shall ensue until the Contractor has been notified by the Owner that he may proceed. The Owner will issue a notice to proceed only after the Standing Rock THPO and/or the Owner's Archaeologist have surveyed the find and made a determination to the Owner. A time extension may be granted by the Owner for delays in construction. The Contractor will not be compensated for costs associated with

construction delays for such occurrences.

Prior to construction, the THPO will require a meeting to review several procedures and excavation requirements. During any excavation on this project a Standing Rock THPO Traditional Cultural Specialists is required to be present at the project location. The meeting scheduled by THPO, the Owner's Representative will coordinate the review meeting with the Contractor, Owner, and THPO. Attendance of the Contractor's Superintendent(s) and foremen scheduled for this project will be mandatory. The review meeting may be scheduled prior to, concurrent with or after the preconstruction conference depending on the affected party's schedules. Identification procedures established during the review meeting shall be implemented by the Contractor during construction. Notification to the THPO shall be in accordance with paragraph one of Subsection F of this Specification Section.

D. Coordination with Utilities

The Contractor shall coordinate all work which parallels, crosses, or is in the vicinity of a given utility with the Owner of that particular utility. The Contractor shall notify all utilities and underground service agencies a minimum of 72 hours in advance of work scheduled or envisioned and arrange to have their respective services located. Upon exposing a utility or underground service, the respective service agency shall be contacted by the Contractor, such that an inspection of the service can be made prior to backfilling.

The Contractor shall use extreme care when working around overhead utilities. Should any facility, either underground or overhead, be unexpectedly encountered or damaged during construction, the Contractor shall immediately notify a representative of the company involved and take such steps as necessary for protection of the general public and his own personnel.

The right is reserved to governmental agencies and to owners of utilities to enter at any time upon any street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the work and for the purpose of maintaining and making repairs to their property.

E. Contract Specifications

The specifications, drawings, and other contract documents are essential parts of the Contract, and a requirement occurring in one shall be considered as a binding requirement occurring in all. The Contract Documents are intended to be complimentary and to describe and provide for the complete work. In the event of an apparent difference or contradiction in the drawings and specifications, reference shall be made to the Owner's Representative for a decision. The decision of the Owner's Representative shall be final. In resolving any apparent difference or contradiction, the hierarchy to be used by the Owner's Representative shall be as follows:

1. Addenda.
2. Special Conditions (Sections 011003 through 019310).
3. Specifications and Drawings (The specification or drawing listing or showing the higher quality material or workmanship shall prevail).
4. BOR Supplemental General Provisions.
5. Standard EJCDC General Conditions.

Before submitting a proposal, the Contractor, his sub-contractors, and material suppliers shall review all contract drawings and specifications and should any material and/or its installation be

indicated or specified in a manner not approved by the material manufacturer, they shall notify the Engineer promptly.

Several paragraphs found in these specifications may not apply to this Contract. Should items of equipment, materials or work be added to the project, then the appropriate paragraph or section shall apply. Should details of any of these items appear on the plans, they shall be considered the same as the above paragraphs.

After award of Contract, five (5) sets of drawings and specifications will be furnished free of charge to the successful bidder. Additional sets will be available, and upon request by the Contractor, furnished at the cost of reproduction and shipping.

F. Drawings

Accompanying these specifications are the drawings, which jointly with these specifications intend to outline, describe, and coordinate the work to be performed under this Contract. The drawings shall not be scaled for mechanical dimensions.

The Contractor shall accurately lay out the work from the indicated dimensions. All dimensions shall be checked in the field prior to installation of any mechanical items. Any discrepancy shall be brought to the attention of the Owner's Representative or the Engineer for interpretation of the drawings.

G. Additional Requirements

The Owner advises the Contractor of the following additional requirements:

1. Any reference to BOR will mean the United States Bureau of Reclamation. Any reference to SRRWS will mean the Standing Rock Rural Water System.
2. The successful Bidder(s) shall follow all requirements and regulations of the Tribal Employment Rights Office (TERO) and Standing Rock Department of Environmental Regulations/EPA.
3. Davis Bacon provisions apply to this work.

H. Insurance

The CONTRACTOR shall purchase and maintain Liability Insurance, Property Damage Insurance, Builders Risk All Risk, and other insurance required under Article 5 of the Standard EJCDC General Conditions. Insurance shall be written with a limit of liability of not less than \$10,000,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident and a limit of liability of not less than \$10,000,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$10,000,000 for all property damages sustained by any one person in any one accident; and a limit of liability of not less than \$10,000,000 aggregate for any such damage sustained by two or more persons in any one accident. As required under the Standard EJCDC General Conditions, the policies shall name the Owner, the Engineer/Architect, and the Owner's Representative, as additional insured and shall be afforded primary insurance.

The Contractor is responsible to obtain and maintain the required general liability and other listed insurances as noted herein. Such requirement is a condition precedent to Owner performance under this Contract and is a material term of the Contract. The Contractor is solely responsible for the fulfillment of this same requirement by his subcontractors and suppliers.

If State Permits are needed for any part of the Work, the coverage shall also be provided to the State of North Dakota as primary insured with a waiver of subrogation.

I. Stormwater Permit

The contractor shall be responsible for development of a Stormwater Pollution Prevention Plan (SWPPP) and shall provide an electronic copy of the SWPPP to the owner for their records. The SWPPP shall be prepared in a manner that complies with all applicable requirements.

The contractor shall be the responsible party for submitting the Notice of Intent (NOI) to NDDEQ and/or SDDANR as required for issuance of any required Stormwater Permits. The contractor shall pay any fees or costs associated with obtaining these permits and shall be the responsible party for compliance to any requirements in the obtained permits.

J. Guarantee Period

The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of substantial completion. During that period, the Contractor shall warrant and guarantee that the completed Project is free from all defects due to faulty materials or workmanship and shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, or other Work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Payment Bond and Performance Bond shall remain in full force and effect through the guarantee period.

K. TERO Compliance

The Contractor is advised that all work provided by this Contract is subject to the fees and requirements of the Tribal Employment Rights Office (TERO). The Contractor is required to submit a compliance plan to TERO at least two weeks prior the start of any work or payment for any materials. As required by the Owner, the Contractor shall provide monthly, or by another mutually agreed schedule, proof of payment and other reports which verify TERO compliance. If any TERO fees, taxes or other costs are unpaid by the Contractor, the Owner shall have the right to withhold such amounts from a pay request by the Contractor and to make such payment directly to TERO. Noncompliance with the TERO compliance plan will be considered a violation and grounds for suspension of the Contract.

The TERO fee allowed to the Contractor, 2.5% as provided within the Bid Schedule, shall reflect the actual fee the Contractor ultimately is responsible to submit to the TERO office.

A copy of the TERO Ordinance, compliance plan application, and other TERO related information and forms is provided in the Front-End Documents.

L. Federal Equal Opportunity Construction Contract Specifications

1. Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246): Separate Goals and Timetables for Women and Minorities have been established and are available from the United States Department of Agriculture (USDA).
2. Equal Opportunity Clause:
  - a. The CONTRACTOR will not discriminate against any employee or applicant for employment on the basis of race, color, religion, sex, or national origin. The CONTRACTOR will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such actions shall include, but not be limited to the following: employment, upgrading, 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 to be provided by the Rural Utilities Service setting forth the provisions of this equal opportunity clause.
  - b. The CONTRACTOR will, in all solicitations or advertising for employees placed by or on behalf of the CONTRACTOR, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
  - c. The CONTRACTOR will send to each labor union or representative of WORKERS with which he has a collective bargaining AGREEMENT or other CONTRACT of understanding, a notice, to be provided by the Rural Utilities Service, advising the said labor union or WORKER'S representative of the CONTRACTOR'S commitments under this AGREEMENT as required pursuant to Section 202(3) of Executive Order 11246, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
  - d. The CONTRACTOR will comply with all provisions of such Executive Order and all relevant rules, regulations, and orders of the Secretary of Labor and any prior authority which remains in effect.
  - e. The CONTRACTOR will furnish all information and reports required by such Executive Order, and rules, regulations, and orders issued pursuant thereto, and will permit access to his books, records, and accounts by the Rural Utilities Service and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
  - f. In the event of the CONTRACTOR'S noncompliance with the equal opportunity clause of this CONTRACT or with any of the said rules, regulations, or orders, this CONTRACT may be cancelled, terminated, or suspended in whole or in part and the CONTRACTOR may be declared ineligible for further GOVERNMENT CONTRACTS or Federally assisted construction CONTRACTS in accordance with procedures authorized in such Executive Order and such other sanctions may be imposed and remedies invoked as provided in such Executive Order or by such rules, regulations, or order of the Secretary of Labor, or as otherwise provided by law.

- g. The CONTRACTOR will include the provisions of paragraph (a) through (g) in every subcontract or purchase order, unless exempted by such rules, regulations, or orders of the Secretary of Labor so that such provisions will be binding upon each such SUBCONTRACTOR or vendor. The CONTRACTOR will take such action as the Rural Utilities Service may direct as means of enforcing such provisions, including sanctions for noncompliance: Provided, however that in the event the CONTRACTOR becomes involved in, or is threatened with, litigation with a SUBCONTRACTOR or vendor as a result of such direction by the Rural Utilities Service, the CONTRACTOR may request the United States to enter into such litigation to protect the interest of the United States.
  - h. It is the policy of the Rural Utilities Service to promote the utilization of minority owned businesses, including A&E firms, CONTRACTORS, SUBCONTRACTORS, and suppliers on Rural Utilities Service assisted PROJECTS.
  - i. Each CONTRACTOR shall be required to have an affirmative action plan which declares that it does not discriminate on the basis of race, color, religion, creed, national origin, sex, or age and which specifies goals and target dates to assure the implementation of that plan. The OWNER shall establish procedures to assure compliance with this requirement by CONTRACTORS and to assure that suspected or reported violations are promptly investigated.
3. If this CONTRACT exceeds \$10,000 the CONTRACTOR is subjected to the provisions of the equal opportunity requirements set forth below and the CONTRACTOR shall submit with his BID a completed and executed Form RD 400-6; Compliance Statement, a copy of which is included in the CONTRACT DOCUMENTS; further, if the CONTRACTOR has one hundred (100) or more employees, he shall file Standard Form 100, Employer Information Report, with the Joint Reporting Committee, P.O. Box 12, Springfield, Virginia 22150, within thirty (30) days after the CONTRACT award and annually on or before March 31 thereafter during the life of the CONTRACT. If the CONTRACT exceeds \$50,000 and the CONTRACTOR has fifty (50) or more employees, he will develop and place on file within one hundred twenty (120) days of the CONTRACT award a written affirmative action compliance program using Form AD-425B, CONTRACTOR'S Affirmative Action Plan for Equal Employment Opportunity, as a guideline.

Information relative to Federal Equal Opportunity is given by Executive Order 11246 which is included in the Appendix.

M. Indian Preference

The Contractor agrees to give Indian Preference in employment opportunities under this contract to Indians who can perform required work, regardless of age subject to existing laws and regulations, sex, religion, or Tribal affiliation. The successful bidder will be obligated to comply with TERO Ordinance No. 165, a copy of which is provided in the Appendix.

N. Bureau of Reclamation / Indian Health Service /Bureau of Indian Affairs

The Contractor is advised that several Federal Agencies have a direct interest in the progression and construction of this project. All work is subject to review and inspection by those agencies; any comments received by the Contractor from such agencies shall be reported as soon as possible to the OWNER. Such agencies, and other offices, are noted on the drawings.



O. Standing Rock Department of Environmental Regulations/EPA (SRDER/EPA)

The Contractor is advised that all work provided by this Contract is subject to the fees and requirements of the SRDER/EPA. The Contractor is required to submit a permit application. As required by the Owner, the Contractor shall provide proof of payment and any other required reports which verify SRDER/EPA compliance. If any SRDER/EPA fees, taxes, or other costs are unpaid by the Contractor, the Owner shall have the right to withhold such amounts from a pay request by the Contractor and to make such payment directly to SRDER/EPA. Noncompliance with the SRDER/EPA plan will be considered a violation and grounds for suspension of the Contract.

The SRDER/EPA fee allowed to the Contractor, 1.0% as provided within the Bid Schedule, shall reflect the actual fee the Contractor ultimately is responsible to submit to the SRDER/EPA office. The Contractor shall coordinate with the SRDER/EPA office prior to startup to negotiate a progress payment schedule; pay estimate payments to the Contractor for the fee allowance shall be in accordance with the negotiated SRDER/EPA fee submission schedule.

A copy of the SRDER/EPA permit information and application is provided in the Appendix.

**END OF SECTION**

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**SECTION 012000  
MEASUREMENT AND PAYMENT**

A. General

1. Work under this contract will be paid on a unit price or lump-sum basis as outlined on the Bid Schedule for the quantity of work installed. It is the Bidding Contractor's sole responsibility to verify that he has received all sheets of the Drawings and Specifications. It is also the Bidding Contractor's sole responsibility to be familiar with the necessary interfaces with other portions of the project.
2. The unit prices and lump-sum prices shall include full compensation for furnishing the labor, materials, tools, and equipment and doing all the work involved to complete the work included in the Contract Documents.
3. The Standard EJCDC General Conditions, Supplemental General Conditions, Special Conditions, and items in the general requirements of the drawings and specifications which are not listed in the schedule of work items of the Bid Schedule are, in general, applicable to more than one listed work item, and no separate work item is provided, therefore. Include the cost of work not listed but necessary to complete the project designated in the Contract Documents in the various listed work items of the Bid Schedule.
4. The bids for the work are intended to establish a total cost for the work in its entirety with the exception of additional compensation provided for work which has a specified reimbursement level stipulated in the Contract Documents including authorized rock excavation, subsurface replacement, and other such items. Should the Contractor feel that the cost for the work has not been established by specific items in the Bid Schedule, he shall include the cost for that work in some related bid item so that his proposal for the project does reflect his total cost for completing the work in its entirety.

No payment for changes in the work (other than those included in Work Change Directives) will be made, and no changes in the time for completion by reason of changes in the work will be made, unless the changes are covered by a written change order approved by the Owner in advance of the Contractor's proceeding with the changes in work.

B. Schedule of Values

1. The Contractor shall submit a schedule of values in duplicate within 15 days after date of Owner-Contractor Agreement.
2. Submit a printed schedule on AIA form G703 – Application and Certificate for Payment Continuation Sheet. Contractors standard form or electronic media printout will be considered; submit draft to Engineer for approval.
3. Forms filled out by hand will not be accepted.
4. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification Section. Identify site mobilization.
5. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
6. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
7. Revise schedule to list approved Change Orders, with each Application For Payment.

C. Application for Progress Payments

1. Payment Period: Submit at intervals stipulated in the Agreement.
2. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Engineer for approval.
3. Forms filled out by hand will not be accepted.
4. Form: Standing Rock Rural Water System Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.
5. Execute certification by signature of authorized officer.
6. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored Products.
7. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
8. Include the following with the application:
  - a. Transmittal letter
  - b. Construction progress schedule revised and current as specified in section 013215.
  - c. Affidavits attesting to off-site stored products.
9. When the Engineer requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

D. Modification Procedures

1. For minor changes not involving an adjustment to the Contract Sum or Contract Time, the Engineer will issue instructions directly to Contractor.
2. For other required changes, the Engineer will issue a work change directive signed by Standing Rock Rural Water instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - a. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - b. Promptly execute the change.
3. The Engineer may issue a document 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. Contractor shall prepare and submit a fixed price quotation within 10 working days.
4. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  - a. For change requested by the Engineer for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  - b. For change requested by the contractor, the amount will be based on the contractor's request for a Change Order as approved by the Engineer.
  - c. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
5. Substantiation of Costs: Provide full information required for evaluation.
  - a. On request, provide the following data:
    - i. Quantities of products, labor, and equipment.
    - ii. Taxes, insurance, and bonds.
    - iii. Overhead and profit.
    - iv. Justification for any change in Contract Time.
    - v. Credit for deletions from Contract, similarly documented.

- b. Support each claim for additional costs with additional information.
    - i. Origin and date claim.
    - ii. Dates and times work was performed, and by whom.
    - iii. Time records and wage rates paid.
    - iv. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  - c. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
6. If the Contractor believes that any Field Orders involve a change in the Contract amount or time for completion, the Contractor shall not proceed with the work ordered and shall follow the requirements stipulated in the Standard EJCDC General Conditions.
  7. Execution of Change Orders: The Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
  8. After execution of Change Order, 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 Sum.
  9. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
  10. Promptly enter changes in Project Record Documents.

D. Contractor's Release and Lien Waivers

Final payment shall not be made until the Contractor provides the Owner with executed copies of USDA Forms RD 1924-9 and RD 1924-10. The Contractor must use these forms when acquiring signed lien waivers from suppliers, subcontractors, and individuals, (non-employees of the Contractor) providing work for the Contractor. The forms shall be fully executed and will be reviewed by the Owner and found to be in acceptable form prior to Final Payment being authorized.

In the event that the Contractor provides evidence to the Owner that a subcontractor or material supplier has not performed in accordance with the terms of the subcontractor or material purchase order, the Owner may waive the requirements for an executed Form RD 1924-10 (Release by Claimant).

**END OF SECTION**

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**SECTION 013000**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Construction progress schedule.
- G. Contractor's daily reports.
- H. Progress photographs.
- I. Coordination drawings.
- J. Submittals for review, information, and project closeout.
- K. Number of copies of submittals.
- L. Requests for Interpretation (RFI) procedures.
- M. Submittal procedures.

**1.03 REFERENCE STANDARDS**

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.

**1.04 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Engineer:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE**

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
  - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction

punchlist, and any other document any participant wishes to make part of the project record.

2. Contractor and Engineer are required to use this service.
  3. It is Contractor's responsibility to submit documents in allowable format.
  4. Subcontractors, suppliers, and Engineer's consultants are to be permitted to use the service at no extra charge.
  5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, [www.adobe.com](http://www.adobe.com), or Bluebeam PDF Revu, [www.bluebeam.com](http://www.bluebeam.com)), unless such software capability is provided by the service provider.
  6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
  7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by the Owner
- C. Submittal Service: The selected service is:
1. Newforma ConstructEx: [www.newforma.com/products/constructex](http://www.newforma.com/products/constructex)
- E. Project Closeout: Engineer will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

### **3.02 PRECONSTRUCTION MEETING**

- A. Engineer will schedule a meeting after Notice of Award.
- B. Attendance Required:
1. Owner.
  2. Engineer.
  3. Contractor.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
  2. Submission of executed bonds and insurance certificates.
  3. Distribution of Contract Documents.
  4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  5. Submission of initial Submittal schedule.
  6. Designation of personnel representing the parties to Contract and Engineer.
  7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  8. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer, Owner, participants, and those affected by decisions made.

### **3.03 SITE MOBILIZATION MEETING**

- A. Attendance Required:
1. Contractor.
  2. Owner.
  3. Engineer.
  4. Contractor's superintendent.
  5. Major subcontractors.
- B. Agenda:
1. Use of premises by Owner and Contractor.
  2. Owner's requirements.
  3. Construction facilities and controls provided by Owner.
  4. Temporary utilities provided by Owner.
  5. Survey and building layout.



6. Security and housekeeping procedures.
  7. Schedules.
  8. Application for payment procedures.
  9. Procedures for testing.
  10. Procedures for maintaining record documents.
  11. Requirements for start-up of equipment.
  12. Inspection and acceptance of equipment put into service during construction period.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer, Owner, participants, and those affected by decisions made.

### **3.04 PROGRESS MEETINGS**

- A. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- B. Attendance Required:
1. Contractor.
  2. Owner.
  3. Engineer.
  4. Special consultants.
  5. Contractor's superintendent.
  6. Major subcontractors.
- C. Agenda:
1. Review minutes of previous meetings.
  2. Review of work progress.
  3. Field observations, problems, and decisions.
  4. Identification of problems that impede, or will impede, planned progress.
  5. Review of submittals schedule and status of submittals.
  6. Review of RFIs log and status of responses.
  7. Maintenance of progress schedule.
  8. Corrective measures to regain projected schedules.
  9. Planned progress during succeeding work period.
  10. Coordination of projected progress.
  11. Maintenance of quality and work standards.
  12. Effect of proposed changes on progress schedule and coordination.
  13. Other business relating to work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer, Owner, participants, and those affected by decisions made.

### **3.05 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

### **3.06 PROGRESS PHOTOGRAPHS**

- A. Submit new photographs at least once a month, within 3 days after being taken.
- B. Photography Type: Digital; electronic files.

- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Engineer.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
- E. Views:
  - 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
  - 2. Consult with Engineer for instructions on views required.
  - 3. Provide factual presentation.
  - 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
  - 1. Delivery Medium: Via email.
  - 2. File Naming: Include project identification, date and time of view, and view identification.
  - 3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.

### **3.07 COORDINATION DRAWINGS**

### **3.08 REQUESTS FOR INTERPRETATION (RFI)**

- A. Definition: A request seeking one of the following:
  - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
  - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  - 1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.
  - 2. Prepare in a format and with content acceptable to Owner.
  - 3. Prepare using software provided by the Electronic Document Submittal Service.
  - 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
  - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
    - a. Approval of submittals.
    - b. Approval of substitutions.
    - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
    - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
  - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.

4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
  - a. The Owner reserves the right to assess the Contractor for the costs (on time-and-materials basis) incurred by the Engineer, and any of its consultants, due to processing of such RFIs.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
  1. Official Project name and number, and any additional required identifiers established in Contract Documents.
  2. Owner's, Engineer's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date, and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
  1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.
  3. Highlight items requiring priority or expedited response.
  4. Highlight items for which a timely response has not been received to date.
  5. Identify and include improper or frivolous RFIs.
- H. Review Time: Engineer will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
  1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
  1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
  2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
  3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
  4. Notify Engineer within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

### **3.09 SUBMITTAL SCHEDULE**

- A. Submit to Engineer for review a schedule for submittals in tabular format.

1. Submit at the same time as the preliminary schedule specified in Section - 013215.
2. Coordinate with Contractor's construction schedule and schedule of values.
3. Format schedule to allow tracking of status of submittals throughout duration of construction.
4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.
  - a. For assemblies, equipment, systems comprised of multiple components and/or requiring detailed coordination with other work, allow for additional time to make corrections or revisions to initial submittals, and time for their review.

### **3.10 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Engineer for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 013400 – Record Drawings and Shop Drawings.

### **3.11 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  1. Design data.
  2. Certificates.
  3. Test reports.
  4. Inspection reports.
  5. Manufacturer's instructions.
  6. Manufacturer's field reports.
  7. Other types indicated.
- B. Submit for Engineer's knowledge as contract administrator or for Owner.

### **3.12 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
  1. Project record documents.
  2. Operation and maintenance data.
  3. Warranties.
  4. Bonds.
  5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

### **3.13 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.

- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Engineer.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

### 3.14 SUBMITTAL PROCEDURES

- A. General Requirements:
  - 1. Use a separate transmittal for each item.
  - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  - 3. Transmit using approved form.
    - a. Use Form AIA G810.
  - 4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
  - 5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
  - 6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
    - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
  - 7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
    - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
  - 8. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving Engineer's consultants, Owner, or another affected party, allow an additional 7 days.
    - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Engineer's approval, allow an additional 30 days.
  - 9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  - 10. Provide space for Contractor and Engineer review stamps.
  - 11. When revised for resubmission, identify all changes made since previous submission.
  - 12. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
  - 13. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
  - 14. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
  - 1. Submit only information required by individual specification sections.
  - 2. Collect required information into a single submittal.
  - 3. Submit concurrently with related shop drawing submittal.
  - 4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
  - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  - 2. Do not reproduce Contract Documents to create shop drawings.
  - 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

### **3.15 SUBMITTAL REVIEW**

- A. Submittals for Review: Engineer will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Engineer will acknowledge receipt and review. See below for actions to be taken.
- C. Engineer's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
  1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- D. Engineer's and consultants' actions on items submitted for review:
  1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
      - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
      - 2) Non-responsive resubmittals may be rejected.
  2. Not Authorizing fabrication, delivery, and installation:
    - a. "Revise and Resubmit".
      - 1) Resubmit revised item, with review notations acknowledged and incorporated.
      - 2) Non-responsive resubmittals may be rejected.
    - b. "Rejected".
      - 1) Submit item complying with requirements of Contract Documents.
- E. Engineer's and consultants' actions on items submitted for information:
  1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

**SECTION 013215  
CONSTRUCTION SCHEDULES, BID BREAKDOWN, AND BIDDER QUALIFICATIONS**

A. General

1. This section includes planning, scheduling, and reporting required of the Contractor(s).
2. Prepare bar chart type schedule for work to be performed.
3. The Contractor shall provide a detailed work and estimated payment draw schedule to the Owner prior to beginning such work; such schedule shall show the anticipated work plan and payment requests which will confirm the ability of the contractor to perform the required work in the required time frame. At any time during the progression of the work, the Owner or funding agency may request updated time and cost schedules from the Contractor to reconfirm or show adjustments to the required work plan.

B. Coordination of Schedules

The Contractor shall develop an overall schedule for the project. Once the overall project schedule has been developed, the Contractor shall submit the schedule in the format outlined below. The schedule shall be submitted to the Owner's Representative.

C. Form of Schedules

Bar Chart Schedule:

1. Shall consist of line items showing the various significant divisions of work in sufficient detail to show that the Project has been reasonably preplanned.
2. Show complete sequence of construction by activity and indicating duration and beginning and completion dates of each line item.
3. Show estimated monetary value of each line item and cumulative value of work performed each month, and progress as percentage of value of work in place and projected cash flow. Superimposed on the chart plot a curve showing the percentage of progress scheduled for each month.

D. Schedule Revisions

Revise the bar chart schedule as requested by the Owner's Representative when:

1. Work progress falls 10 percent behind scheduled progress.
2. When time extensions are approved for changes and causes beyond Contractor's control.
3. When Contractor feels a significant reorganization of activities becomes necessary as a result of field and material supply conditions in order to meet the contract completion date of the Project.

E. Bid Breakdown

The apparent low bidder is required to submit to the Owner's Representative within 5 days of the bid opening a bid breakdown for the major items of work. Within 10 days after the execution of

the contract, a cost breakdown of the Construction Schedule items shall be submitted. Further detailed breakdowns of specific items may be required which shall be furnished within 5 days of the request.

To demonstrate the low Bidder's qualifications to perform the Work, within five days of the Owner's request, the low Bidder shall submit written evidence such as financial data, previous experience, current commitments, and such other data as follows:

1. List of experience on similar type projects with contract amounts, completion times, safety records, and change order information.
2. List of minimum of three references from Owners of similar type projects.
3. Financial Information as deemed appropriate by the Owner's legal and financial advisors."

F. Submittals

1. Submit 3 preliminary copies of schedule and attachments within 10 days of execution of Contract.
  - a. The Owner's Representative will review the submittal for conformance to the intent and requirements of the Contract and return it with appropriate comments for update within 10 days of receipt.
  - b. Submit 6 corrected copies within 7 days after return of review copy.
2. Submit 6 copies of revised schedules within 15 days of request by the Owner's Representative.
3. All schedules shall bear the following heading information:
  - a. Project name/location number.
  - b. Contractor.
  - c. Duration of Project.
  - d. Completion date of Project.
  - e. Effective starting date of schedule.
  - f. Type of tabulation (initial or revised and revision number).
  - g. Signature of Contractor.

**END OF SECTION**



**SECTION 013400  
RECORD DRAWINGS AND SHOP DRAWINGS**

A. Record Drawings

Provide and maintain on the jobsite one complete set of prints of all drawings which form a part of the Contract. Immediately after each portion of work is completed mark upon these drawings, neatly and legibly, and in red ink any variances from the original design. Prepare additional plans, elevations, sections, or details necessary to clearly show the construction. Make drawings to scale and provide all dimensions, notes and callouts which would be necessary for construction of that portion of the work. Upon completion of the job, deliver this record set to the Owner's Representative. Quality and completeness of the records must be such that the Engineer can accurately transfer the information to the drawing originals.

B. Shop Drawings

Review of shop drawings and manufacturer's data sheets is rendered as a service only and shall not be considered as a guarantee of quantities, measurements or building conditions; nor shall it be construed as relieving the Contractor of the basic responsibilities under the Contract.

Where materials, equipment, apparatus, or other products are specifically designated by manufacturer, brand name, type or catalog number, such designation is to establish standards of desired quality and style. Where materials are so specified, it is understood to imply or approved equal.

Submit shop drawings in accordance with the Standard EJCDC General Conditions and the following:

1. "Complete" shop drawings shall be submitted as required by the appropriate Specification Section(s) and/or drawings for the following items. **Shop drawings not containing the Contractor's mark of approval will be returned unreviewed.** The Contractor's approval shall be evidenced by a stamp on the shop drawings or a certification on the letter of transmittal stating that the shop drawings have been reviewed and are in compliance with the Contract Documents, or exceptions are noted.
2. Prior to submittal to the Owner's Representative for review, the Contractor shall fully coordinate with the other trades or Contractors involved on the Contract if the item interfaces with their Work. The coordination shall include verification of all dimensions, interfacing, catalog numbers, field data and conditions, and other similar data.
3. All submittals are to be made far enough in advance of scheduled dates of installation to provide all parties adequate time for review (assume 30-day review time by the Owner's Representative), possible revision, and resubmittal. Adequate time should also be scheduled to allow for placing of orders and securing delivery. Delays or extra costs incurred by improper scheduling of submittals shall be the responsibility of the Contractor.
4. Submit Five (5) copies of shop drawings. The Specification Section and Drawing Number to which each shop drawing is referenced shall be clearly indicated on each drawing. ALL DEVIATIONS FROM THE CONTRACT DOCUMENTS WILL BE CLEARLY INDICATED ON THE SHOP DRAWINGS AND IN THE LETTER OF TRANSMITTAL. The Owner's Representative will keep four (4) copies and return one (1) copy. If the Contractor desires more than one copy, he shall transfer the Owner's Representative's comments onto additional copies at his own expense.

5. If the substitution of a component or material results in a change being required in the Work to be performed by the Contractor or other Contractors involved at the contract site, the Contractor proposing the substitution shall be responsible for all costs associated with the substitution.
6. A copy of the approved submittals pertaining to the work in progress at a particular location shall be readily available at that location.

**END OF SECTION**

**SECTION 014000**  
**QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Tolerances.
- G. Defect Assessment.

**1.02 RELATED REQUIREMENTS**

- A. Document 00 7200 - General Conditions: Inspections and approvals required by public authorities.
- C. Section 01 3000 - Administrative Requirements: Submittal procedures.
- D. Section 01 6000 - Product Requirements: Requirements for material and product quality.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants.
- B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing.
- G. IAS AC89 - Accreditation Criteria for Testing Laboratories.
- H. ASTM E 548 - Standard Guide for General Criteria used for Evaluating Laboratory Competence.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Data: Submit for the Engineer's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for SRRWS's information.
- C. Test Reports: After each test/inspection, promptly submit two copies of report to the Engineer and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.

- j. Conformance with Contract Documents.
    - k. When requested by the Engineer, provide interpretation of results.
  - 2. Test report submittals are for the Engineer 's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for SRRWS's information.
- D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to the Engineer, in quantities specified for Product Data.
  - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to the Engineer.
- E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the SRRWS's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports for the Engineer's benefit as contract administrator or for SRRWS.
  - 1. Submit report in duplicate within 30 days of observation to the Engineer for information.
  - 2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- G. Erection Drawings: Submit drawings for the Engineer 's benefit as contract administrator or for SRRWS.
  - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
  - 2. Data indicating inappropriate or unacceptable Work may be subject to action by the Engineer or SRRWS.

#### **1.05 QUALITY ASSURANCE**

- A. Testing Agency Qualifications:
  - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
  - 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.

#### **1.06 REFERENCES AND STANDARDS**

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Engineer before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

## **1.07 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves the Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
  - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
  - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
  - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
  - 4. Laboratory: Authorized to operate in the State in which the Project is located.
  - 5. Laboratory: Authorized to operate in State in which Project is located.
  - 6. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
  - 7. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from the Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### **3.02 TOLERANCES**

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

### **3.03 TESTING AND INSPECTION**

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
  - 1. Test samples of mixes submitted by Contractor.
  - 2. Provide qualified personnel at site. Cooperate with the Engineer and Contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance with specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.

5. Promptly notify the Engineer and Contractor of observed irregularities or non-conformance of Work or products.
  6. Perform additional tests and inspections required by the Engineer.
  7. Attend preconstruction meetings and progress meetings.
  8. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  2. Agency may not approve or accept any portion of the Work.
  3. Agency may not assume any duties of Contractor.
  4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  4. Notify the Engineer and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  6. Arrange with SRRWS's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by the Engineer.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.
- G. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by the Engineer. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

#### **3.04 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not conforming to specified requirements.

**END OF SECTION**

**SECTION 015100**  
**CONSTRUCTION FACILITIES, TEMPORARY AND PERMANENT UTILITIES**

A. General

Provide the following utilities and facilities. Maintain each site and the environment at an acceptable standard throughout the course of the project. Costs for providing these facilities and services shall be included in the base bid for the project.

B. Field Offices and Sheds

Provide a portable office trailer for Owner. Provide office approximately 12 feet by 40 feet with 8-foot minimum ceiling. Include the following:

1. Hot and cold running water.
2. Washroom with toilet and lavatory, and waste disposal.
3. Electric lighting with adequate fixtures and convenience outlets.
4. Network and data with adequate fixtures and convenience outlets.
5. Heating and refrigerated air conditioning capable of maintaining an inside temperature between 70- and 80-degrees F regardless of weather conditions. Insulate the building and provide screens and storm windows and doors.
6. Two outside doors with cylinder locks and nonremovable hinge pins, and adequate windows.

C. Temporary Water

1. Cost of Water Used: By Owner
2. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
3. Connect to existing water source.

C. Temporary Electricity

1. Cost: By the Owner.
2. Connect to Owner's existing power service.
  - a. Do not disrupt Owner's need for continuous service.
  - b. Exercise measures to conserve energy.
3. Power Service Characteristics: 120 volt, 208 ampere, three phase, four wire.
4. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.
5. Provide main service disconnect and over-current protection at convenient location.
6. Permanent convenience receptacles may be utilized during construction.
7. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

D. Temporary Lighting

1. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
2. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.
3. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

4. Maintain lighting and provide routine repairs.

E. Temporary Heating

1. Cost of energy for temporary operations by Contractor. Utility bills associated with the operation of existing or new HVAC equipment shall be paid by the owner.
2. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
3. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.
4. Existing HVAC equipment schedule to be replaced may be used.
5. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

F. Temporary Cooling

1. Cost of energy for temporary operations by Contractor. Utility bills associated with the operation of existing or new HVAC equipment shall be paid by the owner.
2. Provide cooling devices and cooling as needed to maintain specified conditions for construction operations.
3. Maintain minimum ambient temperature of 80 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.
4. Existing HVAC equipment schedule to be replaced may be used.
5. Prior to operation of permanent equipment for temporary cooling purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

G. Temporary Ventilation

1. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

H. Temporary Sanitary Facilities

1. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
2. Maintain daily in clean and sanitary condition.

I. Temporary Sanitary Facilities

1. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
2. Maintain daily in clean and sanitary condition.

J. Waste Removal

1. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
2. Provide containers with lids. Remove trash from site periodically.
3. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material



outside the structure unless otherwise approved by the authorities having jurisdiction.

K. Vehicular Access and Parking

1. Coordinate access and haul routes with governing authorities and Owner.
2. Provide and maintain access to fire hydrants, free of obstructions.
3. Maintain access to owners shop and yard.

L. Compliance With Codes

Comply with all codes and regulations applicable to the installation and maintenance of temporary utilities.

M. Dust Control

Perform dust control operations at the time, location and in such a manner to prevent the construction activities from producing dust in a harmful or annoying amount, as determined by the Owner, the Owner's Representative, State, or local agencies. Use water or dust preventative for control.

N. Water Control

Make provisions for maintaining proper drainage of the work area. Drain standing pools and excavations. Remedy situations which could cause excessive erosion.

O. Noise Control

Maintain equipment, particularly muffling systems on internal combustion engines, so that acceptable noise levels are not exceeded. If an on-site generator is used, locate it in area where the sound will be least offensive. Provide sound barriers if needed.

P. Transportation of Pipe, Materials, and Equipment

The use of public roadways by the Contractor, his subcontractors, and his suppliers to transport equipment, pipe, and other heavy materials to and from the job site shall be in compliance with applicable State, County, Tribal and BIA highway requirements, including seasonal legal load and speed limitations.

Q. Fire Danger

Take all steps to minimize fire danger in the vicinity of and adjacent to the construction site. Provide labor and equipment to protect the surrounding private property from fire damage resulting from construction operations. All costs arising from fire, or the prevention of fire shall be at the expense of the Contractor.

R. Barricades and Lights

All open trenches and other excavations shall be provided with suitable barriers, signs, and lights to the extent that adequate protection is provided to the public against accident by reason of such open construction. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

All barricades and obstructions shall be illuminated by means of acceptable warning lights at night and all lights used for this purpose shall be kept burning from sunset to sunrise.

Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

S. Security

Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

**END OF SECTION**

**SECTION 016000**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Document - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

**1.03 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code.

**1.04 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

**PART 2 PRODUCTS**

**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. DO NOT USE products having any of the following characteristics:
  - 1. Made of wood from newly cut old growth timber.
  - 2. Containing lead, cadmium, asbestos.
- C. Where all other criteria are met, Contractor shall give preference to products that:
  - 1. If used on interior, have lower emissions, as defined in Section 01 6116.
  - 2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
  - 3. Have a published GreenScreen Chemical Hazard Analysis.

## **2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## **2.03 MAINTENANCE MATERIALS**

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

## **PART 3 EXECUTION**

### **3.01 SUBSTITUTION PROCEDURES**

- A. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- B. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to NDDOT.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

### **3.02 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### **3.03 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.

- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

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**SECTION 016116**  
**VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Requirements for VOC-Content-Restricted products.

**1.03 DEFINITIONS**

- A. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
  - 1. Interior paints and coatings.
  - 2. Interior adhesives and sealants, including flooring adhesives.
- B. Interior of Building: Anywhere inside the exterior weather barrier.
- C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

**1.05 QUALITY ASSURANCE**

- A. VOC Content Test Method: 40 CFR 59, Subpart D <<http://www.ecfr.gov>> (EPA Method 24), or ASTM D3960 <[http://global.ihs.com/doc\\_detail.cfm?rid=BSD&document\\_name=ASTM%20D3960](http://global.ihs.com/doc_detail.cfm?rid=BSD&document_name=ASTM%20D3960)>, unless otherwise indicated.
  - 1. Evidence of Compliance: Acceptable types of evidence are:
    - a. Report of laboratory testing performed in accordance with requirements.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
  - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 <<http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi>> Rule.
  - 2. Joint Sealants: SCAQMD 1168 <<http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi>> Rule.
  - 3. Paints and Coatings: Each color; most stringent of the following:
    - a. 40 CFR 59, Subpart D <<http://www.ecfr.gov>>.
    - b. SCAQMD 1113 <<http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi>> Rule.
    - c. CARB (SCM) <[http://www.arb.ca.gov/coatings/arch/Approved\\_2007\\_SCM.pdf](http://www.arb.ca.gov/coatings/arch/Approved_2007_SCM.pdf)>.

**PART 3 EXECUTION**

**3.01 FIELD QUALITY CONTROL**

- A. SRRWS reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to SRRWS.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION**



**SECTION 016600**  
**STORAGE AND PROTECTION OF MATERIALS DELIVERED**

A. General

Provide secure storage and protection for products to be incorporated into the Project and maintain protection for products after installation and until completion of the Project.

B. Storage

1. Store products immediately on delivery and protect until installed in the Project. Store in accordance with manufacturer's instruction, with seals and labels intact and legible. Upon request, a copy of the manufacturer's storage instructions shall be provided to the Owner's Representative.
2. Store products subject to damage by elements in substantial weather tight enclosures.
  - a. Maintain temperatures within ranges required by manufacturer's instructions.
  - b. Provide humidity control for sensitive products, as required by manufacturer's instructions.
  - c. Store unpacked products on shelves, in bins, or in neat piles, accessible for inspection.
3. Exterior storage:
  - a. Provide substantial platforms, blocking or skids to support fabricated products above ground, and prevent wetting, soiling, or staining. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings; maximum exterior exposure of uncovered PVC pipe shall be one year. Provide adequate ventilation to avoid condensation.
  - b. Store loose granular materials on solid surfaces such as paved areas or provide plywood or sheet materials to prevent mixing with foreign matter.
    - (1) Provide surface drainage to prevent flow or ponding of rainwater.
    - (2) Prevent mixing of refuse or chemically injurious materials or liquids.
4. Arrange storage in manner to provide easy access for inspection.

C. Maintenance of Storage

Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected.

D. Protection After Installation

1. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of Project.
2. Control traffic to prevent damage to equipment and surfaces.

**END OF SECTION**

**SECTION 017000**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Pre-installation meetings.
- C. Cutting and patching.
- D. Surveying for laying out the work.
- E. Cleaning and protection.
- F. Starting of systems and equipment.
- G. Demonstration and instruction of SRRWS personnel.
- H. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of SRRWS or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.04 QUALIFICATIONS**

- A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to the Engineer. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.
- B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located.

**1.05 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

1. Minimize amount of bare soil exposed at one time.
  2. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

## **1.06 COORDINATION**

- A. See Section 01 1000 for occupancy-related requirements.
- B. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- C. Notify affected utility companies and comply with their requirements.
- D. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- E. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- G. Coordinate completion and clean-up of work of separate sections.
- H. After SRRWS occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of SRRWS's activities.

## **PART 2 PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.

- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Engineer four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  1. Review conditions of examination, preparation and installation procedures.
  2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer, SRRWS, participants, and those affected by decisions made.

### **3.04 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Engineer of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Control datum for survey is that indicated on Drawings.
- E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- F. Promptly report to the Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to the Engineer.
- H. Utilize recognized engineering survey practices.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  2. Grid or axis for structures.
  3. Building foundation, column locations, ground floor elevations.
- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.05 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.06 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- C. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.
- J. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- L. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.
- M. Patch or replace surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. Repair substrate prior to patching finish. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

### **3.07 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.08 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.09 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Engineer and owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

### **3.10 DEMONSTRATION AND INSTRUCTION**

- A. Demonstrate operation and maintenance of products to SRRWS's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.

- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with SRRWS's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. The amount of time required for instruction on each item of equipment and system is that specified in individual sections.

### **3.11 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.12 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by SRRWS prior to final completion before SRRWS occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.13 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to the Engineer.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify the Engineer when work is considered ready for the Engineer's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for the Engineer's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Engineer's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Engineer.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to SRRWS-occupied areas.
- G. Notify Engineer when work is considered finally complete and ready for Substantial Completion final inspection.



- H. Complete items of work determined by the Engineer listed in executed Certificate of Substantial Completion.

**END OF SECTION**

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**SECTION 017800**  
**CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to the Engineer with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by SRRWS, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer's comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with SRRWS's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by SRRWS.

- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish first floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 4. Field changes of dimension and detail.
  - 5. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
  - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.

- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- L. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- M. Include test and balancing reports.
- N. Additional Requirements: As specified in individual product specification sections.

### **3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

- A. Assemble operation and maintenance data into durable manuals for SRRWS's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
  - 1. Borrum and Pease Binder No. C 619-3
  - 2. Wilson-Jones No. 564-64LH
  - 3. National No. 98-382
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
  - 1. Imprint front covers with the following.

**STANDING ROCK RURAL WATER SYSTEM  
MR&I OFFICE EXPANSION  
CONTRACT 2-6**

- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Engineer, Consultants, Contractor and subcontractors, with names of responsible parties.

- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
  - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
  - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
    - a. Significant design criteria.
    - b. List of equipment.
    - c. Parts list for each component.
    - d. Operating instructions.
    - e. Maintenance instructions for equipment and systems.
    - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
  - 3. Part 3: Project documents and certificates, including the following:
    - a. Shop drawings and product data.
    - b. Air and water balance reports.
    - c. Certificates.
    - d. Photocopies of warranties and bonds.
- N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- O. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Engineer, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.
- P. Electronic manuals shall be provided in a searchable PDF format with bookmarks and shall be transmitted on a separate CD or flash drive accompanying each binder.

### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with SRRWS's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
  - 1. Borrum and Pease Binder No. C 619-3
  - 2. Wilson-Jones No. 564-64LH

3. National No. 98-382

- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
1. Imprint front covers with the following.

**STANDING ROCK RURAL WATER SYSTEM  
MR&I OFFICE EXPANSION  
CONTRACT 2-6**

- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- I. Electronic manuals shall be provided in a searchable PDF format with bookmarks and shall be transmitted on a separate CD or flash drive accompanying each binder.

**END OF SECTION**

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**END OF SECTION**

**SECTION 024100  
DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.
- D. Abandonment and removal of existing utilities and utility structures.

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 011000 - Summary: Sequencing and staging requirements.
- C. Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- D. Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- E. Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- G. Section 311000 - Site Clearing: Vegetation and existing debris removal.
- H. Section 312200 - Grading: Topsoil removal.
- I. Section 312200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- J. Section 312323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Site Plan: Indicate:
  - 1. Vegetation to be protected.
  - 2. Areas for temporary construction and field offices.
  - 3. Areas for temporary and permanent placement of removed materials.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Fill Material: See Section 312323.

**PART 3 EXECUTION**

**3.01 DEMOLITION**

- A. Remove portions of existing buildings in the following sequence:
  - 1. Office partitions and finishes as identified in drawings.

2. Metal roof and related accessories as identified in drawings.
- B. Remove paving and curbs required to accomplish new work.
- C. Remove other items indicated, for salvage, relocation, and recycling.

### **3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  1. Obtain required permits.
  2. Comply with applicable requirements of NFPA 241.
  3. Use of explosives is not permitted.
  4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  5. Provide, erect, and maintain temporary barriers and security devices.
  6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  8. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.
  9. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
  10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Do not begin removal until vegetation to be relocated has been removed and vegetation to remain has been protected from damage.
- E. Protect existing structures and other elements to remain in place and not removed.
  1. Provide bracing and shoring.
  2. Prevent movement or settlement of adjacent structures.
  3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations. Do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- H. Perform demolition in a manner that maximizes salvage and recycling of materials.
  1. Dismantle existing construction and separate materials.
  2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

### **3.03 EXISTING UTILITIES**

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
  - 1. Verify construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from areas that remain occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction as required to protect the existing building and owner operations. .
- C. Maintain weatherproof exterior building enclosure, except for interruptions required for replacement or modifications; prevent water and humidity damage.
- D. Remove existing work as indicated and required to accomplish new work.
  - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction indicated.
  - 2. Remove items indicated on drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
  - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  - 3. Verify that abandoned services serve only abandoned facilities before removal.
  - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
  - 1. Prevent movement of structure. Provide shoring and bracing as required.
  - 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch to match new work.

### **3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

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**SECTION 033000**  
**CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete foundation walls.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- B. Section 321313 - Concrete Paving: Sidewalks, curbs and gutters.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; 1998 (Reapproved 2004).
- D. ACI 301 - Specifications for Structural Concrete; 2016.
- E. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- G. ACI 305R - Guide to Hot Weather Concreting; 2010.
- H. ACI 306R - Guide to Cold Weather Concreting; 2016.
- I. ACI 308R - Guide to External Curing of Concrete; 2016.
- J. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2017).
- K. ACI 347R - Guide to Formwork for Concrete; 2014.
- L. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- M. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2017.
- N. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- O. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- P. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2018.
- Q. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- R. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- S. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- T. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.

- U. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- V. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- W. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- X. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.
- Y. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.
- Z. ASTM C845/C845M - Standard Specification for Expansive Hydraulic Cement; 2012.
- AA. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- AB. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.
- AC. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2015.
- AD. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.
- AE. ASTM C1582/C1582M - Standard Specification for Admixtures to Inhibit Chloride-Induced Corrosion of Reinforcing Steel in Concrete; 2011, with Editorial Revision (2017).
- AF. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- AG. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004, with Editorial Revision (2013).
- AH. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.
- AI. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2015.
- AJ. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011 (Reapproved 2017).
- AK. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.
- AL. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures complying with mix design composition & requirements for each concrete component as listed in general structural notes on structural drawings.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with the mix design composition and requirement for each concrete component as listed in the general structural notes on the structural drawings.
  - 2. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.



3. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
  4. Indicate proposed mix design complies with admixture manufacturer's written recommendations.
- D. Samples: Submit samples of underslab vapor retarder to be used.
  - E. Samples: Submit two, 12 inch (305 mm) long samples of waterstops and construction joint devices.
  - F. Test Reports: Submit report for each test or series of tests specified.
  - G. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
  - H. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used.
  - I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
  - J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. For slabs required to include moisture vapor reducing admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

#### **1.06 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Slabs with Porosity Inhibiting Admixture (PIA) or Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover cost of flooring failures due to moisture migration from slabs for life of the concrete.
  1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
  2. Provide warranty by admixture manufacturer matching terms of flooring adhesive or primer manufacturer's material defect warranty.
- C. Moisture Emission-Reducing Curing and Sealing Compound, Membrane-Forming: Provide warranty to cover cost of flooring delamination failures for 10 years.
  1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
  1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
  2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.

3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.

## 2.02 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa). (ASTM A706 where being welded).
  1. Type: Deformed billet-steel bars.
  2. Finish: Unfinished, unless otherwise indicated.
  3. Finish: Epoxy coated in accordance with ASTM A775/A775M, unless otherwise indicated.
- B. Reinforcement Accessories:
  1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch (1.29 mm).
  2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches (38 mm) of weathering surfaces.

## 2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I/II Portland type.
  1. Acquire cement for entire project from same source.
- B. Blended, Expansive Hydraulic Cement: ASTM C845/C845M, Type K.
- C. Fine and Coarse Aggregates: ASTM C33/C33M.
  1. Acquire aggregates for entire project from same source.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Calcined Pozzolan: ASTM C618, Class N.
- F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

## 2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Accelerating Admixture: ASTM C494/C494M Type C.
- G. Retarding Admixture: ASTM C494/C494M Type B.
- H. Water Reducing Admixture: ASTM C494/C494M Type A.
- I. Shrinkage Reducing Admixture:
  1. ASTM C494/C494M, Type S.
- J. Corrosion Inhibiting Admixture:
  1. ASTM C494/C494M, Type C.
  2. ASTM C1582/C1582M.
- K. Moisture Vapor Reducing Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs). Closes capillary systems formed during concrete curing to reduce moisture vapor emission and transmission. Reduces concrete shrinkage with no adverse effect on concrete properties or applied flooring.
  1. Products:
    - a. Barrier One Concrete Admixtures; MVRA-CPS: [www.barrierone.com/#sle](http://www.barrierone.com/#sle).

- b. ISE Logik Industries, Inc; MVRA 900: [www.iselogik.com/#sle](http://www.iselogik.com/#sle).
- c. Specialty Products Group; Vapor Lock 20/20: [www.spggogreen.com/#sle](http://www.spggogreen.com/#sle).
- d. Substitutions: See Section 016000 - Product Requirements.

## 2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder:
  - 1. Installation: Comply with ASTM E1643.
  - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.

## 2.06 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
  - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- C. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
  - 1. Size: 1/2 inch (13 mm) throat, 1/2 inch (13 mm) deep.
- D. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.
  - 1. Material: ASTM D1751, cellulose fiber.
- E. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
- F. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches (150 mm) on center; ribbed steel stakes for setting.
  - 1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.
  - 2. Height: To suit slab thickness.
- G. Dowel Sleeves: Plastic sleeve for smooth, round, steel load-transfer dowels.
- H. Plate Dowel System: Steel plate dowel and plastic dowel sleeve; with integral fasteners for attachment to formwork.

## 2.07 CURING MATERIALS

- A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.
- B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
- C. Curing Agent, Water-Cure Equivalent Type: Clear, water-based, non-film-forming, liquid-water cure replacement agent.
  - 1. Comply with ASTM C309 standards for water retention.
  - 2. Compressive Strength of Treated Concrete: Equal to or greater than strength after 14-day water cure when tested according to ASTM C39/C39M.
  - 3. VOC Content: Zero.
- D. Curing and Sealing Compound, Moisture Emission-Reducing, Membrane-Forming: Clear, liquid sealer for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.
  - 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
  - 2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
  - 3. VOC Content: Less than 100 g/L.
- E. Moisture-Retaining Sheet: ASTM C171.
  - 1. Curing paper, regular.

2. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch (0.102 mm).
  3. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard (1.71 kg/sq m).
- F. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch (0.102 mm) thick, clear.
- G. Water: Potable, not detrimental to concrete.

## **2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
  2. Fly Ash Content: As indicated on drawings as indicated on drawings.
  3. Water-Cement Ratio: As indicated on drawings.
  4. Total Air Content: As indicated on drawings ASTM C173/C173M
  5. Maximum Aggregate Size: As indicated on drawings.

## **2.09 MIXING**

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.
- C. Do not use shrinkage-reducing admixture (SRA) in same concrete batch with MVRA or PIA.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in accordance with bonding agent manufacturer's instructions.
1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
  2. Use latex bonding agent only for non-load-bearing applications.
- E. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.

- F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert dowels with epoxy systems as specified by the manufacturer.
- G. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
  - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.
- B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- C. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Notify Architect not less than 24 hours prior to commencement of placement operations.
- C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

### **3.05 SLAB JOINTING**

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
  - 1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
- D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
- E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.
- F. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

### **3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
  - 2. Under Seamless Resilient Flooring: 1/4 inch (6 mm) in 10 feet (3 m).
  - 3. Under Carpeting: 1/4 inch (6 mm) in 10 feet (3 m).
- B. Correct the slab surface if tolerances are less than specified.

- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.07 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
  - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
  - 3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
  - 2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:50 nominal.

### **3.08 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
  - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
  - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
    - b. Spraying: Spray water over floor slab areas and maintain wet.
    - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
  - 3. Final Curing: Begin after initial curing but before surface is dry.
    - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches (75 mm) and seal with waterproof tape or adhesive; secure at edges.
    - b. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

### **3.09 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.

- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards (76 cu m) or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.
- H. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.
- I. Permeability Test: Test concrete with waterproofing admixture according to COE CRD-C 48.

### **3.10 DEFECTIVE CONCRETE**

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

### **3.11 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

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**SECTION 051200**  
**STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural steel framing members.
- B. Structural steel support members and struts.
- C. Base plates, shear stud connectors and expansion joint plates.
- D. Grouting under base plates.

**1.02 RELATED REQUIREMENTS**

- A. Section 053100 - Steel Decking: Support framing for small openings in deck.
- B. Section 055000 - Metal Fabrications: Steel fabrications affecting structural steel work.

**1.03 REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual; 2017.
- B. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.
- C. ASTM A1 - Standard Specification for Carbon Steel Tee Rails; 2000 (Reapproved 2018).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- I. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2013 (Reapproved 2018).
- J. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- K. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use; 2014.
- L. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- M. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- N. ASTM A514/A514M - Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding; 2014.
- O. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.
- P. ASTM A563/A563M - Standard Specification for Carbon and Alloy Steel Nuts (Inch and Metric); 2021a.
- Q. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2015.
- R. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2007 (Reapproved 2013).
- S. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel; 2015.

- T. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance; 2015.
- U. ASTM A759 - Standard Specification for Carbon Steel Crane Rails; 2010 (Reapproved 2016).
- V. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2011 (Reapproved 2015).
- W. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- X. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.
- Y. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.
- Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.
- AA. ASTM E94/E94M - Standard Guide for Radiographic Examination Using Industrial Radiographic Film; 2017.
- AB. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.
- AC. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).
- AD. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2013.
- AE. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2012.
- AF. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2015.
- AG. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- AH. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2016.
- AI. ASTM F959/F959M - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series; 2017a.
- AJ. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2015, with Editorial Revision (2018).
- AK. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- AL. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- AM. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- AN. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- AO. ITS (DIR) - Directory of Listed Products; current edition.
- AP. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).
- AQ. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- AR. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- AS. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- AT. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).

- AU. SSPC-SP 3 - Power Tool Cleaning; 1982, with Editorial Revision (2004).
- AV. SSPC-SP 5 - White Metal Blast Cleaning; 2007.
- AW. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- AX. SSPC-SP 7 - Brush-Off Blast Cleaning; 2007.
- AY. SSPC-SP 10 - Near-White Blast Cleaning; 2007.
- AZ. SSPC-SP 11 - Power Tool Cleaning to Bare Metal; 2012 (Ed. 2013).
- BA. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).
- BB. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
  - 2. Connections not detailed.
  - 3. Indicate cambers and loads.
  - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
- E. Fabricator Test Reports: Comply with ASTM A1011/A1011M.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

#### **1.05 QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Structural steel members designated as architecturally-exposed structural steel (AESS) to also comply with Section 051213.
- C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- D. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- E. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.
- F. Design connections not detailed on drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Steel Angles and Plates: ASTM A36/A36M.
- B. Steel W Shapes and Tees: ASTM A992/A992M.
- C. Rolled Steel Structural Shapes: ASTM A992/A992M.
- D. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.

- E. Steel Shapes, Plates, and Bars: ASTM A529/A529M high-strength, carbon-manganese structural steel, Grade 50.
- F. Steel Plates and Bars: ASTM A572/A572M, Grade 50 (345) high-strength, columbium-vanadium steel.
- G. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- H. Hot-Formed Structural Tubing: ASTM A501/A501M, seamless or welded.
- I. Steel Bars: ASTM A108 Grade 50.
- J. Steel Plate: ASTM A514/A514M.
- K. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.
- L. Pipe: ASTM A53/A53M, Grade B, Finish black.
- M. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- N. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
- O. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563/A563M nuts and ASTM F436/F436M washers.
- P. Tension Control Bolts: Twist-off type; ASTM F3125/F3125M.
- Q. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563/A563M nuts and ASTM F436/F436M Type 1 washers.
- R. Headed Anchor Rods: ASTM F1554, Grade 36, plain.
- S. Load Indicator Washers: Provide washers complying with ASTM F959/F959M at connections requiring high-strength bolts.
- T. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- U. Sliding Bearing Plates: Teflon coated.
- V. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch (13.7 MPa).
  - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).
  - 3. Height Change, Plastic State; when tested according to ASTM C827/C827M:
    - a. Maximum: Plus 4 percent.
    - b. Minimum: Plus 1 percent.
- W. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
- X. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

## **2.02 FABRICATION**

- A. Shop fabricate to greatest extent possible.
- B. Space shear stud connectors at spacing indicated on the plans or 16 inches (406 mm) max. on center.
- C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- D. Fabricate connections for bolt, nut, and washer connectors.
- E. Develop required camber for members.

## **2.03 FINISH**

- A. Prepare structural component surfaces in accordance with SSPC-SP 3.
- B. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

## **2.04 SOURCE QUALITY CONTROL**

- A. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 100 percent of bolts at each connection.
- B. Welded Connections: Visually inspect all shop-welded connections and test at least 25 percent of welds using one of the following:
  - 1. Radiographic testing performed in accordance with ASTM E94/E94M.
  - 2. Ultrasonic testing performed in accordance with ASTM E164.
  - 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
  - 4. Magnetic particle inspection performed in accordance with ASTM E709.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### **3.02 ERECTION**

- A. Erect structural steel in compliance with AISC 303.
- B. Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- E. Do not field cut or alter structural members without approval of Architect.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
- G. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

### **3.03 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

### **3.04 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 100 percent of bolts at each connection.
- C. Welded Connections: Visually inspect all field-welded connections and test all welds indicated on the plans and at least 25 percent of welds using one of the following:
  - 1. Radiographic testing performed in accordance with ASTM E94/E94M.
  - 2. Ultrasonic testing performed in accordance with ASTM E164.
  - 3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
  - 4. Magnetic particle inspection performed in accordance with ASTM E709.

**END OF SECTION**

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**SECTION 053100**  
**STEEL DECKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof deck.
- B. Supplementary framing for openings up to and including 18 inches (450 mm).
- C. Bearing plates and angles.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Concrete topping over metal deck.
- B. Section 051200 - Structural Steel Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.
- C. Section 051200 - Structural Steel Framing: Placement of embedded steel anchors for bearing plates in cast-in-place concrete.
- D. Section 055000 - Metal Fabrications: Steel angle concrete stops at deck edges.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2013.
- E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- G. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.
- H. ASTM E384 - Standard Test Method for Microindentation Hardness of Materials; 2017.
- I. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- J. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- K. FM (AG) - FM Approval Guide; current edition.
- L. FM DS 1-28 - Wind Design; 2016.
- M. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; Factory Mutual System; 2016.
- N. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- O. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2016.
- P. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2016.
- Q. ITS (DIR) - Directory of Listed Products; current edition.
- R. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- T. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

- U. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- V. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
- D. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- E. Certificates: Certify that products furnished meet or exceed specified requirements.
- F. Submit manufacturer's installation instructions.
- G. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

#### **1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Steel Deck:
  - 1. Canam Steel Corporation: [www.canam-steeljoists.ws](http://www.canam-steeljoists.ws).
  - 2. Nucor-Vulcraft Group: [www.vulcraft.com/#sle](http://www.vulcraft.com/#sle).
  - 3. New Millennium Building Systems: [www.newmill.com](http://www.newmill.com)
  - 4. Substitutions: See Section 016000 - Product Requirements.

#### **2.02 STEEL DECK**

- A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
  - 1. Calculate to structural working stress design and structural properties specified.
- B. Roof Deck: Non-composite type, fluted steel sheet:
  - 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
  - 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
  - 3. Minimum Base Metal Thickness: 20 gage, 0.0359 inch (0.91 mm). See Structural Drawings.
  - 4. Nominal Height: 1-1/2 inch (38 mm).
  - 5. Profile: Fluted; SDI See Structural Drawings.
  - 6. Formed Sheet Width: 36 inch (900 mm).
  - 7. Side Joints: Lock seam.
  - 8. End Joints: Lapped, welded.



## 2.03 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B. Welding Materials: AWS D1.1/D1.1M.
- C. Fasteners: Galvanized hardened steel, self tapping.
- D. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
  - 1. Material: Steel; ASTM A510/A510M.
    - a. Hardness: Rockwell C 54.5, minimum.
    - b. Tensile Strength: 285 kips per square inch (1965 MPa), minimum.
    - c. Shear Strength: 175 kips per square inch (1205 MPa), minimum.
    - d. Washers:
      - 1) Exposed Roof Deck Applications: 0.591 inch (15 mm) diameter, minimum.
    - e. Corrosion Resistance:
      - 1) Steel Bar Joist Framing Applications: ASTM B633, SC1, Type III zinc electroplate..
      - 2) Exposed Roof Deck Applications: Provide manufacturer's standard stainless steel sealing caps with bonded neoprene washer over each fastener.
- E. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
  - 1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM)SDI design method for roof deck and floor deck applications and ICC-ES AC43.
  - 2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
  - 3. Fasteners for Exposed Steel Roof Deck Application: Manufacturer's standard stainless steel with bonded neoprene washer.
- F. Weld Washers: Mild steel, uncoated, 3/4 inch (19 mm) outside diameter, 1/8 inch (3 mm) thick.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- I. Flute Closures: Closed cell foam rubber, 1 inch (25 mm) thick; profiled to fit tight to the deck.

## 2.04 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 20 gauge, 0.0359 inch (0.91 mm) thick sheet steel; of profile and size as indicated; finished same as deck.
- B. Roof Sump Pans: Formed sheet steel, 14 gauge, 0.0747 inch (1.90 mm) minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches (38 mm) below roof deck surface, bearing flange 3 inches (75 mm) wide, sealed watertight.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions prior to beginning work.

### 3.02 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch (100 mm) bearing.
- C. On steel supports provide minimum 1-1/2 inch (38 mm) bearing.

- D. Fasten deck to steel support members per Structural Drawings but minimum at ends and intermediate supports at 12 inches (300 mm) on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
  - 1. Welding: Use fusion welds through weld washers.
- E. Clinch lock seam side laps.
- F. At mechanically fastened male/female side laps fasten at 24 inches (600 mm) on center maximum.
- G. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- H. At welded male/female side laps weld at 18 inches (450 mm) on center maximum.
- I. Weld deck in accordance with AWS D1.3/D1.3M.
- J. At deck openings from 6 inches (150 mm) to 18 inches (450 mm) in size, provide 2 by 2 by 1/4 inch (50 by 50 by 6 mm) steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
- K. At deck openings greater than 18 inches (450 mm) in size, provide steel angle reinforcement as specified in Section 051200.
- L. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch (150 mm) minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches (300 mm) on center maximum.
- M. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.
- N. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- O. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- P. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

**END OF SECTION**

**SECTION 054000**  
**COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed steel stud exterior wall and interior wall framing.
- B. Exterior wall sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section 053100 - Steel Decking.
- B. Section 061000 - Rough Carpentry: Wood blocking and miscellaneous framing.
- C. Section 061000 - Rough Carpentry: Roof and wall sheathing.
- D. Section 072100 - Thermal Insulation: Insulation within framing members.
- E. Section 072500 - Weather Barriers: Water-resistive barrier over sheathing.
- F. Section 076200 - Sheet Metal Flashing and Trim: Head and sill flashings.
- G. Section 079200 - Joint Sealants.
- H. Section 092116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
- I. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.
- J. Section 095100 - Acoustical Ceilings: Ceiling suspension system.

**1.03 REFERENCE STANDARDS**

- A. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.
- F. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2017.
- G. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Metal Framing:
  - 1. ClarkDietrich Building Systems: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Framing Connectors and Accessories:
  - 1. Same manufacturer as metal framing.
  - 2. ClarkDietrich Building Systems: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 3. Simpson Strong Tie: [www.strongtie.com/#sle](http://www.strongtie.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.

### **2.02 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

### **2.03 FRAMING MATERIALS**

- A. Wall Studs and Track Sections: AISI S240; c-shaped studs and u-shaped track sections in stud-matching nominal width and compatible height.
  - 1. Structural Grade: As required to meet design criteria.
- B. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web except at headers(unpunched); U-shaped track in matching nominal width and compatible height.
  - 1. Gauge and Depth: As indicated on drawings.
  - 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
  - 3. Provide components fabricated from ASTM A1008/A1008M, Designation SS (structural steel).
- C. Jamb Studs: AISI S240; manufactured, engineered, c-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
  - 1. Structural Grade: As required to meet design criteria.
  - 2. Corrosion Protection Coating Designation: CP 90 in accordance with AISI S240.
  - 3. Thickness and Depth: As indicated on drawings.

### **2.04 FASTENERS**

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.

### **2.05 WALL SHEATHING**

- A. Wall Sheathing: See Section 061000.
- B. Board Insulation Wall Sheathing: See Section 072100.

### **2.06 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C. Galvanizing Repair: Touch up bare steel with zinc-rich paint in compliance with ASTM A780/A780M.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- E. Water-Resistive Barrier: No. 15 asphalt felt.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

### **3.02 INSTALLATION - GENERAL**

- A. Install structural members and connections in compliance with AISI S240.

### **3.03 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches (600 mm) on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- D. Place studs at 16 inches (400 mm) on center; not more than 2 inches (50 mm) from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.
- E. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- F. Align stud web openings horizontally.
- G. Secure studs to tracks using crimping method. Do not weld.
- H. Stud splicing is not permissible.
- I. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- J. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- K. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- L. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- M. Install intermediate studs above and below openings to align with wall stud spacing.
- N. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- O. Attach cross studs to studs for attachment of fixtures anchored to walls.
- P. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- Q. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- R. Sound Isolation Clips: Mechanically attach to framing or structure with fasteners recommended by clip manufacturer. Install at spacing indicated on drawings.
- S. Furring: Coordinate with sound isolation clip spacing and locations. Lap splices a minimum of 6 inches (150 mm).
- T. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- U. Touch-up field welds and damaged galvanized surfaces with primer.

### **3.04 INSTALLATION OF WALL SHEATHING**

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
  - 1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.

2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

**END OF SECTION**

**SECTION 055000**  
**METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel and aluminum items.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 051200 - Structural Steel Framing: Structural steel column anchor bolts.
- C. Section 053100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- D. Section 099113 - Exterior Painting: Paint finish.
- E. Section 099123 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2016).
- G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- H. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- I. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- J. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2016.
- K. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- L. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- M. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- N. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- O. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- P. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

- Q. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- R. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- S. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- T. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata.
- U. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- V. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- W. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- X. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
- D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- F. Slotted Channel Fittings: ASTM A1011/A1011M.
- G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- H. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

#### **2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by intermittent welds and plastic filler.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.



- F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.03 FABRICATED ITEMS**

- A. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- B. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

### **2.04 FINISHES - STEEL**

- A. Prepare surfaces to be primed in accordance with SSPC-SP2.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Prime Painting: One coat.
- D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft (530 g/sq m) galvanized coating.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

### **2.05 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

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**SECTION 061000**  
**ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rough opening framing for doors, windows, and roof openings.
- B. Sheathing.
- C. Roof-mounted curbs.
- D. Roofing nailers.
- E. Preservative treated wood materials.
- F. Miscellaneous framing and sheathing.
- G. Concealed wood blocking, nailers, and supports.
- H. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 054000 - Cold-Formed Metal Framing
- B. Section 072500 - Weather Barriers: Water-resistive barrier over sheathing.
- C. Section 076200 - Sheet Metal Flashing and Trim: Sill flashings.
- D. Section 077200 - Roof Accessories: Prefabricated roof curbs.
- E. Section 092116 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.
- E. PS 1 - Structural Plywood; 2009.
- F. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- G. PS 20 - American Softwood Lumber Standard; 2015.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
  - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

### **2.03 CONSTRUCTION PANELS**

- A. Wall Sheathing, Exposure 1 Rated Plywood or OSB sheathing: PS1 or PS 2 type.
  - 1. Bond Classification: Exterior.
  - 2. Grade: Structural I Sheathing.
  - 3. Span Rating 24/16 APA Rating
  - 4. Performance Category: 1/2 PERF CAT.
  - 5. Edge Profile: Square edge.
  - 6. All panels shall be identified with a grade mark of certificate of inspection issued by an APA approved agency.
- B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

### **2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
  - 3. Anchors: Bolt or ballistic fastener for anchorages to steel.
- B. General Purpose Construction Adhesives: Comply with ASTM C557.
- C. Water-Resistive Barrier: See Section 072500.

### **2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Preservative Treatment:
  - 1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

- b. Treat lumber exposed to weather.
  - c. Treat lumber in contact with roofing, flashing, or waterproofing.
  - d. Treat lumber in contact with masonry or concrete.
  - e. Treat lumber less than 18 inches (450 mm) above grade.
2. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative.
- a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.02 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to authorities having jurisdiction may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific nonstructural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Wall paneling and trim.
  - 9. Joints of rigid wall coverings that occur between studs.

### **3.03 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where specifically indicated otherwise; form corners by alternating lapping side members.

### **3.04 INSTALLATION OF CONSTRUCTION PANELS**

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
  - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

- B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### **3.05 TOLERANCES**

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

**END OF SECTION**

**SECTION 062000**  
**FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wood door frames, glazed frames.
- B. Wood casings and moldings.

**1.02 RELATED REQUIREMENTS**

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 061000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- C. Section 085200 - Wood Windows.
- D. Section 088000 - Glazing: Glass and glazing of wood partitions and screens.
- E. Section 099123 - Interior Painting: Painting of finish carpentry items.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- C. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; 2015.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
  - 2. Provide data on fire retardant treatment materials and application instructions.
  - 3. Provide instructions for attachment hardware and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- D. Samples: Submit two samples of wood trim 3 inch (76.2 mm) long.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- B. Protect from moisture damage.
- C. Handle materials and products to prevent damage to edges, ends, or surfaces.

**PART 2 PRODUCTS**

**2.01 FINISH CARPENTRY ITEMS**

- A. Interior Woodwork Items:
  - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Red Oak (Verify and match existing); prepare for transparent finish.
  - 2. Door, Glazed Light, and Pocket Door Frames: Red Oak (Verify and match existing); prepare for transparent finish.

**2.02 LUMBER MATERIALS**

- A. Hardwood Lumber: Red Oak species, Flat sawn, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.

1. Grading: In accordance with NHLA G-101 Grading Rules; [www.nhla.org](http://www.nhla.org).

### **2.03 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.
- C. Fasteners: Of size and type to suit application; Hardened Steel finish in concealed locations and Stainless Steel finish in exposed locations.

### **2.04 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming and Blocking: Softwood lumber of Clear Fir species.
- C. Glass: See section 088000.
- D. Wood Filler: Solvent base, tinted to match surface finish color.

### **2.05 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Shop prepare and identify components for book match grain matching during site erection.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

### **2.06 SHOP FINISHING**

- A. Apply wood filler in exposed nail and screw indentations.
- B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- C. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
  1. Transparent:
    - a. System - 1, Lacquer, Nitrocellulose.
    - b. Sheen: Match Existing.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.

### **3.02 INSTALLATION**

- A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Install factory-fabricated units in accordance with manufacturer's printed installation instructions.
- C. Set and secure materials and components in place, plumb and level.
- D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

### **3.03 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

### **3.04 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch (1.6 mm).
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

## **END OF SECTION**



**SECTION 072100**  
**THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Board insulation and integral vapor retarder at perimeter foundation wall and exterior wall behind Rain Screen Panels wall finish.
- B. Batt insulation in exterior wall construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

**1.02 RELATED REQUIREMENTS**

- A. Section 054000 - Cold-Formed Metal Framing: Board insulation as wall sheathing.
- B. Section 061000 - Rough Carpentry: Supporting construction for batt insulation.
- C. Section 072500 - Weather Barriers: Separate air barrier and vapor retarder materials.
- D. Section 075300 - Elastomeric Membrane Roofing: Insulation specified as part of roofing system.
- E. Section 078400 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.
- F. Section 092116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2017.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016a.
- G. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2017.
- H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

**1.05 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- B. Insulation Over Metal Stud Framed Walls, Continuous: Polyisocyanurate board.
- C. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

## 2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
  - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 3. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
  - 4. Board Edges: Square.
  - 5. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
  - 6. Products:
    - a. DuPont de Nemours, Inc: [building.dupont.com/#sle](http://building.dupont.com/#sle).
    - b. Kingspan Insulation LLC; GreenGuard XPS Type IV, 25 psi: [www.kingspan.com/#sle](http://www.kingspan.com/#sle).
    - c. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, comply with ASTM C1289.
  - 1. Classifications:
    - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
      - 1) Class 1 - Non-reinforced core foam.
      - 2) Compressive Strength: 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inch (38.1 mm) thick; 9.0 (1.59), minimum, at 75 degrees F (24 degrees C).
  - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
  - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
  - 4. Water Vapor Permeance: 1.2 perm (68 ng/(Pa s sqm)), maximum, at 1 inch (25 mm) thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.
  - 5. Comply with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
  - 6. Board Size: 48 inch by 96 inch (1220 mm by 2440 mm).
  - 7. Board Thickness: 1.5 inch (37.5 mm).
  - 8. Board Edges: Square.
  - 9. Products:
    - a. GAF; EnergyGuard Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - b. Hunter Panels; Xci Foil (Class A): [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
    - c. Johns Manville; AP Foil-Faced: [www.jm.com/#sle](http://www.jm.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.

## 2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
  - 1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  - 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  - 4. Formaldehyde Content: Zero.
  - 5. Products:
    - a. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
    - b. Johns Manville: [www.jm.com/#sle](http://www.jm.com/#sle).
    - c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.

- C. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
  - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  - 3. Products:
    - a. Johns Manville; MinWool Sound Attenuation Fire Batts: [www.jm.com/#sle](http://www.jm.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.

## **2.04 ACCESSORIES**

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
  - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
  - 2. Width: Are required for application.
  - 3. Temperature Resistance: Minus 40 degrees F to 212 degrees F (Minus 40 degrees C to 100 degrees C)
- B. Flashing Tape: Special reinforced film with high performance adhesive.
  - 1. Application: Window and door opening flashing tape.
  - 2. Width: As required for application.
- C. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.
  - 1. Products:
- D. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- E. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- F. Adhesive: Type recommended by insulation manufacturer for application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Adhere a 6 inches (152 mm) wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
  - 1. Tape seal joints.
  - 2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
  - 1. Three continuous beads per board length.
  - 2. Full bed 1/8 inch (3.2 mm) thick.
- C. Install boards horizontally on foundation perimeter.
  - 1. Place boards to maximize adhesive contact.
  - 2. Install in running bond pattern.
  - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- D. Extend boards over expansion joints, unbonded to foundation on one side of joint.
- E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.03 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Adhere 6 inches (152 mm) wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
  - 1. Tape seal joints between sheets.

2. Extend sheet full height of joint.
- B. Apply adhesive to back of boards:
  1. Three continuous beads per board length.
  2. Full bed 1/8 inch (3.2 mm) thick.
- C. Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches (406 mm) on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inches (102 mm) wide sealant tape; comply with ASTM E2357.
- D. Install boards horizontally on walls.
  1. Place boards to maximize adhesive contact.
  2. Install in running bond pattern.
  3. Butt edges and ends tightly to adjacent boards and protrusions.
- E. Extend boards over expansion joints, unbonded to wall on one side of joint.
- F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- G. Place 6 inches (152 mm) wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.
- H. Tape insulation board joints.

#### **3.04 BATT INSTALLATION**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Tape insulation batts in place.

#### **3.05 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements for additional requirements.

#### **3.06 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 072500**  
**WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 076200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- C. Section 079200 - Joint Sealants: Sealing building expansion joints.
- D. Section 092116 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

**1.03 DEFINITIONS**

- A. Weather Barriers: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

**1.04 REFERENCE STANDARDS**

- A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2014.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- E. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
- F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.
- H. Testing Agency Qualification Statement.

## 1.06 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
  2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

## 1.07 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

## PART 2 PRODUCTS

### 2.01 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
  1. Provide on exterior walls under exterior cladding.

### 2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier Sheet, Mechanically Fastened:
  1. Air Permeance: 0.004 cubic feet per minute per square foot (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
  2. Water Vapor Permeance: 5 perms (286 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
  3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
  4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
  5. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches (50 mm) wide, compatible with sheet material; unless otherwise specified.
  6. Manufacturers:
    - a. DuPont Building Innovations; Tyvek Commercial Wrap with Tyvek Fluid Applied Flashing - Brush Formulation, Tyvek Fluid Applied Flashing and Joint Compound, FlexWrap NF, StraightFlash, StraightFlash VF, Tyvek Wrap Caps, and Tyvek Tape: [www.dupont.com/#sle](http://www.dupont.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.

### 2.03 ACCESSORIES

- A. Sealants, Tapes, and Accessories Used for Sealing Water-Resistive Barrier and Adjacent Substrates: As indicated or complying with water-resistive barrier manufacturer's installation instructions.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
  1. Width: 4 inches (102 mm).
  2. Products:
    - a. DuPont de Nemours, Inc; FlexWrap: [www.dupont.com/building/#sle](http://www.dupont.com/building/#sle).
    - b. DuPont de Nemours, Inc; StraightFlash: [www.dupont.com/building/#sle](http://www.dupont.com/building/#sle).
    - c. DuPont de Nemours, Inc; VersaFlange: [www.dupont.com/building/#sle](http://www.dupont.com/building/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces and conditions comply with requirements of this section.

### 3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

### 3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's installation instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Mechanically Fastened Exterior Sheets:
  - 1. Install sheets shingle-fashion to shed water, with seams aligned horizontal.
  - 2. Overlap seams as recommended by manufacturer, 6 inches (152 mm), minimum.
  - 3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches (305 mm), minimum.
  - 4. For applications indicated to be airtight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners as recommended by manufacturer.
  - 5. Install water-resistive barrier over jamb flashings.
  - 6. Install air barrier and vapor retarder UNDER jamb flashings.
  - 7. Install head flashings under water-resistive barrier.
  - 8. At framed openings with frames having nailing flanges, extend sheet into opening and over flanges; at head of opening, seal sheet over flange and flashing.
- D. Openings and Penetrations in Exterior Water-Resistive Barriers:
  - 1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches (127 mm) onto water-resistive barrier and at least 6 inches (152 mm) up jambs; mechanically fasten stretched edges.
  - 2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
  - 3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches (230 mm) wide, and covering entire depth of framing.
  - 4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches (50 mm) beyond face of jambs; seal water-resistive barrier to flashing.
  - 5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
  - 6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.

### 3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Owner92s Inspection and Testing: Cooperate with Owner92s testing agency.
  - 1. Allow access to work areas and staging.
  - 2. Notify Owner92s testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
  - 3. Do not cover work of this section until testing and inspection is accepted.
- C. Coordination of ABAA Tests and Inspections:
  - 1. Provide testing and inspection required by ABAA QAP.
  - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
  - 3. Cooperate with ABAA testing agency.
  - 4. Allow access to air barrier work areas and staging.

- 5. Do not cover air barrier work until tested, inspected, and accepted.
- D. Do not cover installed water-resistive barriers until required inspections have been completed.
- E. Obtain approval of installation procedures from water-resistive barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- F. Take digital photographs of each portion of installation prior to covering up weather barriers.

**3.05 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION**



**SECTION 075300**  
**ELASTOMERIC MEMBRANE ROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Vapor retarder.
- D. Deck sheathing.
- E. Flashings.

**1.02 RELATED REQUIREMENTS**

- A. Section 053100 - Steel Decking: Placement of acoustical insulation for deck flutes.
- B. Section 061000 - Rough Carpentry: Wood nailers and curbs.
- C. Section 076200 - Sheet Metal Flashing and Trim: Counterflashings.
- D. Section 077200 - Roof Accessories: Roof-mounted units; prefabricated curbs.
- E. Section 221006 - Plumbing Piping Specialties: Roof drains.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2017.
- C. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.
- D. FM (AG) - FM Approval Guide; current edition.
- E. FM DS 1-28 - Wind Design; 2016.
- F. ITS (DIR) - Directory of Listed Products; current edition.
- G. NRCA (RM) - The NRCA Roofing Manual; 2018.
- H. NRCA (WM) - The NRCA Waterproofing Manual; 2005.
- I. SPRI RP-4 - Wind Design Standard for Ballasted Single-Ply Roofing Systems; 2013.
- J. UL (DIR) - Online Certifications Directory; Current Edition.
- K. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of associated counterflashings installed under other sections.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, and paver layout.
- D. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- E. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

## **1.08 FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above 90 degrees F (32 degrees C).
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

## **1.09 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a two year period after Date of Substantial Completion.
- C. Provide 30 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. EPDM Membrane Materials:
  - 1. Carlisle SynTec Systems; Sure-Tough EPDM: [www.carlisle-syntec.com/#sle](http://www.carlisle-syntec.com/#sle).
  - 2. Elevate; Low Slope Fire Retardant (LSFR) RubberGard EPDM Membrane: [www.holcimelevate.com/#sle](http://www.holcimelevate.com/#sle).
  - 3. Johns Manville; JM EPDM: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 4. Versico Roofing Systems; VersiGard EPDM: [www.versico.com/#sle](http://www.versico.com/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Insulation:
  - 1. Dow Chemical Company: [www.dow.com/#sle](http://www.dow.com/#sle).
  - 2. GAF: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  - 3. Hunter Panels: [www.hunterpanels.com/#sle](http://www.hunterpanels.com/#sle).
  - 4. Owens Corning Corporation: [www.owenscorning.com/#sle](http://www.owenscorning.com/#sle).
  - 5. Versico Roofing Systems; SecurShield Insulation: [www.versico.com/#sle](http://www.versico.com/#sle).
  - 6. Substitutions: See Section 016000 - Product Requirements.

### **2.02 ROOFING - UNBALLASTED APPLICATIONS**

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over vapor retarder and insulation.
- B. Roofing Assembly Requirements:

1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
  2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
  3. Insulation Thermal Resistance (R-Value): 5 per inch, minimum; provide insulation of thickness required.
- C. Acceptable Insulation Types - Constant Thickness Application: Any of types specified.
1. Minimum 2 layers of polyisocyanurate board.
- D. Acceptable Insulation Types - Tapered Application: Any of types specified.
1. Tapered polyisocyanurate board covered with uniform thickness polyisocyanurate board.

### **2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS**

- A. Membrane: Ethylene-propylene-diene-monomer (EPDM); externally reinforced with fabric; complying with minimum properties of ASTM D4637/D4637M.
1. Thickness: 0.090 inch (90 mil) (2.3 mm).
  2. Sheet Width: 120 inches (3,048 mm), maximum; factory fabricate into widest possible sheets.
  3. Color: Black.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Vapor Retarder: Non-bituminous, foil and fibrous mesh laminate, complying with requirements of fire rating classification; compatible with roofing and insulation materials.
1. Fire-retardant adhesive.
  2. Product: VapAir Seal MD manufactured by Carlisle SynTec Systems.
- D. Flexible Flashing Material: Same material as membrane.

### **2.04 DECK SHEATHING**

- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/4 inch (6.4 mm) thick.
1. Thickness: 1/2 inch (12.7 mm), fire-resistant.
- B. Faced Polyisocyanurate Cover Board: High compressive strength board, complying with ASTM C1289, Type II, Class 4 - Faced with coated or uncoated polymer-bonded glass fiber mat facers on both major surfaces of the core foam. This product is used at a maximum thickness of 1/2 inch (12.7 mm).
1. Grade and Compressive Strength: Grade 1, 80 psi (Grade 1, 551 kPa).
  2. Board Size: 48 by 96 inch (1220 by 2440 mm).
  3. Board Thickness: 1/2 inch (12.7 mm).
  4. Insulation Thermal Resistance, R-value (RSI-value): 1.0 (0.18), nominal.
  5. Manufacturers:
    - a. G-P Dens-Deck.
    - b. Carlisle Secure-Shield HD.
    - c. Firestone Iso-Guard.
    - d. Substitutions: See Section 016000 - Product Requirements.

### **2.05 INSULATION**

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
    - a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
      - 1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
      - 2) Compressive Strength: Classes 1-2-3, Grade 1 - 16 psi (110 kPa), minimum.
      - 3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inches (38 mm) thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F (24 degrees C).
  2. Board Size: 48 by 96 inches (1220 by 2440 mm).
  3. Board Thickness: 1.5 inch (37.5 mm).

4. Tapered Board: Slope as indicated; minimum thickness 1 inch (25.4 mm); fabricate of fewest layers possible.
5. Board Edges: Square.
6. Products:
  - a. Dow Chemical Company: [www.dow.com/#sle](http://www.dow.com/#sle).
  - b. GAF; EnergyGuard Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  - c. Versico Roofing Systems; SecurShield Insulation: [www.versico.com/#sle](http://www.versico.com/#sle).
  - d. Substitutions: See Section 016000 - Product Requirements.

## **2.06 ACCESSORIES**

- A. Roofing Expansion Joint Flashing: Sheet butyl.
- B. Sheathing Adhesive: Noncombustible type, for adhering gypsum sheathing to metal deck.
- C. Sheathing Joint Tape: Paper type, 6 inch (150 mm) wide, self adhering.
- D. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (152 mm) wide; self adhering.
- E. Insulation Fasteners: Appropriate for purpose intended.
  1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- F. Membrane Adhesive: As recommended by membrane manufacturer.
- G. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- H. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- I. Insulation Adhesive: As recommended by insulation manufacturer.
- J. Roofing Nails: Galvanized, hot-dipped type, size and configuration as required to suit application.
- K. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.
- L. Insulation Perimeter Restraint: Stainless steel edge device configured to restrain insulation boards in position and provide top flashing over ballast.
- M. Sealants: As recommended by membrane manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.02 PREPARATION - METAL DECK**

- A. Install preformed acoustical glass fiber insulation strips in roof deck flutes in accordance with manufacturer's instructions; see Section 053100.
- B. Install deck sheathing on metal deck.
  1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
  2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
  3. Tape joints.

- C. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
  - 1. Over entire roof area, fasten sheathing using six fasteners with washers per sheathing board.
  - 2. At roof perimeter to a distance of 4 feet (1.2 m) in from edges, fasten sheathing using 6 fasteners with washers per board.

### **3.03 VAPOR RETARDER AND INSULATION - UNDER MEMBRANE**

- A. Install vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
  - 1. Extend vapor retarder under cant strips and blocking to deck edge.
  - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Attachment of Insulation:
  - 1. Mechanically fasten entire insulation and cover board to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
- D. Cover Boards: Fully adhered cover boards in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
- E. Lay subsequent layers of insulation with joints staggered minimum 6 inches (152 mm) from joints of preceding layer.
- F. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- G. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- I. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- J. Do not apply more insulation than can be covered with membrane in same day.

### **3.04 INSTALLATION - MEMBRANE**

- A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Fully Adhered Application: Apply adhesive to substrate at rate specified on the container label. Fully embed membrane in adhesive except in areas directly over or within 3 inches (75 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- E. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (76 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- F. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 4 inches (102 mm) onto vertical surfaces.
  - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- G. Around roof penetrations, seal flanges and flashings with flexible flashing.
- H. Install roofing expansion joints where indicated. Make joints watertight.
- I. Coordinate installation of roof drains and sumps and related flashings.

### **3.05 CLEANING**

- A. See Section 017000 - Execution and Closeout Requirements for additional requirements.

- B. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.
- C. Remove bituminous markings from finished surfaces.
- D. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- E. Repair or replace defaced or damaged finishes caused by work of this section.

**3.06 PROTECTION**

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**END OF SECTION**

**SECTION 077100**  
**ROOF SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured roof specialties, including copings and counterflashings.

**1.02 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- C. NRCA (RM) - The NRCA Roofing Manual; 2018.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Roof Edge Flashings and Copings:
  - 1. ATAS International, Inc; Rapid-Lok Fascia: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Hickman Edge Systems: [www.hickmanedgesystems.com/#sle](http://www.hickmanedgesystems.com/#sle).
  - 3. Metal-Era Inc: [www.metalera.com/#sle](http://www.metalera.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Counterflashings:
  - 1. ATAS International, Inc: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Hickman Edge Systems: [www.hickmanedgesystems.com/#sle](http://www.hickmanedgesystems.com/#sle).
  - 3. Metal-Era Inc: [www.metalera.com/#sle](http://www.metalera.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.

**2.02 COMPONENTS**

- A. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
  - 1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
  - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
  - 3. Wall Width: 10 inches (254 mm).
  - 4. Outside Face Height: 6 inches (152 mm).
  - 5. Inside Face Height: 4 inches (102 mm).
  - 6. Material: Formed steel sheet, galvanized, 22 gauge, 0,03 inch (0.75 mm) thick, minimum.
  - 7. Finish: 70 percent polyvinylidene fluoride.
  - 8. Color: As selected by Architect from manufacturer's standard range.
- B. Counterflashings: Factory fabricated and finished sheet metal that overlaps top edges of base flashing by at least 4 inches (102 mm), and designed to snap into through-wall flashing or reglets with lapped joints.

1. Material: Zinc-coated steel sheet, 0.022 inch (0.56 mm) thick, minimum.
2. Color: To be selected by Architect from manufacturer's standard range.

### **2.03 FINISHES**

- A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

### **2.04 ACCESSORIES**

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

### **3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.
- F. Coordinate installation of flashing flanges into reglets.

**END OF SECTION**



**SECTION 077123**  
**MANUFACTURED GUTTERS AND DOWNSPOUTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pre-finished galvanized steel gutters, scuppers and downspouts.
- B. Precast concrete splash pads.

**1.02 RELATED REQUIREMENTS**

- A. Section 075300: Elastomeric Membrane Roofing.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- C. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- D. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Comply with SMACNA (ASMM) for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.
- B. Comply with applicable code for size and method of rain water discharge.
- C. Maintain one copy of each document on site.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on prefabricated components.
- C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Gutters and Downspouts:
  - 1. ATAS International, Inc: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Hickman Edge Systems; Wind Resistant Gutter: [www.hickmanedgesystems.com/#sle](http://www.hickmanedgesystems.com/#sle).
  - 3. Metal-Era Inc; Seal-Tite WR Gutter: [www.metalera.com/#sle](http://www.metalera.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Scupper and Collectors:
  - 1. ATAS International, Inc: [www.atas.com/#sle](http://www.atas.com/#sle).
  - 2. Substitutions: See Section 016000 - Product Requirements.

**2.02 MATERIALS**

- A. Pre-Finished Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch (0.6 mm) thick base metal.

1. Finish: Shop pre-coated with modified silicone coating.
  2. Color: As selected by Architect from manufacturer's standard colors.
- B. Primer: Zinc molybdate type.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Solder: ASTM B32; Sn50 (50/50) type.

### **2.03 COMPONENTS**

- A. Gutters: CDA rectangular style profile.
- B. Downspouts: CDA rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
1. Anchoring Devices: In accordance with CDA requirements.
  2. Downspout Supports: Brackets.
- D. Fasteners: Galvanized steel, with soft neoprene washers.

### **2.04 FABRICATION**

- A. Form gutters and scuppers of profiles and size indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

### **2.05 FINISHES**

- A. Modified silicone polyester coating: Baked enamel system, comply with AAMA 2603.

### **2.06 ACCESSORIES**

- A. Splash Pads: Precast concrete type, profiles size(s) as indicated; minimum 3,000 psi (21 MPa) compressive strength at 28 days, with minimum 5 percent air entrainment.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that surfaces are ready to receive work.

### **3.02 PREPARATION**

- A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch (0.381 mm).

### **3.03 INSTALLATION**

- A. Install scuppers, gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/4 inch per foot (6.5 mm/m), .25 percent minimum.
- D. Solder metal joints for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.

**END OF SECTION**

**SECTION 078400  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies.

**1.02 RELATED REQUIREMENTS**

- A. Section 017000 - Execution and Closeout Requirements: Cutting and patching.

**1.03 REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a (Reapproved 2017).
- B. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops; 2014b.
- C. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2010a (Reapproved 2015).
- D. ITS (DIR) - Directory of Listed Products; current edition.
- E. FM (AG) - FM Approval Guide; current edition.
- F. UL (DIR) - Online Certifications Directory; Current Edition.
- G. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Certificate from authority having jurisdiction indicating approval of materials used.

**1.05 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
  - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at [www.icc-es.org](http://www.icc-es.org) will be considered as constituting an acceptable test report.
  - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

**1.06 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Firestopping Manufacturers:
  - 1. 3M Fire Protection Products: [www.3m.com/firestop/#sle](http://www.3m.com/firestop/#sle).
  - 2. A/D Fire Protection Systems Inc: [www.adfire.com/#sle](http://www.adfire.com/#sle).

3. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
4. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
5. Substitutions: See Section 016000 - Product Requirements.

## **2.02 MATERIALS**

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- C. Fire Ratings: Refer to drawings for required systems and ratings.

## **2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
  1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
  2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
  3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
  4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

## **2.04 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS**

- A. Blank Openings:
  1. 2 Hour Construction: UL System W-L-0020; Specified Technologies Inc. Composite Sheet.
  2. 2 Hour Construction: UL System W-L-0038; Specified Technologies Inc. FP Intumescent Firestop Plug.
  3. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
  1. Uninsulated Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
  2. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
    - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
  3. Insulated Pipes:
    - a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
    - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.

## **2.05 FIRESTOPPING SYSTEMS**

- A. Firestopping: Any material meeting requirements.
  1. Fire Ratings: See drawings for required systems and ratings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Install labeling required by code.

### **3.04 FIELD QUALITY CONTROL**

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

### **3.05 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

### **3.06 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

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**SECTION 079200**  
**JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 072500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
- B. Section 078400 - Firestopping: Firestopping sealants.
- C. Section 087100 - Door Hardware: Setting exterior door thresholds in sealant.
- D. Section 088000 - Glazing: Glazing sealants and accessories.
- E. Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- F. Section 092216 - Non-Structural Metal Framing: Sealing between framing and adjacent construction in acoustical and sound-rated walls and ceilings.
- G. Section 233100 - HVAC Ducts and Casings: Duct sealants.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- H. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016.
- I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturer's technical datasheets for each product to be used; include the following:
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Backing material recommended by sealant manufacturer.
  - 4. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 5. Substrates the product should not be used on.
- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

### **1.05 QUALITY ASSURANCE**

- A. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
  - 1. Adhesion Testing: In accordance with ASTM C794.
  - 2. Compatibility Testing: In accordance with ASTM C1087.
  - 3. Stain Testing: In accordance with ASTM C1248; required only for stone substrates.
  - 4. Allow sufficient time for testing to avoid delaying the work.
  - 5. Deliver sufficient samples to manufacturer for testing.
  - 6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.

### **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.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Nonsag Sealants:
  - 1. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 2. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - 3. W.R. Meadows, Inc: [www.wrmeadows.com/#sle](http://www.wrmeadows.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Self-Leveling Sealants:
  - 1. Sika Corporation: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - 2. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).

### **2.02 JOINT SEALANT APPLICATIONS**

- A. Scope:
  - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to:
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Openings below ledge angles in masonry.
    - e. Other joints indicated below.
  - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. Other joints indicated below.
  - 3. Do not seal the following types of joints:
    - a. Intentional weep holes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover, or some other type of sealing device.



- c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
  - d. Joints where installation of sealant is specified in another section.
  - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
- 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, noncuring.
  - 2. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
- 1. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
- D. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.

### 2.03 JOINT SEALANTS - GENERAL

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

### 2.04 NONSAG JOINT SEALANTS

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: 1 inch, minimum.
  - 2. Nonstaining to Porous Stone: Nonstaining to light-colored natural stone when tested in accordance with ASTM C1248.
  - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  - 4. Color: To be selected by Architect from manufacturer's standard range.
  - 5. Service Temperature Range: Minus 20 to 180 degrees F (Minus 29 to 82 degrees C).
  - 6. Products:
    - a. Dow; DOWSIL 756 SMS Building Sealant: [www.dow.com/#sle](http://www.dow.com/#sle).
    - b. Dow; DOWSIL 790 Silicone Building Sealant: [www.dow.com/#sle](http://www.dow.com/#sle).
    - c. Pecora Corporation; Pecora 890 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - d. Sika Corporation; Sikasil WS-290: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
    - e. Tremco Commercial Sealants & Waterproofing; Tremsil 400: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - f. Substitutions: See Section 016000 - Product Requirements.
- B. Silicone Sealant: ASTM C920, Uses S and T; single-component, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
- 1. Movement Capability: Plus 100 percent and minus 50 percent, minimum.
  - 2. Color: To be selected by Architect from manufacturer's standard range.
  - 3. Products:
    - a. Dow; DOWSIL 888 Silicone Joint Sealant: [www.dow.com/#sle](http://www.dow.com/#sle).
    - b. Pecora Corporation; Pecora PCS: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - c. Tremco Commercial Sealants & Waterproofing; Spectrem 800: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
- 1. Color: White.
  - 2. Products:
    - a. Pecora Corporation; Pecora 898 NST (Non-Staining Technology): [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - b. Sika Corporation; Sikasil GP: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).

- c. Substitutions: See Section 016000 - Product Requirements.
- D. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's standard range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Products:
    - a. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - b. Sika Corporation; Sikaflex-1a: [www.usa.sika.com/#sle](http://www.usa.sika.com/#sle).
    - c. Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- E. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 20 to 30, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's standard range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
  - 5. Products:
    - a. Mapei; Mapeiflex P2 NS: [www.mapei.com/#sle](http://www.mapei.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
- F. Epoxy Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Hardness Range: 65 to 75, Shore D, when tested in accordance with ASTM C661.
  - 2. Color: To be selected by Architect from manufacturer's standard range.
  - 3. Service Temperature Range: 40 to 120 degrees F (4 to 49 degrees C).
  - 4. Products:
    - a. Pecora Corporation; DynaPoxy EP-1200 Two-Part Epoxy Security Sealant: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
- G. Noncuring Butyl Sealant: Solvent-based, single component, nonsag, nonskinning, nonhardening, nonbleeding; nonvapor permeable; intended for fully concealed applications.
  - 1. Products:
    - a. Pecora Corporation; Pecora BA-98 Non-Skinning Butyl Sealant: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - b. Tremco Commercial Sealants & Waterproofing; Acoustical/Curtainwall Sealant: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.

## 2.05 SELF-LEVELING JOINT SEALANTS

- A. Self-Leveling Polyurethane Sealant for Horizontal Expansion Joints: ASTM C920, Grade P, Uses T, M and O; multi-component; explicitly approved by manufacturer for horizontal expansion joints.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 30 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's standard range.
  - 4. Tensile Strength: 200 to 250 psi (1.38 to 1.72 MPa) in accordance with ASTM D412.
  - 5. Products:
    - a. Tremco Commercial Sealants & Waterproofing; THC-901: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.

## **2.06 ACCESSORIES**

- A. Sealant Backing Materials, General: Materials placed in joint before applying sealants; assists sealant performance and service life by developing optimum sealant profile and preventing three-sided adhesion; type and size recommended by sealant manufacturer for compatibility with sealant, substrate, and application.
- B. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
  - 5. Products:
    - a. Nomaco, Inc: [www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
- C. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- D. Masking Tape: Self-adhesive, nonabsorbent, nonstaining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- E. Joint Cleaner: Noncorrosive and nonstaining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- F. Primers: Type recommended by sealant manufacturer to suit application; nonstaining.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

### **3.03 INSTALLATION**

- A. Install this work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Provide joint sealant installations complying with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

#### **3.04 POST-OCCUPANCY**

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width, i.e., at low temperature in thermal cycle. Report failures immediately and repair them.

**END OF SECTION**

**SECTION 079513**  
**EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Expansion joint cover assemblies for wall surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 092116 - Gypsum Board Assemblies: Placement of expansion joint assemblies in gypsum board walls and ceilings.

**1.03 REFERENCE STANDARDS**

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- C. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles; 2020.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Installation Templates: For frames and anchors to be embedded in concrete or masonry, furnish templates to relevant installers; include installation instructions and tolerances.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Expansion Joint Cover Assemblies:
  - 1. Balco, Inc: [www.balcousa.com/#sle](http://www.balcousa.com/#sle).
  - 2. Construction Specialties, Inc: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.

**2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS**

- A. Interior Wall/Ceiling Joints Subject to Thermal Movement:
  - 1. Manufacturers:
    - a. Balco, Inc; WD Wall and Ceiling Snap-On Joint Cover: [www.balcousa.com/#sle](http://www.balcousa.com/#sle).
    - b. Construction Specialties, Inc; Allway Standard Wall and Ceiling Covers: [www.c-sgroup.com/#sle](http://www.c-sgroup.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.
- B. Exterior Wall Joints Subject to Seismic Movement:
  - 1. Manufacturers:
    - a. Balco, Inc; 9WC-1: [www.balcousa.com/#sle](http://www.balcousa.com/#sle).

**2.03 EXPANSION JOINT COVER ASSEMBLIES**

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
  - 1. Joint Dimensions and Configurations: As indicated on drawings.

2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

#### **2.04 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
  1. Exposed Finish Outdoors: Natural anodized.
  2. Exposed Finish at Walls and Ceilings: Natural anodized.
- B. Resilient Seals:
  1. For Ceilings: Any resilient material, flush, pleated, or hollow gasket.
  2. Color: Gray.
- C. Anchors and Fasteners: As recommended by cover manufacturer.
- D. Ferrous Metal Anchors: Galvanized where embedded in concrete or in contact with cementitious materials.
- E. Threaded Fasteners: Aluminum.
- F. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

#### **PART 3 EXECUTION**

##### **3.01 EXAMINATION**

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

##### **3.02 INSTALLATION**

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

##### **3.03 PROTECTION**

- A. Do not permit traffic over unprotected floor joint surfaces.
- B. Provide strippable coating to protect finish surface.

**END OF SECTION**

**SECTION 081416**  
**FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush and flush glazed configuration; non-rated.

**1.02 RELATED REQUIREMENTS**

- A. Section 062000 - Finish Carpentry: Wood door frames.
- B. Section 087100 - Door Hardware.
- C. Section 088000 - Glazing.
- D. Section 099300 - Staining and Transparent Finishing: Field finishing of doors.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- C. ANSI A208.1 - American National Standard for Particleboard; 2009.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- F. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- G. AWI (QCP) - Quality Certification Program; current edition at [www.awiqcp.org](http://www.awiqcp.org).
- H. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- I. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- J. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. ITS (DIR) - Directory of Listed Products; current edition.
- L. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- M. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.
- N. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2018.
- O. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Q. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.
- R. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
  - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Specimen warranty.
- G. Warranty, executed in Owner's name.

#### **1.05 QUALITY ASSURANCE**

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than five years of documented experience.
  - 1. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- D. Woodwork Quality Assurance Program:
  - 1. Provide labels indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
  - 2. Provide designated labels on shop drawings as required by quality assurance program.
  - 3. Provide designated labels on installed products as required by quality assurance program.
  - 4. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

#### **1.07 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide manufacturer's warranty on interior doors for the life of the installation. Complete forms in Owner's name and register with manufacturer.
  - 1. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.
- C. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
  - 1. Eggers Industries: [www.eggersindustries.com/#sle](http://www.eggersindustries.com/#sle).
  - 2. Graham Wood Doors: [www.grahamdoors.com/#sle](http://www.grahamdoors.com/#sle).
  - 3. VT Industries, Inc: [www.vtindustries.com/#sle](http://www.vtindustries.com/#sle).
  - 4. Masonite Architectural/Marshfield/Algoma: [www.marshfielddoors.com/#sle](http://www.marshfielddoors.com/#sle).
  - 5. Substitutions: See Section 016000 - Product Requirements.

#### **2.02 DOORS AND PANELS**

- A. Doors: See drawings for locations and additional requirements.
  - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
  - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.



- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location.
  - 2. Wood veneer facing for field transparent finish.

### **2.03 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

### **2.04 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: Red Oak (Verify and match existing), veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Same species as face veneer.
  - 2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.
- B. Facing Adhesive: Type I - waterproof.

### **2.05 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge for hardware reinforcement.
  - 2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

### **2.06 ACCESSORIES**

- A. Wood Door Frames: See Section 062000.
- B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
  - 1. Size: As indicated on drawings.
  - 2. Frame Material: 18 gauge, 0.0478 inch (1.21 mm), galvanized steel.
  - 3. Metal Finish: Beige polyester powder coating.
- C. Glazing: See Section 088000.
- D. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Field-Finished Doors: Trimming to fit is acceptable.

1. Adjust width of non-rated doors by cutting equally on both jamb edges.
  2. Trim maximum of 3/4 inch (19 mm) off bottom edges.
- C. Use machine tools to cut or drill for hardware.
  - D. Coordinate installation of doors with installation of frames and hardware.
  - E. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**END OF SECTION**

**SECTION 084313**  
**ALUMINUM-FRAMED STOREFRONTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed storefront, with vision glass.
- B. Infill panels of glass.
- C. Aluminum doors and frames.
- D. Weatherstripping.

**1.02 RELATED REQUIREMENTS**

- A. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 087100 - Door Hardware: Hardware items other than specified in this section.
- C. Section 088000 - Glazing: Glass and glazing accessories.

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- J. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- K. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- L. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
  - 1. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

#### **1.08 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

#### **1.09 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.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Aluminum-Framed Storefronts:
  - 1. Kawneer North America: [www.kawneer.com/#sle](http://www.kawneer.com/#sle).
  - 2. Oldcastle BuildingEnvelope: [www.oldcastlebe.com/#sle](http://www.oldcastlebe.com/#sle).
  - 3. Tubelite, Inc: [www.tubeliteinc.com/#sle](http://www.tubeliteinc.com/#sle).
  - 4. C.R. Laurence Company, Inc; U.S. Aluminum Series 400/400-S.
  - 5. Substitutions: See Section 016000 - Product Requirements.

#### **2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING**

#### **2.03 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING**

- A. Center-Set Style:
  - 1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 400/400-S: [www.crl-arch.com/#sle](http://www.crl-arch.com/#sle).

2. Vertical Mullion Dimensions: 1-3/4 inches wide by 4-1/2 inches deep (44 mm wide by 114 mm deep).

#### **2.04 BASIS OF DESIGN -- SWINGING DOORS**

- A. Wide Stile, Insulating Glazing, Thermally-Broken:
  1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 550-T Wide Stile Thermal Door: [www.crl-arch.com/#sle](http://www.crl-arch.com/#sle).

#### **2.05 ALUMINUM-FRAMED STOREFRONT**

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  1. Finish: Superior performing organic coatings.
    - a. Factory finish all surfaces that will be exposed in completed assemblies.
    - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
    - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
  2. Finish Color: Clean Anodized Aluminum.
  3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
  6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
  7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
  8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements
  1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
    - a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
  2. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf (75 Pa) pressure difference.

#### **2.06 COMPONENTS**

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
  1. Glazing Stops: Flush.
  2. Cross-Section: 2 by 4-1/2 inch (51 by 114 mm) nominal dimension.
- B. Glazing: See Section 088000.

#### **2.07 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209/B209M.

- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- E. Fasteners: Stainless steel.
- F. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.
- G. Concealed Flashings: Galvanized steel, 26 gauge, 0.0179 inch (0.45 mm) minimum base metal thickness.
- H. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- I. Sealant for Setting Thresholds: Non-curing butyl type.
- J. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- K. Glazing Accessories: See Section 088000.
- L. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.
- M. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

## **2.08 FINISHES**

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.
- B. Pigmented Organic Coatings: AAMA 2603; polyester or acrylic baked enamel finish.
- C. Color: Clear.
- D. Touch-Up Materials: As recommended by coating manufacturer for field application.

## **2.09 HARDWARE**

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Other Door Hardware: See Section 087100.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
- E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

### **3.02 INSTALLATION**

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install glass and infill panels using glazing method required to achieve performance criteria; see Section 088000.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet (1.5 mm per m) non-cumulative or 0.06 inch per 10 feet (1.5 mm per 3 m), whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

### **3.04 ADJUSTING**

- A. Adjust operating hardware for smooth operation.

### **3.05 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

### **3.06 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

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**SECTION 085200**  
**WOOD WINDOWS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Factory-fabricated wood windows.
- B. Glazing.
- C. Operating hardware.
- D. Insect screens.
- E. Wood trim for exterior finishing.
- F. Internal Blinds

**1.02 RELATED REQUIREMENTS**

- A. Section 061000 - Rough Carpentry: Wood perimeter shims.
- B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 088000 - Glazing.
- D. Section 099123 - Interior Painting: Site finishing wood surfaces.

**1.03 REFERENCE STANDARDS**

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for windows, doors, and skylights; 2017.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Show component dimensions, anchorage and fasteners, glass, and internal drainage details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.
- D. Samples: Two samples 3 1/2 by 3 1/2 inch (90 by 90 mm) in size illustrating factory finished surfaces.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

**1.06 FIELD CONDITIONS**

- A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C).
- B. Maintain this minimum temperature during and after installation of sealants.

**1.07 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.
- C. Manufacturer Warranty: Provide 5-year manufacturer warranty for insulated glass units against seal failure, interpane dusting or misting, and replacement of same. Complete forms in Owner's name and register with manufacturer.
- D. Manufacturer Warranty: Provide 2-year manufacturer warranty against defects listed. Complete forms in Owner's name and register with manufacturer or warrantor.
  - 1. Degradation of color finish.
  - 2. Delamination or separation of finish cladding from window member.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Wood Windows:
  - 1. Andersen Windows, Inc: [www.andersenwindows.com/#sle](http://www.andersenwindows.com/#sle).
  - 2. Pella Corp: [www.pellacommercial.com/#sle](http://www.pellacommercial.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Aluminum Clad Wood Windows:
  - 1. Andersen Windows, Inc; E-Series Casement Windows: [www.andersenwindows.com/#sle](http://www.andersenwindows.com/#sle).
  - 2. Pella Corporation; Architect Series Reserve: [www.pellacommercial.com/#sle](http://www.pellacommercial.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.

### **2.02 EXTERIOR OFFICE ALUMINUM CLAD WOOD WINDOWS**

- A. Wood Windows: Wood frame and sash, factory fabricated and assembled.
  - 1. Exterior Finish: Metal clad, painted.
  - 2. Interior Finish: Unfinished, for transparent finish.
  - 3. Color: As selected by Architect from manufacturer's standard range.
  - 4. Configuration: As indicated on drawings. Window types AW1, AW2, and AW3.
  - 5. Wood Species: Red Oak, verify and match existing, preservative treated using treatment type suitable for required finish.
  - 6. Metal Cladding: Formed aluminum, factory finished, factory fit to profile of wood members.
  - 7. Transparent Finish: Scarf joints permitted if wood matches in color and grain texture.
  - 8. Weather Stop Flange: Continuous at perimeter of unit.
  - 9. Fasteners: Concealed from view.
  - 10. Blinds: Internal operable blinds by manufacturer.

### **2.03 EXTERIOR SHOP ALUMINUM CLAD WOOD WINDOWS**

- A. Wood Windows: Wood frame and sash, factory fabricated and assembled.
  - 1. Exterior Finish: Metal clad, painted.
  - 2. Interior Finish: Same as exterior.
  - 3. Color: As selected by Architect from manufacturer's standard range.
  - 4. Configuration: As indicated on drawings. Window type AW4.
  - 5. Metal Cladding: Formed aluminum, factory finished, factory fit to profile of wood members.
  - 6. Weather Stop Flange: Continuous at perimeter of unit.
  - 7. Fasteners: Concealed from view.
  - 8. Insect Screen: Locate on inside of windows.
  - 9. Operable Units: Double weatherstripped.
  - 10. Blinds: None.

### **2.04 INTERIOR WOOD WINDOWS**

- A. Wood Windows: Wood frame and sash, factory fabricated and assembled.
  - 1. Exterior Finish: Unfinished, for transparent finish.
  - 2. Interior Finish: Unfinished, for transparent finish.
  - 3. Configuration: As indicated on drawings. Window type WW1.
  - 4. Wood Species: Red Oak, verify and match existing, preservative treated using treatment type suitable for required finish.
  - 5. Transparent Finish: Scarf joints permitted if wood matches in color and grain texture.
  - 6. Fasteners: Concealed from view.
  - 7. Blinds: Internal operable blinds by manufacturer.

### **2.05 COMPONENTS**

- A. Type IG-2 - Exterior Glazing: Triple glazed, gray tinted, Low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions.
- B. Interior Glazing: Single panel safety glass, Clear, with glass thickness as recommended by manufacturer.

- C. Frames: 1 1/2 inch (38 mm) wide by 5 inch (127 mm) deep profile; flush formed metal glass stops to match cladding of screw fastened type, sloped for positive drainage.
- D. Mullions: 2 1/2" inch (38 mm) wide by 5 inch (127 mm) deep profile.
- E. Insect Screens: Extruded aluminum frame with mitered and reinforced corners; screen mesh taut and secure to frame; secured to window with adjustable supports allowing screen removal without use of tools.
  - 1. Supports: Spring-loaded steel pins; four per screen unit.
  - 2. Screen Mesh: Vinyl-coated fiberglass, window manufacturer's standard mesh.
  - 3. Frame Finish: Baked enamel, color to match window interior color.
- F. Operable Sash Weatherstripping: Wool pile; permanently resilient, profiled to effect weather seal.
- G. Fasteners: Stainless steel.
- H. Sealant and Backing Materials: See Section 079200 of types as indicated.
- I. Wood for Casings and Trim: Clear Match existing wood species, clear preservative treated, of type suitable for required finish.
  - 1. Scarf joints permitted in transparent finished exposed surfaces only if color and grain texture match.
- J. Flashing: Provide related flashings, with necessary anchors and attachment devices.
- K. Blinds:
  - 1. 15 mm aluminum slat raise and lower blinds with polyester cord ladder.
  - 2. Installed in triple-pane glazing systems between panes of glass.
  - 3. Operated with cordless operator.
  - 4. Controlled by built-in operating mechanism.

## **2.06 PERFORMANCE REQUIREMENTS**

- A. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 requirements for the specific window type in accordance with the following:
  - 1. Performance Class (PC): R.
- B. Design Pressure (DP): In accordance with applicable codes.
- C. Overall Thermal Transmittance (U-value): 0.36, maximum, including glazing, measured on window sizes required for this project.

## **2.07 HARDWARE**

- A. Horizontal Sliding Sash: Extruded PVC interfacing tracks, limit stops in head and sill track.
- B. Sash lock: Lever handle with cam lock.

## **2.08 ALUMINUM FINISHES**

- A. High Performance Organic Coatings: AAMA 2604, multiple coats, thermally cured fluoropolymer system.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install windows in accordance with manufacturer's instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

### **3.02 TOLERANCES**

- A. Maximum Variation from Level or Plumb: 1/16 inch per 3 ft (1.6 mm per m) non-cumulative or 1/8 inch per 10 ft (3.2 mm per 3 m), whichever is less.

### **3.03 CLEANING**

- A. Remove protective material from factory finished surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

**END OF SECTION**

**SECTION 087100**  
**DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for aluminum doors.
- B. Thresholds.
- C. Weatherstripping and gasketing.

**1.02 RELATED REQUIREMENTS**

- A. Section 079200 - Joint Sealants: Sealants for setting exterior door thresholds.
- B. Section 084313 - Aluminum-Framed Storefronts: Door hardware, except as noted in section.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. BHMA (CPD) - Certified Products Directory; 2017.
- C. BHMA A156.1 - American National Standard for Butts and Hinges; 2016.
- D. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2017.
- E. BHMA A156.3 - American National Standard for Exit Devices; 2014.
- F. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- G. BHMA A156.6 - American National Standard for Architectural Door Trim; 2015.
- H. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2016.
- I. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.
- J. BHMA A156.20 - American National Standard for Strap and Tee Hinges, and Hasps; 2006 (Reaffirmed 2012).
- K. BHMA A156.21 - American National Standard for Thresholds; 2014.
- L. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2017.
- M. BHMA A156.30 - American National Standard for High Security Cylinders; 2014.
- N. DHI (H&S) - Sequence and Format for the Hardware Schedule; 1996.
- O. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- P. ITS (DIR) - Directory of Listed Products; current edition.
- Q. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- R. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- S. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2016.
- T. UL (DIR) - Online Certifications Directory; Current Edition.
- U. UL 437 - Standard for Key Locks; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

## 1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
  - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
  - 3. List groups and suffixes in proper sequence.
  - 4. Provide complete description for each door listed.
  - 5. Provide manufacturer name, product names, and catalog numbers; include functions, types, styles, sizes and finishes of each item.
  - 6. Include account of abbreviations and symbols used in schedule.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
  - 1. Submit manufacturer's parts lists and templates.
  - 2. Bitting List: List of combinations as furnished.
- F. Keying Schedule:
  - 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- G. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- I. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Lock Cylinders: Ten for each master keyed group.
  - 3. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

## 1.06 QUALITY ASSURANCE

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.
- D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

## 1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.

- B. Manufacturer's Warranty: Provide warranty against defects in material and workmanship for period indicated. Complete forms in Owner's name and register with manufacturer.
  - 1. Closers: Five years, minimum.
  - 2. Exit Devices: Three years, minimum.
  - 3. Locksets and Cylinders: Three years, minimum.
  - 4. Other Hardware: Two years, minimum.

## **PART 2 PRODUCTS**

### **2.01 DESIGN AND PERFORMANCE CRITERIA**

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards and ICC A117.1.
  - 3. Applicable provisions of NFPA 101.
  - 4. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
  - 5. Listed and certified compliant with specified standards by BHMA (CPD).
  - 6. Auxiliary Hardware: BHMA A156.16.
  - 7. Straps and Tee Hinges: BHMA A156.20.
- D. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. Refer to Door Hardware Schedule.
- E. Fasteners:
  - 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
    - a. Aluminum fasteners are not permitted.
    - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
  - 2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
    - a. Self-drilling (Tek) type screws are not permitted.
  - 3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
  - 4. Provide wall grip inserts for hollow wall construction.
  - 5. Provide spacers or sex bolts with sleeves for through bolting of hollow metal doors and frames.
  - 6. Fire-Rated Applications: Comply with NFPA 80.
    - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
    - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
  - 7. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated.

### **2.02 HINGES**

- A. Manufacturers:
  - 1. McKinney; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. C. R. Laurence Co., Inc: [www.crl-arch.com/#sle](http://www.crl-arch.com/#sle).
  - 3. Hager Companies: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
- B. Hinges: Comply with BHMA A156.1, Grade 1.
  - 1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
    - a. Provide hinge width required to clear surrounding trim.
  - 2. Provide hinges on every swinging door.

3. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
4. Provide ball-bearing hinges at each door with closer.
5. Provide non-removable pins on exterior outswinging doors.
6. Provide non-removable pins on interior outswinging doors at locations as indicated.
7. Provide following quantity of butt hinges for each door:
  - a. Doors up to 60 inches (1.5 m) High: Two hinges.
  - b. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
  - c. Doors 90 inches (2.3 m) High up to 120 inches (3 m) High: Four hinges.
  - d. Doors over 120 inches (3 m) High: One additional hinge per each additional 30 inches (762 mm) in height.

### **2.03 EXIT DEVICES**

- A. Manufacturers:
  1. Von Duprin, an Allegion brand: [www.allegion.com/us/#sle](http://www.allegion.com/us/#sle).
- B. Exit Devices: Comply with BHMA A156.3, Grade 1.
  1. Lever design to match lockset trim.
  2. Provide cylinder with cylinder dogging or locking trim.
  3. Provide exit devices properly sized for door width and height.
  4. Provide strike as recommended by manufacturer for application indicated.
  5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.
  6. For electrical options, provide quick connect plug-in pre-wired connectors.

### **2.04 LOCK CYLINDERS**

- A. Manufacturers:
  1. Basis of Design: Corbin-Russwin.
  2. Substitutions: See Section 016000 - Product Requirements.
- B. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
  1. Provide high security mechanical type cylinders, Grade 1, with six-pin core in compliance with BHMA A156.30 or UL 437 at locations indicated.
  2. Provide cylinders from same manufacturer as locking device.
  3. Provide cams and/or tailpieces as required for locking devices.
  4. Verify and match existing latch and cylinder manufacturer.

### **2.05 CYLINDRICAL LOCKS**

- A. Manufacturers:
  1. Corbin Russwin; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. Schlage, an Allegion brand: [www.allegion.com/us/#sle](http://www.allegion.com/us/#sle).
  3. Substitutions: See Section 016000 - Product Requirements.
- B. Cylindrical Locks (Bored): Comply with BHMA A156.2, Grade 1, 4000 Series.
  1. Bored Hole: 2-1/8 inch (54 mm) diameter.
  2. Latchbolt Throw: 1/2 inch (12.7 mm), minimum.
  3. Backset: 2-3/4 inch (70 mm) unless otherwise indicated.
  4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
    - a. Finish: To match lock or latch.
    - b. Flat-Lip Strikes: Provide for locks with three piece antifriction latchbolts as recommended by manufacturer.
    - c. Extra-Long-Lip Strikes: Provide for locks used on frames with applied wood casing trim.
    - d. Aluminum-Frame Strike Box: Provide strike box fabricated for use with aluminum framing by framing manufacturer.
    - e. Rabbet Front and Strike: Provide on locksets for use with rabbeted meeting rails.
  5. Provide a lock for each door, unless otherwise indicated that lock is not required.



6. Provide an office lockset for swinging door where hardware set is not indicated.
7. Trim: Provide lever handle or pull trim on outside of each lock, unless otherwise indicated.

## **2.06 DOOR PULLS AND PUSH PLATES**

- A. Manufacturers:
  1. Rockwood; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. Hager Companies: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
  3. Hiawatha, Inc, division of Activar Construction Products Group, Inc: [www.activarcpg.com/hiawatha/#sle](http://www.activarcpg.com/hiawatha/#sle).
  4. Substitutions: See Section 016000 - Product Requirements.
- B. Door Pulls and Push Plates: Comply with BHMA A156.6.
  1. Pull Type: Straight, unless otherwise indicated.
  2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
    - a. Edges: Beveled, unless otherwise indicated.
  3. Material: Aluminum, unless otherwise indicated.

## **2.07 CLOSERS**

- A. Manufacturers; Surface Mounted:
  1. Corbin Russwin, Norton, Rixson, Sargent, or Yale; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. C. R. Laurence Company, Inc: [www.crl-arch.com/#sle](http://www.crl-arch.com/#sle).
  3. Hager Companies: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
  4. LCN, an Allegion brand: [www.allegion.com/us/#sle](http://www.allegion.com/us/#sle).
- B. Closers: Comply with BHMA A156.4, Grade 1.
  1. Type: Surface mounted to door.
  2. Provide door closer on each exterior door.
  3. Provide door closer on each fire-rated and smoke-rated door.
    - a. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
  4. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
  5. At corridor entry doors, mount closer on room side of door.
  6. At outswinging exterior doors, mount closer on interior side of door.

## **2.08 WALL STOPS**

- A. Manufacturers:
  1. Rockwood; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  2. Hager Companies: [www.hagerco.com/#sle](http://www.hagerco.com/#sle).
  3. Hiawatha, Inc, division of Activar Construction Products Group, Inc: [www.activarcpg.com/hiawatha/#sle](http://www.activarcpg.com/hiawatha/#sle).
  4. Trimco: [www.trimcohardware.com/#sle](http://www.trimcohardware.com/#sle).
- B. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
  1. Provide wall stops to prevent damage to wall surface upon opening door.
  2. Type: Bumper, concave, wall stop.
  3. Material: Aluminum housing with rubber insert.

## **2.09 THRESHOLDS**

- A. Thresholds: Comply with BHMA A156.21.
  1. Provide threshold at each exterior door, unless otherwise indicated.
  2. Type: Flat surface.
  3. Material: Aluminum.
  4. Threshold Surface: Fluted horizontal grooves across full width.
  5. Field cut threshold to profile of frame and width of door sill for tight fit.
  6. Provide non-corroding fasteners at exterior locations.

## **2.10 WEATHERSTRIPPING AND GASKETING**

- A. Manufacturers:
  - 1. Pemko; an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. National Guard Products, Inc: [www.ngpinc.com/#sle](http://www.ngpinc.com/#sle).
  - 3. Reese Enterprises, Inc: [www.reeseusa.com/#sle](http://www.reeseusa.com/#sle).
- B. Weatherstripping and Gasketing: Comply with BHMA A156.22.
  - 1. Head and Jamb Type: Adjustable.
  - 2. Door Sweep Type: Encased in retainer.
  - 3. Material: Aluminum, with brush weatherstripping.

## **2.11 FINISHES**

- A. Finishes: Identified in Door Hardware Schedule.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware for smoke and draft control doors in accordance with NFPA 105.
- C. Use templates provided by hardware item manufacturer.
- D. Do not install surface mounted items until application of finishes to substrate are fully completed.
- E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Schedule or on drawings.
  - 1. For Aluminum-Framed Storefront Doors and Frames: See Section 084313.
  - 2. Mounting heights in compliance with ADA Standards:
    - a. Locksets: 40-5/16 inch (1024 mm).
    - b. Push Plates/Pull Bars: 42 inch (1067 mm).
    - c. Deadlocks (Deadbolts): 48 inch (1219 mm).
    - d. Exit Devices: 40-5/16 inch (1024 mm).
    - e. Door Viewer: 43 inch (1092 mm); standard height 60 inch (1524 mm).
- F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing under provisions of Section 014000 - Quality Requirements.
- B. Provide an Architectural Hardware Consultant (AHC) to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

### **3.04 ADJUSTING**

- A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Adjust hardware for smooth operation.
- C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.05 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

- B. Clean adjacent surfaces soiled by hardware installation.
- C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

**3.06 PROTECTION**

- A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

**END OF SECTION**

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## SECTION 088000

### GLAZING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds.

##### 1.02 RELATED REQUIREMENTS

- A. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 084313 - Aluminum-Framed Storefronts: Glazing provided as part of storefront assembly.
- C. Section 085200 - Wood Windows: Glazing provided by window manufacturer.

##### 1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- H. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- I. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- J. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.
- L. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.
- M. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- N. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.
- O. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- P. GANA (SM) - GANA Sealant Manual; 2008.
- Q. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- R. IGMA TB-3001 - Guidelines for Sloped Glazing; 2001.
- S. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- T. ITS (DIR) - Directory of Listed Products; current edition.
- U. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.

- V. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).
- W. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.
- X. UL (DIR) - Online Certifications Directory; Current Edition.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch (305 by 305 mm) in size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Insulating Glass Units: One of each glass size and each glass type.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

#### **1.07 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### **1.08 WARRANTY**

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Glass Fabricators:
  - 1. Viracon, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  - 2. Oldcastle Building Envelope [www.obe.com](http://www.obe.com).
  - 3. Substitutions: Refer to Section 016000 - Product Requirements.
- B. Float Glass Manufacturers:
  - 1. Cardinal Glass Industries: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  - 2. Guardian Glass, LLC: [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).
  - 3. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  - 4. Oldcastle Building Envelope [www.obe.com](http://www.obe.com).

5. Substitutions: Refer to Section 016000 - Product Requirements.

## **2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES**

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  1. Design Pressure: Calculated in accordance with ASCE 7.
  2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
  1. In conjunction with weather barrier related materials described in other sections, as follows:
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  3. Solar Optical Properties: Comply with NFRC 300 test method.

## **2.03 GLASS MATERIALS**

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
  5. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.

## **2.04 INSULATING GLASS UNITS**

- A. Manufacturers:
  1. Glass: Any of the manufacturers specified for float glass.
  2. Fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
  3. Guardian Glass, LLC: [www.guardianglass.com/#sle](http://www.guardianglass.com/#sle).
  4. Pilkington North America Inc: [www.pilkington.com/na/#sle](http://www.pilkington.com/na/#sle).
  5. Viracon, Apogee Enterprises, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  6. Vitro Architectural Glass (formerly PPG Glass): [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  7. Substitutions: See Section 016000 - Product Requirements.
- B. Insulating Glass Units: Types as indicated.
  1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Warm-Edge Spacers: Polypropylene and stainless steel.
    - a. Spacer Width: As required for specified insulating glass unit.
    - b. Spacer Height: Manufacturer's standard.
  4. Spacer Color: Black.
  5. Edge Seal:

- a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
    - b. Color: Black.
  - 6. Purge interpane space with dry air, hermetically sealed.
  - 7. Capillary Tubes: Provide tubes from air space for insulating glass units without inert type gas that have a change of altitude greater than 2500 feet (762 m) between point of fabrication and point of installation to permit pressure equalization of air space.
    - a. Capillary Tubes: Tubes to remain open and be of length and material type in accordance with insulating glass fabricator's requirements.
    - b. Inert gas may be installed in the field into air space in accordance with insulating glass fabricator's and installer's requirements.
- C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
  - 1. Applications: Exterior glazing unless otherwise indicated.
  - 2. Space between lites filled with argon.
  - 3. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Gray, match adjacent..
  - 4. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
    - a. Tint: Clear.
    - b. Coating: Low E coating, on #3 surface.
  - 5. Total Thickness: 1 inch (25.4 mm).
  - 6. Thermal Transmittance (U-Value): 0.24, nominal.
  - 7. Glazing Method: Dry glazing method, gasket glazing.
- D. Type IG-2- Insulating Glass Units: Vision glass, triple glazed.
  - 1. Applications: Exterior glazing as indicated on drawings
  - 2. Glass and Glazing Materials: See Section 085200.

## 2.05 GLAZING UNITS

- A. Monolithic Interior Vision Glazing:
  - 1. Applications: Interior glazing unless otherwise indicated.
  - 2. Glass Type: Annealed float glass.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch (6.4 mm), nominal.
- B. Monolithic Safety Glazing: Non-fire-rated.
  - 1. Applications:
    - a. Glazed lites in doors, except fire doors.
    - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
    - c. Other locations required by applicable federal, state, and local codes and regulations.
    - d. Other locations indicated on drawings.
  - 2. Glass Type: Fully tempered safety glass as specified.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch (6.4 mm), nominal.

## 2.06 GLAZING COMPOUNDS

- A. Type GC-1 - Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; gray color.
- B. Type GC-2 - Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Type GC-3 - Polysulfide Sealant: Two component; chemical curing, nonsagging type; ASTM C920, Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.



- D. Type GC-4 - Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.
- E. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- F. Manufacturers:
  - 1. Dow Corning Corporation: [www.dowcorning.com/construction/#sle](http://www.dowcorning.com/construction/#sle).
  - 2. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 3. Tremco Commercial Sealants & Waterproofing; Proglaze SSG: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
  - 4. Substitutions: See Section 016000 - Product Requirements.

## 2.07 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch (75 mm) long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
  - 1. Width: As required for application.
  - 2. Thickness: As required for application.
  - 3. Spacer Rod Diameter: As required for application.
  - 4. Manufacturers:
    - a. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
    - b. Tremco Global Sealants: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
    - c. Substitutions: See Section 016000 - Product Requirements.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

## PART 3 EXECUTION

### 3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### **3.03 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

### **3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### **3.05 FIELD QUALITY CONTROL**

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

### **3.06 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### **3.07 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

## SECTION 090561

### COMMON WORK RESULTS FOR FLOORING PREPARATION

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Carpet tile.
- B. Removal of existing floor coverings.
- C. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
  - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- F. Patching compound.
- G. Remedial floor coatings.
- H. Remedial floor sheet membrane.

##### 1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.

##### 1.03 REFERENCE STANDARDS

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2017.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

##### 1.05 SUBMITTALS

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Moisture and alkalinity (pH) limits and test methods.
  - 2. Manufacturer's required bond/compatibility test procedure.
- C. Testing Agency's Report:
  - 1. Description of areas tested; include floor plans and photographs if helpful.
  - 2. Summary of conditions encountered.

3. Moisture and alkalinity (pH) test reports.
  4. Copies of specified test methods.
  5. Recommendations for remediation of unsatisfactory surfaces.
  6. Submit report to Architect.
  7. Submit report not more than two business days after conclusion of testing.
- D. Adhesive Bond and Compatibility Test Report.
- E. Copy of RFCI (RWP).
- F. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
1. Manufacturer's qualification statement.
  2. Manufacturer's statement of compatibility with types of flooring applied over remedial product.
  3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  4. Manufacturer's installation instructions.
  5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

#### **1.06 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.
- B. Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
  2. Confirm date of start of testing at least 10 days prior to actual start.
  3. Allow at least 4 business days on site for testing agency activities.
  4. Achieve and maintain specified ambient conditions.
  5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

#### **1.08 FIELD CONDITIONS**

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any

recommendation from flooring manufacturer, provide a product with the following characteristics:

1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  4. Products:
    - a. LATICRETE International, Inc; SKIM LITE: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. ARDEX Engineered Cements; ARDEX Feather Finish: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
  2. Products:
    - a. ARDEX Engineered Cements; ARDEX MC RAPID: [www.ardexamericas.com/#sle](http://www.ardexamericas.com/#sle).
    - b. LATICRETE International, Inc; LATICRETE NXT Vapor Reduction Coating with LATICRETE NXT Level Plus: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
- D. Remedial Floor Sheet Membrane: Pre-formed multi-ply sheet membrane installed over concrete subfloor and intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
1. Thickness: 28 mil (0.028 inch) (0.711 mm).
  2. Tape: Types recommended by underlayment manufacturer to install membrane and cover seams.
  3. Products:
    - a. GCP Applied Technologies; Kovara MBX: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).

## **PART 3 EXECUTION**

### **3.01 CONCRETE SLAB PREPARATION**

- A. Perform following operations in the order indicated:
1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
    - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
    - b. Removal of existing floor covering.
  2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
    - a. Do not attempt to remove coating or penetrating material.
    - b. Do not abrade surface.
  3. Preliminary cleaning.
  4. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
  5. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  6. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.

7. Specified remediation, if required.
8. Patching, smoothing, and leveling, as required.
9. Other preparation specified.
10. Adhesive bond and compatibility test.
11. Protection.

### **3.02 REMOVAL OF EXISTING FLOOR COVERINGS**

- A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

### **3.03 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

### **3.04 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.
- F. Report: Report the information required by the test method.

### **3.05 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

### **3.06 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
- C. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.

- D. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

### **3.07 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with requirements and recommendations of floor covering manufacturer.
- C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D. Do not fill expansion joints, isolation joints, or other moving joints.

### **3.08 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

### **3.09 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.

### **3.10 INSTALLATION OF REMEDIAL FLOOR SHEET MEMBRANE**

- A. Install in accordance with sheet membrane manufacturer's instructions.

### **3.11 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

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**SECTION 092116**  
**GYPSON BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Gypsum wallboard.
- E. Joint treatment and accessories.
- F. Textured finish system.
- G. Water-resistive barrier over exterior wall sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section 054000 - Cold-Formed Metal Framing: Structural steel stud framing.
- B. Section 061000 - Rough Carpentry: Building framing and sheathing.
- C. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.
- D. Section 072100 - Thermal Insulation: Acoustic insulation.
- E. Section 078400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- F. Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016.
- B. AISI S220 - North American Standard for Cold-Formed Steel Framing - Nonstructural Members; 2015.
- C. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing; 2015.
- D. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- E. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2010 (Reaffirmed 2016).
- F. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- H. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- I. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a (Reapproved 2015).
- J. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- K. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2014).
- L. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing; 2003 (Reapproved 2017).
- M. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014, with Editorial Revision (2015).

- N. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.
- O. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2017.
- P. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2017a.
- Q. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- R. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2016.
- S. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- T. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- U. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
- V. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units; 2017a.
- W. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- X. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2018.
- Y. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.
- Z. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- AA. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- AB. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- AC. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.
- AD. GA-600 - Fire Resistance Design Manual; 2015.

#### **1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
  - 1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
- E. Samples: Submit two samples of gypsum board finished with proposed texture application, 12 by 12 inches (300 by 300 mm) in size, illustrating finish color and texture.

### **PART 2 PRODUCTS**

#### **2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
  - 1. See PART 3 for finishing requirements.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

## 2.02 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220 or equivalent.
- B. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clarkwestern Dietrich Building Systems LLC: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.
- C. Structural Steel Framing for Application of Gypsum Board: See Section 054000.
- D. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf (L/120 at 240 Pa).
  - 1. Studs: C-shaped with knurled or embossed faces.
  - 2. Runners: U shaped, sized to match studs.
  - 3. Ceiling Channels: C-shaped.
  - 4. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
  - 5. Furring Members: U-shaped sections, minimum depth of 3/4 inch (19 mm).
- E. Loadbearing Studs for Application of Gypsum Board: As specified in Section 054000.
- F. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
- G. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
  - 1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
  - 2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
  - 3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
  - 4. Deflection and Firestop Track:
    - a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
  - 5. Provide top track preassembled with connection devices spaced to fit stud spacing indicated on drawings; minimum track length of 12 feet (3660 mm).
- H. Non-structural Framing Accessories:
  - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
  - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
  - 3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.

## 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum Company: [www.americangypsum.com/#sle](http://www.americangypsum.com/#sle).
  - 2. CertainTeed Corporation: [www.certainteed.com/#sle](http://www.certainteed.com/#sle).
  - 3. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  - 4. National Gypsum Company: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  - 5. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 6. Substitutions: See Section 016000 - Product Requirements.
- B. Abuse Resistant Wallboard:
  - 1. Surface Abrasion: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
  - 2. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.

3. Soft Body Impact: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
  4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  5. Paper-Faced Type: Gypsum wallboard, as defined in ASTM C1396/C1396M.
  6. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
  7. Unfaced Type: Interior fiber-reinforced gypsum panels, as defined in ASTM C1278/C1278M.
  8. Type: Fire-resistance-rated Type X, UL or WH listed.
  9. Thickness: 5/8 inch (16 mm).
  10. Edges: Tapered.
- C. Backing Board For Wet Areas: One of the following products:
1. Application: Surfaces behind tile in wet areas including Toilet Rooms.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    - a. Thickness: 1/2 inch (12.7 mm).
    - b. Products:
      - 1) USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
      - 2) Substitutions: See Section 016000 - Product Requirements.
  4. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
    - a. Regular Type: Thickness 1/2 inch (12.7 mm).
    - b. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch (16 mm).
    - c. Products:
      - 1) Georgia-Pacific Gypsum; DensShield Tile Backer: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
      - 2) Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Fire-Shield Tile Backer: [www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
      - 3) Substitutions: See Section 016000 - Product Requirements.
- D. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  4. Type: Regular and Type X, in locations indicated.
  5. Type X Thickness: 5/8 inch (16 mm).
  6. Type C Thickness: 1/2 inch (13 mm).
  7. Regular Board Thickness: 1/2 inch (13 mm).
  8. Edges: Tapered.
  9. Products:
    - a. Georgia-Pacific Gypsum; ToughRock Mold-Guard Gypsum Board: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - b. Georgia-Pacific Gypsum; DensArmor Plus: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - c. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond XP Fire-Shield Gypsum Board: [www.goldbondbuilding.com/#sle](http://www.goldbondbuilding.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- E. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
  2. Thickness: 1/2 inch (13 mm).
  3. Edges: Tapered.
  4. Products:

- a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board:  
www.gpgypsum.com/#sle.
- b. Substitutions: See Section 016000 - Product Requirements.

#### 2.04 GYPSUM BOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: 4 inch (102 mm).
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
  - 1. Products:
    - a. Franklin International, Inc; Titebond Acoustical Smoke & Sound Sealant:  
www.titebond.com/#sle.
    - b. Liquid Nails, a brand of PPG Architectural Coatings: www.liquidnails.com/#sle.
    - c. Substitutions: See Section 016000 - Product Requirements.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
  - 1. Corner Beads: Low profile, for 90 degree outside corners.
    - a. Products:
      - 1) CertainTeed Corporation; No-Coat Drywall Corner: www.certainteed.com/#sle.
      - 2) ClarkDietrich; Strait-Flex OS-300: www.clarkdietrich.com/#sle.
      - 3) Trim-Tex, Inc: www.trim-tex.com/#sle.
      - 4) Substitutions: See Section 016000 - Product Requirements.
  - 2. L-Trim with Tear-Away Strip: Sized to fit 1/2 inch (13 mm) thick gypsum wallboard.
    - a. Products:
      - 1) Phillips Manufacturing Co; gripSTIK L-Tear: www.phillipsmfg.com/#sle.
      - 2) Trim-Tex, Inc: www.trim-tex.com/#sle..
      - 3) Substitutions: See Section 016000 - Product Requirements.
  - 3. Architectural Reveal Beads:
    - a. Reveal Depth: 1/2 inch (12 mm).
    - b. Reveal Width: 1 inch (24 mm).
    - c. Shapes: As indicated on drawings.
    - d. Products:
      - 1) Phillips Manufacturing Co; J-400 Reveal Trim: www.phillipsmfg.com/#sle.
      - 2) Trim-Tex, Inc: www.trim-tex.com/#sle.
      - 3) Substitutions: See Section 016000 - Product Requirements.
  - 4. Wall Mounted Deflection Beads: Flexible gasket and bead with 1-1/8 inch (29 mm) flange.
    - a. Products:
      - 1) Trim-Tex, Inc: www.trim-tex.com/#sle.
      - 2) Substitutions: See Section 016000 - Product Requirements.
  - 5. Expansion Joints:
    - a. Type: V-shaped PVC with tear away fins.
    - b. Type: V-shaped metal with factory-installed protective tape.
    - c. Type: Accordion profile with factory-installed protective tape.
    - d. Type: Off-angle inside corner expansion.
    - e. Products:
      - 1) Phillips Manufacturing Co; 093 Expansion Control Joint:  
www.phillipsmfg.com/#sle.
      - 2) Trim-Tex, Inc: www.trim-tex.com/#sle.
      - 3) Substitutions: See Section 016000 - Product Requirements.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
  - 1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners, except as otherwise indicated.

2. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
  3. Ready-mixed vinyl-based joint compound.
  4. Powder-type vinyl-based joint compound.
  5. Chemical hardening type compound.
  6. Joint Compound: Setting type, field-mixed.
- E. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
- F. Abuse Resistant Finishes:
1. Acrylic, integrally colored textured coating.
- G. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- H. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- I. Nails for Attachment to Wood Members: ASTM C514.
- J. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- K. Adhesive for Attachment to Wood, ASTM C557 and Metal:
1. Products:
    - a. Liquid Nails, a brand of PPG Architectural Coatings: [www.liquidnails.com/#sle](http://www.liquidnails.com/#sle).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

### **3.02 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C1007/AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- C. Studs: Space studs at 16 inches on center (at 406 mm on center).
1. Extend partition framing to structure where indicated and to ceiling in other locations.
  2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  3. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track. Provide minimum 1" vertical slip at stud connection to deep leg track each flange. (See Section 092216 Non-Structural Metal Framing.)
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
1. Orientation: Horizontal.
  2. Spacing: As indicated.
- F. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated and to GA-600 requirements.
- G. Blocking: Install wood blocking for support of:
1. Framed openings.

2. Wall-mounted cabinets.
3. Plumbing fixtures.
4. Toilet partitions.
5. Toilet accessories.
6. Wall-mounted door hardware.

### **3.03 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  1. Place one bead continuously on substrate before installation of perimeter framing members.
  2. Place continuous bead at perimeter of each layer of gypsum board.
  3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- E. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- F. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- G. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
  1. Single-Layer Applications: Adhesive application.
  2. Double-Layer Application: Install base layer using screws or nails. Install face layer using adhesive.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
  2. At exterior soffits, not more than 30 feet (10 meters) apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.06 JOINT TREATMENT**

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.
  2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  3. Level 3: Walls to receive textured wall finish.
  4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
  6. Level 0: Temporary partitions.
  7. Level 0: Surfaces indicated to be finished in later stage of project.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
  2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
  3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

### **3.07 TEXTURE FINISH**

- A. Apply finish texture coating by means of roller in accordance with manufacturer's instructions and to match approved sample.

### **3.08 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

### **3.09 PROTECTION**

- A. Protect installed gypsum board assemblies from subsequent construction operations.

**END OF SECTION**



**SECTION 095100**  
**ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.
- C. Supplementary insulation above ceiling.

**1.02 RELATED REQUIREMENTS**

- A. Section 053100 - Steel Decking: Placement of special anchors or inserts for suspension system.
- B. Section 233700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- C. Section 265100 - Interior Lighting: Light fixtures in ceiling system.
- D. Section 284600 - Fire Detection and Alarm: Fire alarm components in ceiling system.

**1.03 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2017.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- E. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

**1.06 QUALITY ASSURANCE**

- A. Fire-Resistive Assemblies: Complete assembly listed and classified by 1 for the fire resistance indicated.
- B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com/#sle](http://www.armstrong.com/#sle).
  - 2. USG; 76755 Eclipse ClimaPlus Ceiling Tile: [www.usg.com/#sle](http://www.usg.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.
- B. Suspension Systems:
  - 1. Same as for acoustical units.
  - 2. Armstrong World Industries, Inc: [www.armstrongceilings.com/#sle](http://www.armstrongceilings.com/#sle).
  - 3. USG Corporation: [www.usg.com/ceilings/#sle](http://www.usg.com/ceilings/#sle).
  - 4. Chicago Metallic; 200 Snap Grid 15/16".

### **2.02 ACOUSTICAL UNITS**

- A. Acoustical Units - General: ASTM E1264, Class A.
  - 1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistive assembly as part of suspension system.
- B. Acoustical Panels:
  - 1. Size: 24 by 24 inches (600 by 600 mm).
  - 2. Panel Edge: Beveled.
  - 3. Surface Pattern: Perforated.
  - 4. Surface Color: White.
  - 5. Suspension System: Exposed grid.
  - 6. Products:
    - a. USG76755 Eclipse ClimaPlus Ceiling Tile.
    - b. Substitutions: See Section 016000 - Product Requirements.

### **2.03 SUSPENSION SYSTEM(S)**

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- B. Exposed Steel Suspension System Type I: Formed steel, commercial quality cold rolled; heavy-duty.
  - 1. Profile: Tee; 15/16 inch (24 mm) wide face.
  - 2. Construction: Double web.
  - 3. Finish: White painted.
  - 4. Products:
    - a. Chicago Metallic 200 Snap Grid 15/16".
    - b. Substitutions: See Section 016000 - Product Requirements.

### **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.
- C. Perimeter Moldings: Same metal and finish as grid.
  - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- D. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.
- F. Touch-up Paint: Type and color to match acoustical and grid units.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- G. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- J. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
- K. Do not eccentrically load system or induce rotation of runners.
- L. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Install with continuous gasket.
  - 2. Use longest practical lengths.
  - 3. Overlap and rivet corners.

### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
- G. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

**SECTION 096500**  
**RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B. Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

**1.03 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2017.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2017.
- C. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2013a.
- D. ASTM F1861 - Standard Specification for Resilient Wall Base; 2016.
- E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Concrete Testing Standard: Submit a copy of ASTM F710.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Flooring Material: 120 square feet (11.15 square meters) of each type and color.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum five years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum five years documented experience.
- C. Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

## 1.07 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

## PART 2 PRODUCTS

### 2.01 TILE FLOORING

- A. Luxuryt Vinyl Tile: Printed film type, with transparent or translucent wear layer; acoustic interlayer or backing.
  - 1. Manufacturers:
    - a. Armstrong Flooring; Unify: [www.armstrongflooring.com/#sle](http://www.armstrongflooring.com/#sle).
    - b. Dal-Tile Corporation; Luxury Vinyl Flooring: [www.daltile.com/#sle](http://www.daltile.com/#sle).
    - c. Karndean Designflooring; Karndean Art Select: [www.karndean.com/#sle](http://www.karndean.com/#sle).
    - d. Mannington Commercial; Color Anchor LVT: [www.manningtoncommercial.com/#sle](http://www.manningtoncommercial.com/#sle).
    - e. J+J Flooring; Make Your Mark LVT: [www.jjflooringgroup.com](http://www.jjflooringgroup.com).
    - f. Substitutions: See Section 016000 - Product Requirements.
  - 2. Minimum Requirements: Comply with ASTM F1700, Class III.
  - 3. Square Tile Size: 18 by 18 inch (457 by 457 mm), nominal.
  - 4. Plank Tile Size: 6 by 36 inch (228 by 1220 mm).
  - 5. Wear Layer Thickness: 0.020 inch (0.50 mm).
  - 6. Total Thickness: 0.12 inch (3 mm).
  - 7. Tile Edge: Straight.
  - 8. Pattern: Groove.
  - 9. Color: To be selected by Architect from manufacturer's full range.

### 2.02 RESILIENT BASE

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; style as scheduled.
  - 1. Manufacturers:
    - a. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
    - b. Substitutions: See Section 016000 - Product Requirements.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
  - 3. Height: 4 inches (100 mm).
  - 4. Thickness: 0.125 inch (3.2 mm).
  - 5. Finish: Satin.
  - 6. Length: Roll.
  - 7. Color: To be selected by Architect from manufacturer's full range.

### 2.03 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with ASTM F710.
  - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

### **3.02 PREPARATION**

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- D. Prohibit traffic until filler is fully cured.
- E. Clean substrate.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints and butt seams tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
  - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
  - 2. Resilient Strips: Attach to substrate using adhesive.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- I. Install flooring in recessed floor access covers, maintaining floor pattern.

### **3.04 INSTALLATION - TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- C. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

### **3.05 INSTALLATION - RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Install base on solid backing. Bond tightly to wall and floor surfaces.

**3.06 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

**3.07 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**



**SECTION 099123**  
**INTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Materials for backpriming woodwork.
- D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Mechanical and Electrical:
    - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
    - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically indicated.
  - 8. Ceramic and other tiles.
  - 9. Brick, architectural concrete, cast stone, integrally colored plaster, and stucco.
  - 10. Glass.
  - 11. Concrete masonry units in utility, mechanical, and electrical spaces.
  - 12. Acoustical materials, unless specifically indicated.
  - 13. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 055000 - Metal Fabrications: Shop-primed items.

**1.03 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

**1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).

- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- G. SSPC-SP 2 - Hand Tool Cleaning; 1982, with Editorial Revision (2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; 2007.
- I. SSPC-SP 13 - Surface Preparation of Concrete; 1997 (Reaffirmed 2003).

#### **1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
  - 2. MPI product number (e.g., MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit two paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
  - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as wood cabinets and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

#### **1.07 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F (18 degrees C) for interior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  - 1. Behr Process Corporation: [www.behr.com/#sle](http://www.behr.com/#sle).
  - 2. Cloverdale Paint, Brand Products of Rodda Paint Company: [www.cloverdalepaint.com/#sle](http://www.cloverdalepaint.com/#sle).
  - 3. Diamond Vogel Paints: [www.diamondvogel.com/#sle](http://www.diamondvogel.com/#sle).
  - 4. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 5. Pratt & Lambert Paints: [www.prattandlambert.com/#sle](http://www.prattandlambert.com/#sle).
  - 6. Rodda Paint Co: [www.roddapaint.com/#sle](http://www.roddapaint.com/#sle).
  - 7. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 8. Valspar Corporation: [www.valsparpaint.com/#sle](http://www.valsparpaint.com/#sle).
- C. Transparent Finishes:
  - 1. Behr Process Corporation: [www.behr.com/#sle](http://www.behr.com/#sle).
  - 2. PPG Paints Deft Interior Clears/Polyurethanes: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 3. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
- D. Stains:
  - 1. Behr Process Corporation: [www.behr.com/#sle](http://www.behr.com/#sle).
  - 2. PPG Paints Deft Interior Stains: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  - 3. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
- E. Primer Sealers: Same manufacturer as top coats.
- F. Substitutions: See Section 016000 - Product Requirements.

### **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.

2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.
  2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
  3. Extend colors to surface edges; colors may change at any edge as directed by Architect.
  4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.
  5. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

### 2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, wood, plaster, uncoated steel, shop primed steel, and galvanized steel.
1. Two top coats and one coat primer.
  2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, 141, or 142.
    - a. Products:
      - 1) Sherwin-Williams Pre-Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #139)
  3. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
    - b. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  4. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-WC - Medium Duty Vertical and Overhead: Including gypsum board, uncoated steel, shop primed steel, and galvanized steel.
1. Two top coats and one coat primer.
  2. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Gloss. (MPI #115)
  3. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
  4. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-TR -W - Transparent Finish on Wood.
1. 1 top coat over sanding sealer over stain.
  2. Stain: Semi-Transparent Stain for Wood; MPI #90.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics 250 VOC Oil Stain. (MPI #90)
  3. Sealer: Alkyd, Sanding Sealer, Clear; MPI #102.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics FastDry Sanding Sealer. (MPI #102)
  4. Top Coat(s): Polyurethane Varnish, Oil Modified; MPI #56 or 57.
    - a. Products:
      - 1) Sherwin-Williams Wood Classics Polyurethane Varnish, Satin. (MPI #57)
  5. Top Coat Sheen:
    - a. Satin: MPI gloss level 4; use this sheen at all locations.

- D. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
  - 1. Filler coat (for open grained wood only).
  - 2. One coat of stain.
  - 3. One coat sealer.
  - 4. Satin: One coat of varnish.
- E. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:
  - 1. One coat of block filler.
  - 2. Semi-gloss: Two coats of latex enamel.
  - 3. Flat: Two coats of latex enamel.
- F. Paint MI-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
  - 1. One coat of alkyd primer.
  - 2. Semi-gloss: Two coats of alkyd enamel.
- G. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
  - 1. One coat of latex primer.
  - 2. Semi-gloss: Two coats of latex enamel.
- H. Paint Mgl-OP-3A - Galvanized Metals, Alkyd, 3 Coat:
  - 1. One coat galvanize primer.
  - 2. Semi-gloss: Two coats of alkyd enamel.
- I. Paint Mgl-OP-3L - Galvanized Metals, Latex, 3 Coat:
  - 1. One coat galvanize primer.
  - 2. Semi-gloss: Two coats of latex enamel.
- J. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
  - 1. One coat of alkyd primer sealer.
  - 2. Semi-gloss: Two coats of latex enamel.
- K. Paint FI-OP-3A - Fabrics/Insulation Jackets, Alkyd, 3 Coat:
  - 1. One coat of alkyd primer sealer.
  - 2. Semi-gloss: Two coats of alkyd enamel.

#### **2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
  - 1. Alkali Resistant Water Based Primer; MPI #3.
  - 2. Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.
    - a. Products:
      - 1) Pratt & Lambert Pro-Hide Gold Interior Latex Zero VOC Primer. (MPI #149)
      - 2) Valspar Professional Interior Latex Primer, No. 11286. (MPI #149)
      - 3) Substitutions: Section 016000 - Product Requirements.
  - 3. Interior Latex Primer Sealer; MPI #50.
    - a. Products:
      - 1) Pratt & Lambert Multi-Purpose Waterborne Primer. (MPI #50)
      - 2) Valspar Interior Latex New Construction Primer, No. 11287.
      - 3) Substitutions: Section 016000 - Product Requirements.
  - 4. Interior Drywall Primer Sealer.
    - a. Products:
      - 1) Pratt & Lambert Drywall Primer.
      - 2) Substitutions: Section 016000 - Product Requirements.
  - 5. Interior Rust-Inhibitive Water Based Primer; MPI #107.
    - a. Products:
      - 1) Valspar Interior/Exterior Acrylic DTM Primer, No. 81145 Series.
      - 2) Substitutions: Section 016000 - Product Requirements.
  - 6. Alkyd Primer for Galvanized Metal.
    - a. Products:

- 1) Valspar Armor Anti-Rust Oil Galvanized Primer, No. 21850.
- 2) Substitutions: Section 016000 - Product Requirements.

## **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin application of paints and finishes until substrates have been adequately prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Plaster and Stucco: 12 percent.
  3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
  4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete:
  1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  2. Clean surfaces with pressurized water. Use pressure range of 1,500 to 4,000 psi (10,350 to 27,580 kPa) at 6 to 12 inches (150 to 300 mm). Allow to dry.
  3. Clean concrete according to ASTM D4258. Allow to dry.
  4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- K. Galvanized Surfaces:
  1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

2. Prepare surface according to SSPC-SP 2.
- L. Ferrous Metal:
1. Solvent clean according to SSPC-SP 1.
  2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- M. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- N. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### **3.06 SCHEDULE - PAINT SYSTEMS**

- A. Gypsum Board: Finish surfaces exposed to view(new and existing).
  1. Interior Ceilings and Bulkheads: GI-OP-3L, flat.
  2. Interior Walls: GI-OP-3A, eggshell.
- B. Wood: Finish surfaces exposed to view.
  1. Interior trim and frames: WI-OP-3A, satin.
- C. Steel Fabrications: Finish surfaces exposed to view.
  1. Interior: MI-OP-3L, semi-gloss.
- D. Galvanized Steel: Finish surfaces exposed to view.

1. Interior: MGI-OP-3L.
- E. Shop-Primed Metal Items: Finish surfaces exposed to view.
  1. Finish the following items:
    - a. Elevator pit ladders.
    - b. Exposed surfaces of steel stairs and railings.
    - c. Mechanical equipment.
    - d. Electrical equipment.
  2. Interior: MI-OP-2A.
- F. Pipe and Duct Insulation Jackets: Finish surfaces exposed to view; FI-OP-2L, flat.

**END OF SECTION**



**SECTION 099300**  
**STAINING AND TRANSPARENT FINISHING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Field application of stains.
- B. Field application of transparent finishes.

**1.02 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.

**1.03 REFERENCE STANDARDS**

- A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2016.
- C. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and catalog number, and general product category.
  - 2. MPI product number (e.g. MPI #33).
  - 3. Manufacturer's installation instructions.
  - 4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Certification: By manufacturer that stains and transparent finishes comply with VOC limits specified.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Manufacturer's Qualification Statement.
- F. Maintenance Data: Submit data including finish schedule showing where each product, color, and finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 016000 - Product Requirements for additional provisions.
  - 2. Extra Stock Materials: Stain and transparent finish materials, 1 gal (4 L) of each color and type; store where directed.
    - a. Label each container with color and type in addition to the manufacturer's label.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with at least three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

- C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 STAINS AND TRANSPARENT FINISHES - GENERAL**

- A. Finishes:
1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. Provide materials compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  3. Supply each finish material in quantity required to complete entire project's work from a single production run.
  4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

### **2.02 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS**

- A. Finish on Wood - Vertical Surfaces:
1. 1-coat stain.
  2. 1-coat sealer.
  3. 1-coat varnish.
  4. Stain: Semi-transparent stain for wood, water based with polyurethane.
    - a. Products:
      - 1) Behr Water-Based Wood Stain and Poly in One, Satin [B6200].
      - 2) Substitutions: Section 016000 - Product Requirements.
  5. Sealer: Water based, sanding sealer, clear.
    - a. Products:
      - 1) Behr Water-Based Pre-Stain Wood Conditioner [No.B2080].
      - 2) Substitutions: Section 016000 - Product Requirements.
  6. Top Coat: Polyurethane varnish, oil modified; MPI #56 or 57.
    - a. Products:
      - 1) Bona US; Sport Poly 275: [www.bona.com/#sle](http://www.bona.com/#sle).
      - 2) United Gilsonite Laboratories ZAR Interior Oil Base Poly: [www.zar.com/#sle](http://www.zar.com/#sle).
      - 3) Substitutions: Section 016000 - Product Requirements.
  7. Top Coat: Polyurethane varnish, high build.
    - a. Products:
      - 1) Sherwin-Williams MinWax High Build Polyurethane, Satin.
      - 2) Substitutions: Section 016000 - Product Requirements.
  8. Top Coat: Clear water-based varnish; MPI #128, 129, or 130.
    - a. Products:
      - 1) Behr Fast Drying Water-Based Polyurethane [B8100].
      - 2) Multispec by Rust-Oleum Corporation MCT Clear Top Coat: [www.multispec.com/#sle](http://www.multispec.com/#sle).
      - 3) Substitutions: Section 016000 - Product Requirements.
  9. Top Coat: Clear lacquer; MPI #85, 86, or 87.
    - a. Products:
      - 1) PPG Paints Speedline High Build Clear Lacquer, 77-9130, Satin. (MPI #85)
      - 2) Substitutions: Section 016000 - Product Requirements.
  10. Top Coat(s): Pigmented lacquer; MPI #122, #123, or #124.
    - a. Products:
      - 1) PPG Paints Speedline Pigmented White Lacquer Finish, 77-9730, Satin. (MPI #122)

- 2) Substitutions: Section 016000 - Product Requirements.
- 11. Top Coat Sheen:
  - a. Satin: MPI gloss level 4; use this sheen at all locations.

### **2.03 ACCESSORY MATERIALS**

- A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Wood: 15 percent, measured in accordance with ASTM D4442.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- G. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

### **3.03 APPLICATION**

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Sand wood surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- G. Reinstall items removed prior to finishing.

### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

**SECTION 101100  
VISUAL DISPLAY UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Porcelain enamel steel markerboards.

**1.02 RELATED REQUIREMENTS**

- A. Section 061000 - Rough Carpentry: Blocking and supports.
- B. Section 092116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

**1.03 REFERENCE STANDARDS**

- A. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a (Reapproved 2016).

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on porcelain enamel steel markerboard, tackboard, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations, special anchor details.
- D. Samples: Color charts for selection of color and texture of porcelain enamel steel markerboard, tackboard, and trim.
- E. Test Reports: Show compliance to specified surface burning characteristics requirements.
- F. Maintenance Data: Include data on regular cleaning, stain removal.

**1.05 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for chalkboard and markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Visual Display Boards:
  - 1. Claridge Products and Equipment, Inc: [www.claridgeproducts.com/#sle](http://www.claridgeproducts.com/#sle).
  - 2. Polyvision Corporation (Nelson Adams): [www.polyvision.com/#sle](http://www.polyvision.com/#sle).
  - 3. Substitutions: See Section 016000 - Product Requirements.

**2.02 VISUAL DISPLAY UNITS**

- A. Porcelain Enamel Steel Markerboards:
  - 1. Color: White.
  - 2. Backing: Aluminum sheet, laminated to core.
  - 3. Height: 48 inches (1220 mm).
  - 4. Length: 6 feet (1830 mm), in one piece.
  - 5. Frame: Extruded aluminum, with concealed fasteners.
  - 6. Frame Finish: Anodized, natural.
  - 7. Accessories: Provide marker tray and map rail.

**2.03 MATERIALS**

- A. Porcelain Enamelled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Aluminum Sheet Backing: 27 gauge, 0.014 inch (0.36 mm) thick.
- C. Adhesives: Type used by manufacturer.

## **2.04 ACCESSORIES**

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch (25 mm) wide overall, full width of frame.
- B. Temporary Protective Cover: Sheet polyethylene, 8 mil (0.2 mm) thick.
- C. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.
- D. Mounting Brackets: Concealed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

### **3.02 INSTALLATION**

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Butt Joints: Install with tight hairline joints.

### **3.03 CLEANING**

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

**END OF SECTION**

**SECTION 102800**  
**TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Utility room accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 224000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

**1.03 REFERENCE STANDARDS**

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- E. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings; 2013.
- F. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.
- G. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- H. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.05 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. Bradley Corporation: [www.bradleycorp.com/#sle](http://www.bradleycorp.com/#sle).
  - 2. Georgia-Pacific Professional: [www.blue-connect.com/#sle](http://www.blue-connect.com/#sle).
  - 3. Substitutions: Section 016000 - Product Requirements.

**2.02 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Keys: Provide 6 keys for each accessory to Owner; master key lockable accessories.
- C. Stainless Steel Sheet: ASTM A666, Type 304.

- D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- F. Zinc Alloy: Die cast, ASTM B86.
- G. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.
- H. Adhesive: Two component epoxy type, waterproof.
- I. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- J. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

### **2.03 FINISHES**

- A. Stainless Steel: Satin finish, unless otherwise noted.
- B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.
- C. Baked Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.
- D. Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.
- E. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- F. Back paint components where contact is made with building finishes to prevent electrolysis.

### **2.04 COMMERCIAL TOILET ACCESSORIES**

- A. Toilet Paper Dispenser: Single roll, surface mounted bracket type, stainless steel.
  - 1. Products:
    - a. Georgia Pacific Jumbo Jr. Bathroom Tissue Dispenser.
- B. Paper Towel Dispenser: Electric, roll paper type.
  - 1. Cover: Transparent.
  - 2. Paper Discharge: Touchless automatic.
  - 3. Capacity: 10 inch diameter roll.
  - 4. Mounting: Surface mounted.
  - 5. Power: Battery operated.
  - 6. Refill Indicator: Illuminated refill indicator.
  - 7. Products:
    - a. Georgia-Pacific enMotion Paper Towel Dispenser.
- C. Mirrors: Stainless steel framed, 1/4 inch (6 mm) thick annealed float glass; ASTM C1036.
  - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
  - 2. Frame: 0.05 inch (1.3 mm) angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
  - 3. Backing: Full-mirror sized, minimum 0.03 inch (0.8 mm) galvanized steel sheet and nonabsorptive filler material.
- D. Grab Bars: Stainless steel, smooth surface.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force (1112 N), minimum.
    - b. Dimensions: 1-1/4 inch (32 mm) outside diameter, minimum 0.05 inch (1.3 mm) wall thickness, exposed flange mounting, 1-1/2 inch (38 mm) clearance between wall and inside of grab bar.
    - c. Finish: Satin.
    - d. Length and Configuration: As indicated on drawings.
    - e. Products:
      - 1) Product: Bradley 837..



- 2) Substitutions: Section 016000 - Product Requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.

**3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

**3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
  - 1. Grab Bars: As indicated on drawings.

**3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

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**SECTION 113013**  
**RESIDENTIAL APPLIANCES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Kitchen appliances.

**1.02 RELATED REQUIREMENTS**

- A. Section 221005 - Plumbing Piping: Plumbing connections for appliances.
- B. Section 260583 - Wiring Connections: Electrical connections for appliances.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.
- C. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

**1.04 WARRANTY**

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.
- C. Provide ten (10) year manufacturer warranty on magnetron tube of microwave ovens.

**PART 2 PRODUCTS**

**2.01 KITCHEN APPLIANCES**

- A. Provide Equipment Eligible for Energy Star Rating: Energy Star Rated.
- B. Refrigerator: Free-standing, bottom-mounted freezer, and frost-free.
  - 1. Capacity: Total minimum storage of 22 cubic ft (0.62 cu m); minimum 15 percent freezer capacity.
  - 2. Features: Include glass shelves, automatic icemaker, light in freezer compartment, and in-door water and ice dispenser.
  - 3. Exterior Finish: Stainless steel, color as indicated.
  - 4. Manufacturers:
    - a. Frigidaire Home Products: [www.frigidaire.com/#sle](http://www.frigidaire.com/#sle).
    - b. GE Appliances: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - c. Whirlpool Corp: [www.whirlpool.com/#sle](http://www.whirlpool.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.
- C. Microwave: Countertop.
  - 1. Capacity: 0.7 cubic ft (0.019 cu m).
  - 2. Power: 700 watts.
  - 3. Features: Include turntable and night light.
  - 4. Exterior Finish: Black.
  - 5. Manufacturers:
    - a. Frigidaire Home Products: [www.frigidaire.com/#sle](http://www.frigidaire.com/#sle).
    - b. GE Appliances: [www.geappliances.com/#sle](http://www.geappliances.com/#sle).
    - c. Whirlpool Corp: [www.whirlpool.com/#sle](http://www.whirlpool.com/#sle).
    - d. Substitutions: See Section 016000 - Product Requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify utility rough-ins are provided and correctly located.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

**3.03 ADJUSTING**

- A. Adjust equipment to provide efficient operation.

**3.04 CLEANING**

- A. Remove packing materials from equipment and properly discard.
- B. Wash and clean equipment.

**END OF SECTION**

**SECTION 123200**  
**MANUFACTURED WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured standard and custom casework, with cabinet hardware.
- B. Countertops.

**1.02 RELATED REQUIREMENTS**

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions: VOC limitations for adhesives and sealants.
- B. Section 061000 - Rough Carpentry: Blocking and nailers for anchoring casework.
- C. Section 079200 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
- D. Section 092116 - Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring casework.
- E. Section 096500 - Resilient Flooring: Resilient wall base.
- F. Section 224000 - Plumbing Fixtures: Sinks and fittings installed in casework.
- G. Section 262726 - Wiring Devices: Switches, receptacles installed in casework.

**1.03 DEFINITIONS**

- A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.
- B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.
- C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.

**1.04 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014, with Errata (2016).
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; 2016, with Errata (2017).
- E. BHMA A156.9 - American National Standard for Cabinet Hardware; 2015.
- F. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2016.
- G. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- H. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

**1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- B. Keying Conference: Conduct conference prior to ordering keys. Incorporate conference decisions into keying submittal.

**1.06 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements for submittal procedures.

- B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.
- C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.
- D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches (51 mm by 75 mm).
  - 1. Plastic laminate samples, for color, texture, and finish selection.
  - 2. Solid surface countertops for color, texture, and finish selection.
- E. Manufacturer's Installation Instructions.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Maintenance Data: Manufacturer's recommendations for care and cleaning.
- I. Finish touch-up kit for each type and color of materials provided.

#### **1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience and approved by manufacturer.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.
- B. Acceptance at Site:
  - 1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.
- C. Storage:
  - 1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

#### **1.09 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, at no additional cost to Owner. Defects include, but are not limited to:
  - 1. Ruptured, cracked, or stained finish coating.
  - 2. Discoloration or lack of finish integrity.
  - 3. Cracking or peeling of finish.
  - 4. Delamination of components.
  - 5. Failure of adhesives.
  - 6. Failure of hardware.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Plastic Laminate Casework:
  - 1. TMI Systems Corporation; [www.tmisystems.com/#sle](http://www.tmisystems.com/#sle).
  - 2. JMJ Caseworks; <https://jmjcaseworks.business.site/>

3. Woodside Industries; <https://www.woodside-industries.com/>
4. Substitutions: See Section 016000 - Product Requirements.

B. Obtain casework from single source and manufacturer, unless otherwise indicated.

## **2.02 CASEWORK, GENERAL**

- A. Quality Standard: AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Types: More than one type is required. See drawings for location of each type of casework.
- C. Plastic Laminate Faced Cabinets: Custom Grade.

## **2.03 FABRICATION**

- A. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
- B. Construction: As required for selected grade.
- C. Structural Performance: Safely support the following minimum loads:
  1. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
  2. Suspended Units: 300 pounds (136 kg) static load.
  3. Drawers: 125 pounds (57 kg), minimum.
  4. Hanging Wall Cases: 300 pounds (135 kg).
  5. Shelves: 100 pounds (45 kg), minimum.
- D. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
- E. Hardware Application: Factory-machine casework members for hardware that is not surface applied.
- F. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.
- G. Removable back panels on all base cabinets. Provide partial height back panels at sink cabinets.
- H. Fixed panels at backs of open spaces between base cabinets.
  1. Provide cutouts for power receptacles where indicated on drawings.
- I. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- J. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
- K. Countertop Panel-Type Supports: Materials similar to adjacent casework, 1-1/2 inch (38 mm) in width, with front-to-back and toe space dimensions matching base cabinet. Designed to be secured in a concealed fashion to countertop material. Include two leveling devices per support panel.

## **2.04 PLASTIC-LAMINATE-CLAD CASEWORK**

- A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base cabinets.
  1. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
  2. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
    - a. Base Cabinets: 24 inches (610 mm).
    - b. Tall Cabinets: 22 inches (559 mm).
    - c. Wall Cabinets: 16 inches (406 mm).
  3. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.
    - a. Finish: Matte or suede, gloss rating of 5 to 20.
    - b. Surface Color and Pattern: As selected by Architect from manufacturer's full line.

- c. Exposed Interior Surfaces: Thermally fused laminate.
  - 1) Color: White.
- d. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- e. Cap exposed plastic laminate finish edges with material of same finish and pattern.

## 2.05 COUNTERTOPS

- A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting over continuous substrate.
  - 1. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  - 2. Manufacturer's standard configuration for exposed edges, back and end splashes.
  - 3. Fabricate in accordance with manufacturer's standard requirements.

## 2.06 CABINET HARDWARE

- A. Manufacturer's standard types, styles and finishes.
- B. Comply with BHMA A156.9 requirements.
  - 1. Acceptable base materials for plated finishes include brass, bronze, and steel.

## 2.07 MATERIALS

- A. Adhesives Used for Assembly: Comply with VOC requirements for adhesives and sealants; see Section 016116.
- B. Wood-Based Materials:
  - 1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
- C. Hardwood Plywood: Veneer core; HPVA HP-1 Grade as indicated; same species as exposed solid wood, clear, compatible grain and color, no defects. Band exposed edges with solid wood of same species as veneer.
- D. Concealed Solid Wood or Plywood: Any species and without defects affecting strength or utility.
- E. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. complying with Grade requirements, and standard with the manufacturer.
- F. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.
- G. Stainless Steel Sheet: ASTM A666 Type 304.

## 2.08 ACCESSORIES

- A. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
  - 1. Color: As selected by Architect from manufacturer's standard range.
- B. Concealed Joint Fasteners: Corrosion-resistant, standard with manufacturer.
- C. Grommets: Standard painted metal grommets for cut-outs, in color to match adjacent surface.
- D. Sealant for Use in Casework Installation:
  - 1. One component, clear silicone base sealant, chemical curing complying with ASTM C920, Type S, Grade NS, Class 25, Use NT, when tested to glass and aluminum, anti-fungus composition.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

### 3.02 EXAMINATION

- A. Site Verification of Environmental Conditions:



1. Do not deliver casework until the following conditions have been met:
  - a. Building has been enclosed (windows and doors sealed and weather-tight).
  - b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
  - c. Ceiling, overhead ductwork, piping, and lighting have been installed.
  - d. Installation areas do not require further construction.
- B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
- C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
  1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more, and/or maximum variation from plumb exceeds 1/4 inch (6 mm) per story.
  2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.
- D. Verify adequacy of support framing and anchors.
- E. Verify that service connections are correctly located and of proper characteristics.

### **3.03 INSTALLATION**

- A. Perform installation in accordance with manufacturer's instructions.
- B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
- C. Set casework items plumb and square, securely anchored to building structure.
- D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
- E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch ( 1.6 mm). In addition, do not exceed the following tolerances:
  1. Variation of Tops of Base Cabinets from Level: 1/16 inch ( 1.6 mm) in 10 feet (3 m).
  2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
  3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
  4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch ( 1.6 mm).
- F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
- G. Install hardware uniformly and precisely.
- H. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
- I. Replace units that are damaged, including those that have damaged finishes.

### **3.04 ADJUSTING**

- A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

### **3.05 CLEANING**

- A. Clean casework and other installed surfaces thoroughly.

### **3.06 PROTECTION**

- A. Do not permit finished casework to be exposed to continued construction activity.

- B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
- C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

**END OF SECTION**

**SECTION 133419**  
**METAL BUILDING SYSTEMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulated Metal roof panels including gutters and downspouts.

**1.02 RELATED REQUIREMENTS**

- A. Section 055000 - Metal Fabrications.
- B. Section 079200 - Joint Sealants: Sealing joints between accessory components and wall system.

**1.03 REFERENCE STANDARDS**

- A. AISC 360 - Specification for Structural Steel Buildings; 2016.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014 (Editorial 2017).
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- M. IAS AC472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems; 2018.
- N. MBMA (MBSM) - Metal Building Systems Manual; 2012.
- O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- P. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions, for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.
- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchors and methods of anchorage.
- D. Manufacturer's Instructions: Indicate preparation requirements, anchor bolt placement.

- E. Erection Drawings: Indicate members by label, assembly sequence, and temporary erection bracing.
- F. Manufacturer's Qualification Statement: Provide documentation showing metal building manufacturer is accredited under IAS AC472.
  - 1. Include statement that manufacturer designs and fabricates metal building system as integrated components and assemblies, including but not limited to primary structural members, secondary members, joints, roof, and wall cladding components specifically designed to support and transfer loads and properly assembled components form a complete or partial building shell.
- G. Erector's Qualification Statement.
- H. Project Record Documents: Record actual locations of concealed components and utilities.

## **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this type of work and licensed in the State of North Dakota.
  - 1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
  - 2. Comply with applicable code for submission of design calculations as required for acquiring permits. Design to meet the requirement of all applicable design codes including ASCE 7-16, IBC 2018 and MBMA (MBSM).
  - 3. Cooperate with regulatory agency or authorities having jurisdiction (AHJ), and provide data as requested.
- B. Perform work in accordance with AISC 360 and MBMA (MBSM).
  - 1. Maintain one copy on site.
- C. Perform welding in accordance with AWS D1.1/D1.1M.

## **1.07 WARRANTY**

- A. See Section 01700 - Contract Closeout, for additional warranty requirements.
- B. Correct defective Work within a Fifteen year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty for Materials.
  - 1. Include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Include coverage for weather tightness of building enclosure elements after installation.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Metal Buildings Systems:
  - 1. Butler Manufacturing Company: [www.butlermfg.com/#sle](http://www.butlermfg.com/#sle).
  - 2. Chief Buildings: [www.chiefbuildings.com/#sle](http://www.chiefbuildings.com/#sle).

### **2.02 ASSEMBLIES**

- A. Verify existing.
- B. Roof System: Preformed metal panels oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and liner panels, and accessory components.
- C. Roof Slope: 1 inches in 12 inches (1/12). Verify existing.

### **2.03 PERFORMANCE REQUIREMENTS**

- A. Installed Thermal Resistance of Roof System: R-value of 25 (RSI-value of 11).
- B. Design structural members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.
- C. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.

- D. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 100 degrees F (38 degrees C).
- E. Size and fabricate roof systems free of distortion or defects detrimental to appearance or performance.

#### **2.04 MATERIALS - FRAMING**

- A. Structural Steel Members: ASTM A36/A36M.
- B. Structural Tubing: ASTM A500/A500M, Grade B cold-formed.
- C. Plate or Bar Stock: ASTM A529/A529M, Grade 50.
- D. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1; galvanized to ASTM A153/A153M.
- E. Welding Materials: Type required for materials being welded.
- F. Primer: SSPC-Paint 20, zinc rich.

#### **2.05 METAL ROOF SYSTEM**

- A. Metal Roof System: Butler Manufacturing "CMR-24®" roof system.
- B. Roof System Design:
  - 1. Design roof panels and liner panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
  - 2. Design roof paneling system to support design live, snow, and wind loads.
  - 3. Endwall Trim and Roof Transition Flashings: Allow roof panels to move relative to wall panels and/or parapets as roof expands and contracts with temperature changes.
- C. Roof System Performance Testing:
  - 1. UL Wind Uplift Classification Rating, UL 580: Class 90.
  - 2. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E 1592.
  - 3. Roof system has been tested in accordance with U.S. Army Corps of Engineers Unified Facilities Guide Specification Section 07 61 13.
  - 4. FM Global (Factory Mutual):
    - a. Roof system has been tested in accordance with FMRC Standard 4471 and approved as a Class 1 Panel Roof.
    - b. Metal Building System Manufacturer: Provide specific assemblies to meet required wind rating in accordance with FM Global.
    - c. Installation modifications or substitutions can invalidate FM Global approval.
- D. Roof Panels:
  - 1. Factory roll-formed, 24 inches wide, with 2 major corrugations, 2 inches high (2-3/4 inches including seam), 24 inches on center.
  - 2. Flat of the Panel: Cross flutes 6 inches on center, perpendicular to major corrugations in entire length of panel to reduce wind noise.
  - 3. Variable Width Panels:
    - a. For roof lengths not evenly divisible by the 2'-0" panel width, factory-manufactured variable-width (9-inch, 12-inch, 15-inch, 18-inch, and 21-inch-wide) panels shall be used to ensure modular, weathertight roof installation.
    - b. Minimum Length: 15 feet.
    - c. Supply maximum possible panel lengths.
  - 4. Panel Material and Finish:
    - a. 24-gauge galvanized steel, G90 coating; ASTM A 653, G90.
    - b. Paint with exterior colors of "Butler-Cote™" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.
    - c. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years for the following.
      - 1) Not to peel, crack, or chip.

- 2) Chalking: Not to exceed ASTM D 4214, #8 rating.
- 3) Fading: Not more than 5 color-difference units, ASTM D 2244.
- E. Insulation: Owens-Corning Fiberglas, NAIMA 202, "Certified R" metal building insulation.
  - 1. TIMA Insignia and Insulation Thickness: Ink-jet printed on fiberglass.
  - 2. Facing: 1.0.0015-inch-thick, UV-stabilized, white polypropylene laminated to metalized polyester film, reinforced with glass-fiber scrim.
- F. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- G. Sealant: ASTM C920, elastomeric sealant with movement capability of at least plus/minus 50 percent; 100 percent silicone; for exposed applications, match adjacent colors as closely as possible.
- H. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- I. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

## **2.06 FABRICATION - WALL AND ROOF PANELS**

- A. Soffit Panels: Minimum 24 guage (.0239 inch (.607 mm) metal thickness, flat profile indicated, unperforated.
- B. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.
- C. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

## **2.07 FABRICATION - GUTTERS AND DOWNSPOUTS**

- A. Fabricate of same material and finish as roofing metal.
- B. Form gutters and downspouts and scuppers of box profile and size to collect and remove water. Fabricate with connection pieces.
- C. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- D. Fabricate support straps of same material and finish as roofing metal, color as selected.

## **2.08 FINISHES**

- A. Exterior Surfaces of Roof Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.
- B. Interior Surfaces of Roof Components and Accessories: Precoated enamel on steel of modified silicone finish, color as selected from manufacturer's standard range.

## **PART 3 EXECUTION**

### **3.01 ERECTION - WALL AND ROOF PANELS**

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches (50 mm). Place side laps over bearing.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners.
- G. Install insulation and vapor retarder utilizing approved fasteners for attachment. Place wire mesh under vapor retarder for support between framing members.

H. Install sealant and gaskets, providing weather tight installation.

### **3.02 ERECTION - GUTTERS AND DOWNSPOUTS**

- A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Apply bituminous paint on surfaces in contact with cementitious materials.
- C. Slope gutters minimum 1/4 inch/ft (6.35 mm/m).
- D. Install splash pads under each downspout.

### **3.03 TOLERANCES**

- A. Siding and Roofing: 1/8 inch (3 mm) from true position.

**END OF SECTION**

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**SECTION 220500**  
**COMMON WORK RESULTS FOR PLUMBING**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

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

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Piping materials and installation instructions common to most piping systems.
  - 2. Transition fittings.
  - 3. Dielectric fittings.
  - 4. Mechanical sleeve seals.
  - 5. Sleeves.
  - 6. Escutcheons.
  - 7. Grout.
  - 8. Plumbing demolition.
  - 9. Equipment installation requirements common to equipment sections.
  - 10. Painting and finishing.
  - 11. Concrete bases.
  - 12. Supports and anchorages.

**1.03 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
  - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
  - 2. CPVC: Chlorinated polyvinyl chloride plastic.
  - 3. PE: Polyethylene plastic.
  - 4. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
  - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
  - 2. NBR: Acrylonitrile-butadiene rubber.

**1.04 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Transition fittings.
  - 2. Dielectric fittings.
  - 3. Mechanical sleeve seals.
  - 4. Escutcheons.
- B. Welding certificates.

## **1.05 QUALITY ASSURANCE**

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
  - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
  - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

## **1.07 COORDINATION**

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Access panels and doors are specified Section 083113 "Access Doors."

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### **2.02 PIPE, TUBE, AND FITTINGS**

- A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### **2.03 JOINING MATERIALS**

- A. Refer to individual Division 22 piping Sections for special joining materials not listed below.
- B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- C. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- D. Solvent Cements for Joining Plastic Piping:
  - 1. ABS Piping: ASTM D 2235.
  - 2. CPVC Piping: ASTM F 493.
  - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
  - 4. PVC to ABS Piping Transition: ASTM D 3138.

## 2.04 TRANSITION FITTINGS

- A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
  - 1. Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Dresser Industries, Inc.; DMD Div.
    - c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
    - d. JCM Industries.
    - e. Smith-Blair, Inc.
    - f. Viking Johnson.
  - 2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
  - 3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
  - 4. Aboveground Pressure Piping: Pipe fitting.
- B. Plastic-to-Metal Transition Fittings: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
  - 1. Manufacturers:
    - a. Eslon Thermoplastics.
- C. Plastic-to-Metal Transition Adaptors: One-piece fitting with manufacturer's SDR 11 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint end.
  - 1. Manufacturers:
    - a. Thompson Plastics, Inc.
- D. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.
  - 1. Manufacturers:
    - a. NIBCO INC.
    - b. NIBCO, Inc.; Chemtrol Div.
- E. Flexible Transition Couplings for Underground Nonpressure Drainage Piping: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.
  - 1. Manufacturers:
    - a. Cascade Waterworks Mfg. Co.
    - b. Fernco, Inc.
    - c. Mission Rubber Company.
    - d. Plastic Oddities, Inc.

## 2.05 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
  - 1. Manufacturers:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Eclipse, Inc.
    - d. Epco Sales, Inc.
    - e. Hart Industries, International, Inc.
    - f. Watts Industries, Inc.; Water Products Div.
    - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
  - 1. Manufacturers:

- a. Capitol Manufacturing Co.
  - b. Central Plastics Company.
  - c. Epco Sales, Inc.
  - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
- 1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Central Plastics Company.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- 1. Manufacturers:
    - a. Calpico, Inc.
    - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
- 1. Manufacturers:
    - a. Perfection Corp.
    - b. Precision Plumbing Products, Inc.
    - c. Sioux Chief Manufacturing Co., Inc.
    - d. Victaulic Co. of America.

## 2.06 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- 1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 3. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.07 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.

- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

## **2.08 ESCUTCHEONS**

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated.
- E. One-Piece, Stamped-Steel Type: With set screw or spring clips and chrome-plated finish.
- F. One-Piece, Floor-Plate Type: Cast-iron floor plate.
- G. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

## **2.09 GROUT**

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.

## **PART 3 EXECUTION**

### **3.01 PLUMBING DEMOLITION**

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.
  - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
  - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

### **3.02 PIPING SYSTEMS - COMMON REQUIREMENTS**

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

- D. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
  - 1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - g. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    - h. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
    - i. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.
  - 2. Existing Piping: Use the following:
    - a. Chrome-Plated Piping: Split-casting, cast-brass type with chrome-plated finish.
    - b. Insulated Piping: Split-plate, stamped-steel type with concealed or exposed-rivet hinge and spring clips.
    - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
    - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting, cast-brass type with chrome-plated finish.
    - e. Bare Piping in Unfinished Service Spaces: Split-casting, cast-brass type with polished chrome-plated finish.
    - f. Bare Piping in Equipment Rooms: Split-casting, cast-brass type.
    - g. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.

- b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
- c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
- 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.03 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
  3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
  4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  5. PVC Nonpressure Piping: Join according to ASTM D 2855.
  6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- H. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- I. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- J. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End Pipe and Fittings: Use butt fusion.
  2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- K. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### **3.04 PIPING CONNECTIONS**

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
  4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

### **3.05 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS**

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

### **3.06 PAINTING**

- A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### **3.07 CONCRETE BASES**

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
  2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
  3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.



4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section.

### **3.08 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Refer to Section 055000 "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### **3.09 ERECTION OF WOOD SUPPORTS AND ANCHORAGES**

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

### **3.10 GROUTING**

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

**END OF SECTION**

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**SECTION 220517**  
**SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

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

**1.03 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**PART 2 PRODUCTS**

**2.01 SLEEVES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. CALPICO, Inc.
  - 3. GPT, an EnPro Industries Co.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.
- C. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, anticorrosion coated, with plain ends and integral welded waterstop collar.
- D. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- E. PVC Pipe Sleeves: ASTM D1785, Schedule 40.
- F. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.
- G. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

**2.02 STACK-SLEEVE FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Jay R. Smith Mfg. Co.; a division of Morris Group International
  - 2. Zurn Industries, LLC
- B. Description: Manufactured, Dura-coated or Duco-coated cast-iron sleeve with integral clamping flange for use in waterproof floors and roofs. Include clamping ring, bolts, and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with setscrews.

**2.03 SLEEVE-SEAL SYSTEMS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. CALPICO, Inc.
  - 3. GPT, an EnPro Industries Co.
  - 4. Metraflex Company (The)
  - 5. Proco Products, Inc.
- B. Description:
  - 1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

2. Designed to form a hydrostatic seal of 20 psig minimum.
3. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
4. Pressure Plates: Stainless steel
5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

#### **2.04 SLEEVE-SEAL FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Advance Products & Systems, Inc.
  2. CALPICO, Inc.
  3. GPT, an EnPro Industries Co.
  4. Metraflex Company (The)
  5. Proco Products, Inc.
- B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall.
- C. Plastic or rubber waterstop collar with center opening to match piping OD.

#### **2.05 GROUT**

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

### **PART 3 EXECUTION**

#### **3.01 SLEEVE INSTALLATION**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
  2. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  1. Cut sleeves to length for mounting flush with both surfaces.
  2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.
- E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified in Section 078413 "Penetration Firestopping."

### **3.02 STACK-SLEEVE-FITTING INSTALLATION**

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
  - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
  - 3. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
  - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 5. Use silicone sealant to seal the space around outside of stack-sleeve fittings.
- B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping specified in Section 078400 "Penetration Firestopping."

### **3.03 SLEEVE-SEAL-SYSTEM INSTALLATION**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### **3.04 SLEEVE-SEAL-FITTING INSTALLATION**

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Use grout to seal the space around outside of sleeve-seal fittings.

### **3.05 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
- B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

### **3.06 SLEEVE AND SLEEVE-SEAL SCHEDULE**

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls above Grade:
    - a. Piping Smaller Than NPS 6: Sleeve-seal fittings
    - b. Piping NPS 6 and Larger: Sleeve-seal fittings
  - 2. Exterior Concrete Walls below Grade:
    - a. Piping Smaller Than NPS 6: Sleeve-seal fittings.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
    - b. Piping NPS 6 and Larger: Sleeve-seal fittings.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 3. Concrete Slabs-on-Grade:
    - a. Piping Smaller Than NPS 6: Steel pipe sleeves with sleeve-seal system.

- 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
- b. Piping NPS 6 and Larger: Steel pipe sleeves with sleeve-seal system.
  - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
4. Concrete Slabs above Grade:
  - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
  - b. Piping NPS 6 and Larger: Steel pipe sleeves.
5. Interior Partitions:
  - a. Piping Smaller Than NPS 6: Steel pipe sleeves.
  - b. Piping NPS 6 and Larger: Galvanized-steel sheet sleeves.

**END OF SECTION**

**SECTION 220518**  
**ESCUTCHEONS FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed and salvaged, or removed and reinstalled.

**1.03 ACTION SUBMITTALS**

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

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. BrassCraft Manufacturing Co.; a Masco company
  2. Dearborn Brass
  3. Keeney Manufacturing Company (The)
  4. Mid-America Fittings, Inc.
  5. ProFlo; a Ferguson Enterprises, Inc. brand

**2.02 ESCUTCHEONS**

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.
- C. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- D. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.
- E. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed hinge; and spring-clip fasteners.

**2.03 FLOOR PLATES**

- A. Split Floor Plates: Cast brass with concealed hinge.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.
  1. Escutcheons for New Piping and Relocated Existing Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
    - b. Chrome-Plated Piping: One-piece cast brass with polished, chrome-plated finish.
    - c. Insulated Piping: One-piece stainless steel with polished stainless-steel finish.
    - d. Insulated Piping: One-piece cast brass with polished, chrome-plated finish.
    - e. Insulated Piping: One-piece stamped steel with polished, chrome-plated finish.
    - f. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.
    - g. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
    - h. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece stainless steel with polished stainless-steel finish.

- i. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece cast brass with polished, chrome-plated finish.
  - j. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.
  - k. Bare Piping in Unfinished Service Spaces: One-piece cast brass with polished, chrome-plated finish.
  - l. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
  - m. Bare Piping in Equipment Rooms: One-piece cast brass with polished, chrome-plated finish.
2. Escutcheons for Existing Piping to Remain:
- a. Chrome-Plated Piping: Split-casting, stamped steel with concealed hinge with polished, chrome-plated finish.
  - b. Insulated Piping: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish
  - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
  - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
  - e. Bare Piping in Unfinished Service Spaces: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
  - f. Bare Piping in Equipment Rooms: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
- 1. New Piping and Relocated Existing Piping: One-piece, floor plate.
  - 2. Existing Piping: Split floor plate.

### **3.02 FIELD QUALITY CONTROL**

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

**END OF SECTION**



**SECTION 220523**  
**GENERAL-DUTY VALVES FOR PLUMBING PIPING**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of valve indicated.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.
- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS FOR VALVES**

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve Actuator Types:
  - 1. Gear Actuator: For quarter-turn valves NPS 8 and larger.

2. Handwheel: For valves other than quarter-turn types.
  3. Handlever: For quarter-turn valves NPS 6 and smaller except plug valves.
- E. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- F. Valve-End Connections:
1. Flanged: With flanges according to ASME B16.1 for iron valves.
  2. Grooved: With grooves according to AWWA C606.
  3. Solder Joint: With sockets according to ASME B16.18.
  4. Threaded: With threads according to ASME B1.20.1.
- G. Valve Bypass and Drain Connections: MSS SP-45.

## **2.02 BRASS BALL VALVES**

- A. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Hammond Valve.
    - d. Jamesbury; a subsidiary of Metso Automation.
    - e. Kitz Corporation.
    - f. Legend Valve.
    - g. Milwaukee Valve Company.
    - h. NIBCO INC.
    - i. Red-White Valve Corporation.
  2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Forged brass.
    - f. Ends: Threaded.
    - g. Seats: PTFE or TFE.
    - h. Stem: Brass.
    - i. Ball: Chrome-plated brass.
    - j. Port: Full.

## **2.03 BRONZE BALL VALVES**

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Conbraco Industries, Inc.; Apollo Valves.
    - b. Crane Co.; Crane Valve Group; Crane Valves.
    - c. Hammond Valve.
    - d. Legend Valve.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Red-White Valve Corporation.
    - h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.

- d. Body Design: Two piece.
- e. Body Material: Bronze.
- f. Ends: Threaded.
- g. Seats: PET or TFE.
- h. Stem: Bronze.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

#### **2.04 BRONZE LIFT CHECK VALVES**

- A. Class 125, Lift Check Valves with Bronze Disc:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Crane Co.; Crane Valve Group; Stockham Division.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Vertical flow.
    - d. Body Material: ASTM B 61 or ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.

#### **2.05 BRONZE SWING CHECK VALVES**

- A. Class 125, Bronze Swing Check Valves with Bronze Disc:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Crane Co.; Crane Valve Group; Stockham Division.
    - d. Hammond Valve.
    - e. Kits Corporation.
    - f. Milwaukee Valve Company.
    - g. NIBCO INC.
    - h. Red-White Valve Corporation.
    - i. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 3.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Horizontal flow.
    - d. Body Material: ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.
- B. Class 150, Bronze Swing Check Valves with Bronze Disc:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Crane Co.; Crane Valve Group; Stockham Division.
    - d. Kits Corporation.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Red-White Valve Corporation.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 3.

- b. CWP Rating: 300 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: Bronze.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Do not attempt to repair defective valves; replace with new valves.

#### **3.02 VALVE INSTALLATION**

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.
- E. Install check valves for proper direction of flow and as follows:
  - 1. Swing Check Valves: In horizontal position with hinge pin level.
  - 2. Lift Check Valves: With stem upright and plumb.

#### **3.03 ADJUSTING**

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

#### **3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS**

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball or butterfly valves.
  - 2. Throttling Service: Ball valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

#### **3.05 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE**

- A. Pipe NPS 2 and Smaller:
  - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Ball Valves: Two piece, full port, bronze with bronze trim.
  - 3. Bronze Swing Check Valves: Class 150, bronze disc.

**END OF SECTION**

## SECTION 220529

### HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 ACTION SUBMITTALS

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

##### 1.03 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

##### 1.04 QUALITY ASSURANCE

- A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.
- B. Pipe Welding Qualifications: Qualify procedures and operators according to 2015 ASME Boiler and Pressure Vessel Code, Section IX.

#### PART 2 PRODUCTS

##### 2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  - 1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
  - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

##### 2.02 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
  - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  - 2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
  - 3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
  - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

##### 2.03 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

##### 2.04 METAL FRAMING SYSTEMS

- A. MFMA Manufacturer Metal Framing Systems:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. B-Line, an Eaton business.
    - b. Flex-Strut Inc.
    - c. Hayden Corporation.
    - d. Thomas & Betts Corporation.
    - e. Unistrut; Part of Atkore International.
  - 2. Description: Shop- or field-fabricated pipe-support assembly, made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
  - 3. Standard: Comply with MFMA-4, factory-fabricated components for field assembly.

4. Channels: Continuous slotted carbon-steel channel with inturred lips.
5. Channel Width: Selected for applicable load criteria.
6. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
7. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
8. Metallic Coating: Hot-dip galvanized.
9. Paint Coating: Green epoxy, acrylic, or urethane.
10. Plastic Coating: None.
11. Combination Coating: None.

## **2.05 THERMAL HANGER-SHIELD INSERTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. CADDY; a brand of nVent.
  2. Carpenter & Paterson, Inc.
  3. National Pipe Hanger Corporation.
  4. Pipe Shields, Inc.
  5. Piping Technology & Products, Inc.
  6. Rilco Manufacturing Co., Inc.
  7. Value Engineered Products, Inc.
- B. Insulation-Insert Material for Cold Piping: ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- C. Insulation-Insert Material for Hot Piping: Water-repellent-treated, ASTM C533, Type I calcium silicate with 100-psig ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

## **2.06 PIPE-POSITIONING SYSTEMS**

- A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

## **2.07 EQUIPMENT SUPPORTS**

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-carbon-steel shapes.

## **2.08 MATERIALS**

- A. Aluminum: ASTM B221.
- B. Carbon Steel: ASTM A1011/A1011M.
- C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.
- D. Stainless Steel: ASTM A240/A240M.
- E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi, 28-day compressive strength.

## **PART 3 EXECUTION**

### **3.01 APPLICATION**

- A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

- B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

### 3.02 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
  - 1. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- M. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:

- a. NPS 1/4 to NPS 3-1/2 : 12 inches long and 0.048 inch thick.
- 5. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

### **3.03 EQUIPMENT SUPPORTS**

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment, and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### **3.04 METAL FABRICATIONS**

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections, so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### **3.05 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to .

### **3.06 PAINTING**

- A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

### **3.07 HANGER AND SUPPORT SCHEDULE**

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal hanger-shield inserts for insulated piping and tubing.



- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
  3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
  4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
  5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
  7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
  11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.
  12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
  14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
  15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
  16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
  17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction occurs.
  18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction occurs.
  19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction occurs but vertical adjustment is unnecessary.
  20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction occurs and vertical adjustment is unnecessary.
  21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation, in addition to expansion and contraction, is required.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.
- N. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.

5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
  - a. Horizontal (MSS Type 54): Mounted horizontally.
  - b. Vertical (MSS Type 55): Mounted vertically.
  - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- O. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- Q. Use pipe-positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

**END OF SECTION**

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## SECTION 220553

### IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

#### PART 1 GENERAL

##### 1.01 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- C. Valve-numbering scheme.
- D. Valve Schedules: For each piping system. Include in operation and maintenance manuals.

#### PART 2 PRODUCTS

##### 2.01 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Brady Corporation.
    - b. Brimar Industries, Inc.
    - c. Carlton Industries, LP.
    - d. Champion America.
    - e. Craftmark Pipe Markers.
    - f. Kolbi Pipe Marker Co.
    - g. LEM Products Inc.
    - h. Marking Services, Inc.
    - i. Seton Identification Products; a Brady Corporation company.
  - 2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
  - 3. Letter and Background Color: As indicated for specific application under Part 3.
  - 4. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
  - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  - 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  - 7. Fasteners: Stainless steel rivets or self-tapping screws.
  - 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

##### 2.02 WARNING SIGNS AND LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Brady Corporation.
  - 2. Brimar Industries, Inc.
  - 3. Carlton Industries, LP.
  - 4. Champion America.
  - 5. Craftmark Pipe Markers.
  - 6. LEM Products Inc.
  - 7. Marking Services Inc.
  - 8. National Marker Company.
  - 9. Seton Identification Products; a Brady Corporation company.

10. Stranco, Inc.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Arc-Flash Warning Signs: Provide arc-flash warning signs in locations and with content in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.
- J. Label Content: Include caution and warning information plus emergency notification instructions.

### **2.03 PIPE LABELS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
  2. Brady Corporation.
  3. Brimar Industries, Inc.
  4. Carlton Industries, LP.
  5. Champion America.
  6. Craftmark Pipe Markers.
  7. Kolbi Pipe Marker Co.
  8. LEM Products Inc.
  9. Marking Services Inc.
  10. Seton Identification Products; a Brady Corporation company.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:
  1. Pipe size.
  2. Flow-Direction Arrows: Include flow-direction arrows on distribution piping. Arrows may be either integral with label or applied separately.
  3. Lettering Size: Size letters in accordance with ASME A13.1 for piping.

### **2.04 VALVE TAGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Actioncraft Products, Inc.; a division of Industrial Test Equipment Co., Inc.
  2. Brady Corporation.
  3. Brimar Industries, Inc.
  4. Carlton Industries, LP.

5. Champion America.
  6. Craftmark Pipe Markers.
  7. Kolbi Pipe Marker Co.
  8. LEM Products Inc.
  9. Marking Services Inc.
  10. Seton Identification Products; a Brady Corporation company.
- B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
1. Tag Material: Brass, 0.04-inch or stainless steel, 0.024-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
  2. Fasteners: Brass link chainor S-hook.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
1. Include valve-tag schedule in operation and maintenance data.

## **2.05 WARNING TAGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Brady Corporation.
  2. Brimar Industries, Inc.
  3. Champion America.
  4. Craftmark Pipe Markers.
  5. Kolbi Pipe Marker Co.
  6. LEM Products Inc.
  7. Marking Services Inc.
  8. Seton Identification Products; a Brady Corporation company.
- B. Description: Preprinted accident-prevention tags of plasticized card stock.
1. Size: 3 by 5-1/4 inches minimum .
  2. Fasteners: Brass grommet and wire.
  3. Nomenclature: Large-size primary caption, such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Letter and Background Color: As indicated for specific application under Part 3.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

### **3.02 INSTALLATION, GENERAL REQUIREMENTS**

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

### **3.03 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS**

- A. Permanently fasten labels on each item of plumbing equipment.
- B. Sign and Label Colors.
  1. White letters on an ANSI Z535.1 safety-green background .

- C. Locate equipment labels where accessible and visible.

### **3.04 INSTALLATION OF PIPE LABELS**

- A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Within 3 ft. of each valve and control device.
  - 2. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 3. Within 3 ft. of equipment items and other points of origination and termination.
  - 4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping and equipment.
- C. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation.
- D. Flow-Direction Flow Arrows: Use arrows, in compliance with ASME A13.1, to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- E. Pipe-Label Color Schedule:
  - 1. Domestic Cold-Water Piping: White letters on an ANSI Z535.1 safety-green background .
  - 2. Domestic Hot-Water Piping: White letters on an ANSI Z535.1 safety-green background

### **3.05 INSTALLATION OF VALVE TAGS**

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, faucets, convenience and lawn-watering hose connections, and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule in the operating and maintenance manual.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below:
  - 1. Valve-Tag Size and Shape:
    - a. Domestic Cold Water: 2 inches, round .
    - b. Domestic Hot Water: 2 inches, round .
  - 2. Valve-Tag Colors:
    - a. For each piping system, use the same lettering and background coloring system on valve tags as used in the piping system labels and background.

### **3.06 INSTALLATION OF WARNING TAGS**

- A. Warning Tag Color: Black letters on an ANSI Z535.1 safety-yellow background .
- B. Attach warning tags, with proper message, to equipment and other items where indicated on Drawings.

**END OF SECTION**



**SECTION 220719**  
**PLUMBING PIPING INSULATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Related Sections:
  - 1. Section 220716 "Plumbing Equipment Insulation" for equipment insulation.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less and smoke-developed index of 150 or less.
- C. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.07 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

**1.08 SCHEDULING**

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## **PART 2 PRODUCTS**

### **2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Comply with ASTM C552.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pittsburgh Corning Corporation
  - 2. Preformed Pipe Insulation: Type II, Class 1, without jacket.
  - 3. Preformed Pipe Insulation: Type II, Class 2, with factory-applied ASJ jacket.
  - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
  - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
- G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I for tubular materials.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Aeroflex USA.
    - b. Armacell LLC.
    - c. K-Flex USA
- H. Mineral-Fiber, Preformed Pipe: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C547.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; a Berkshire Hathaway company (Microlite.)
    - b. Knauf Insulation ( Friendly Feel Duct Wrap.)
    - c. Manson Insulation Inc. (Alley Wrap.)
    - d. Owens Corning (SOFT R All-Service Duct Wrap.)
  - 2. Preformed Pipe Insulation: Type I, Grade A with factory-applied ASJ.
  - 3. 850 deg F.
  - 4. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
  - 5. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

### **2.02 INSULATING CEMENTS**

- A. Mineral-Fiber Insulating Cement: Comply with ASTM C195.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Ramco Insulation, Inc.; Super-Stik.
- B. Expanded or Exfoliated Vermiculite Insulating Cement: Comply with ASTM C196.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Ramco Insulation, Inc.; Thermokote V.
- C. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C449.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Ramco Insulation, Inc.; Ramcote 1200 and Quik-Cote.

### 2.03 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Foster Brand; H.B. Fuller Construction Products
- C. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA, Inc.; Aero seal.
    - b. Armacell LCC; Armaflex 520 Adhesive.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
    - d. Flex USA
  - 2. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less as tested in accordance with ASTM E84.
  - 3. Wet Flash Point: Below 0 deg F.
  - 4. Service Temperature Range: 40 to 200 deg F.
  - 5. Color: Black.
- D. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
- E. ASJ Adhesive and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A, for bonding insulation jacket lap seams and joints.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
    - c. Mon-Eco Industries, Inc.
- F. PVC Jacket Adhesive: Compatible with PVC jacket.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation (The); 739, Dow Silicone.
    - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
    - c. P.I.C. Plastics, Inc.; Welding Adhesive.
    - d. Speedline Corporation; Polyco VP Adhesive.

### 2.04 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    - b. Vimasco Corporation; 749.
    - c. Childers Brand; H.B. Fuller Construction Products
    - d. Foster Brand; H.B. Fuller Construction Products
    - e. Knauf Insulation
    - f. Vimasco Corporation
  - 2. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.

3. Service Temperature Range: 0 to plus 180 deg F.
  4. Color: White.
- C. Vapor-Retarder Mastic, Solvent Based, Outdoor Use: Suitable for outdoor use on below-ambient services.
1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
  2. Service Temperature Range: Minus 50 to plus 220 deg F.
  3. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products
    - b. Foster Brand; H. B. Fuller Construction Products
    - c. Knauf Insulation
    - d. Mon-Eco Industries; Inc.
    - e. Vimasco-Corporation
  2. Water-Vapor Permeance: ASTM E96/E96M, greater than 1.0 perm at manufacturer's recommended dry film thickness.
  3. Service Temperature Range: 0 to plus 180 deg F.
  4. Color: White.

## **2.05 LAGGING ADHESIVES**

- A. Adhesives shall comply with MIL-A-3316C, Class I, Grade A, and shall be compatible with insulation materials, jackets, and substrates.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
    - c. Vimasco Corporation; 713 and 714.
  2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
  3. Service Temperature Range: 0 to plus 180 deg F.
  4. Color: White.

## **2.06 SEALANTS**

- A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.
- B. Joint Sealants:
1. Joint Sealants for Cellular-Glass and Phenolic Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
    - c. Mon-Eco Industries, Inc.; 44-05.
    - d. Pittsburgh Corning Corporation; Pittseal 444.
  2. Materials shall be compatible with insulation materials, jackets, and substrates.
  3. Permanently flexible, elastomeric sealant.
  4. Service Temperature Range: Minus 58 to plus 176 deg F.
  5. Color: White or gray.
- C. FSK and Metal Jacket Flashing Sealants:
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.

- b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
    - c. Mon-Eco Industries, Inc.; 44-05.
  - 2. Fire- and water-resistant, flexible, elastomeric sealant.
  - 3. Service Temperature Range: Minus 40 to plus 250 deg F.
  - 4. Color: Aluminum.
- D. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
  - 2. Materials shall be compatible with insulation materials, jackets, and substrates.
  - 3. Fire- and water-resistant, flexible, elastomeric sealant.
  - 4. Service Temperature Range: Minus 40 to plus 250 deg F.
  - 5. Color: White.

## 2.07 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
- 1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
  - 2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C1136, Type I.

## 2.08 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  - 2. Adhesive: As recommended by jacket material manufacturer.
  - 3. Color: White.
  - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Metal Jacket:
- 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ITW Insulation Systems; Illinois Tool Works, Inc.
    - b. RPR Products, Inc.; Insul-Mate.
  - 2. Aluminum Jacket: Comply with ASTM B209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
    - a. Factory cut and rolled to size
    - b. Finish and thickness are indicated in field-applied jacket schedules.
    - c. Moisture Barrier for Indoor Applications: 1-mil- thick, heat-bonded polyethylene and kraft paper
    - d. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
    - e. Factory-Fabricated Fitting Covers:
      - 1) Same material, finish, and thickness as jacket.
      - 2) Preformed two-piece or gore, 45- and 90-degree, short- and long-radius elbows.

- 3) Tee covers.
  - 4) Flange and union covers.
  - 5) End caps.
  - 6) Beveled collars.
  - 7) Valve covers.
  - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- D. Underground Direct-Buried Jacket: 125-mil- thick vapor barrier and waterproofing membrane, consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pittsburgh Corning Corporation; Pittwrap.
    - b. Polyguard Products, Inc.; Insulrap No Torch 125.

## 2.09 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. 3M Industrial Adhesives and Tapes Division
    - b. Knauf Insulation
  2. Width: 3 inches.
  3. Thickness: 11.5 mils.
  4. Adhesion: 90 ounces force/inch in width.
  5. Elongation: 2 percent.
  6. Tensile Strength: 40 lbf/inch in width.
  7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. 3M Industrial Adhesives and Tapes Division
  2. Width: 2 inches.
  3. Thickness: 6 mils.
  4. Adhesion: 64 ounces force/inch in width.
  5. Elongation: 500 percent.
  6. Tensile Strength: 18 lbf/inch in width.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. 3M Industrial Adhesives and Tapes Division
    - b. Knauf Insulation
  2. Width: 2 inches.
  3. Thickness: 3.7 mils.
  4. Adhesion: 100 ounces force/inch in width.
  5. Elongation: 5 percent.
  6. Tensile Strength: 34 lbf/inch in width.

## 2.10 SECUREMENTS

- A. Bands:
1. Products: Subject to compliance with requirements, provide one of the following:
  2. ITW Insulation Systems; Illinois Tool Works, Inc.
  3. Stainless Steel: ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 3/4 inch wide with wing seal.
  4. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

- C. Wire: 0.062-inch soft-annealed, stainless steel.
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. C & F Wire.

## **2.11 PROTECTIVE SHIELDING GUARDS**

- A. Protective Shielding Pipe Covers, :
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Just Manufacturing
    - b. McGuire Manufacturing
    - c. MVG Molded Products
    - d. Truebro
    - e. Zurn Industries, LLC
  - 2. Description: Manufactured plastic wraps for covering plumbing fixture and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.
- B. Protective Shielding Piping Enclosures, :
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Truebro; a brand of IPS Corporation.
    - b. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
  - 2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  - 1. Verify that systems to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  - 1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  - 2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the tradesman installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.

- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
  - 3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.
    - a. For below-ambient services, apply vapor-barrier mastic over staples.
  - 4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
  - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.
- P. For above-ambient services, do not install insulation to the following:
  - 1. Vibration-control devices.
  - 2. Testing agency labels and stamps.
  - 3. Nameplates and data plates.
  - 4. Cleanouts.



### 3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  - 4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
  - 1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- F. Insulation Installation at Floor Penetrations:
  - 1. Pipe: Install insulation continuously through floor penetrations.
  - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### 3.05 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:
  - 1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
  - 2. Insulate pipe elbows using preformed fitting insulation made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  - 3. Insulate tee fittings with preformed fitting insulation of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  - 4. Insulate valves using preformed fitting insulation of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves,

- insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### **3.06 INSTALLATION OF CELLULAR-GLASS INSULATION**

- A. Insulation Installation on Straight Pipes and Tubes:
1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
  2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
  3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.

4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
1. Install preformed pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as that of pipe insulation.
  4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed sections of same material as that of straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
  2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed sections of cellular-glass insulation to valve body.
  2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.

### **3.07 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION**

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
  4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as that of pipe insulation when available.
  2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.
  4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### **3.08 INSTALLATION OF MINERAL-FIBER INSULATION**

- A. Insulation Installation on Straight Pipes and Tubes:
1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.

2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
  3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
  4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
1. Install preformed pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
  4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
  2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
  2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
  3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  4. Install insulation to flanges as specified for flange insulation application.

### **3.09 FIELD-APPLIED JACKET INSTALLATION**

- A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.
1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.
  2. Embed glass cloth between two 0.062-inch-thick coats of lagging adhesive.
  3. Completely encapsulate insulation with coating, leaving no exposed insulation.
- B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

### **3.10 FINISHES**

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless steel jackets.

### **3.11 FIELD QUALITY CONTROL**

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

### **3.12 PIPING INSULATION SCHEDULE, GENERAL**

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Drainage piping located in crawl spaces.
  - 2. Underground piping.
  - 3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

### **3.13 INDOOR PIPING INSULATION SCHEDULE**

- A. Domestic Cold Water:
  - 1. NPS 1 and Smaller: Insulation shall be one of the following:
    - a. Cellular Glass: 1-1/2 inches thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
  - 2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
    - a. Cellular Glass: 1-1/2 inches thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:
  - 1. NPS 1-1/4 and Smaller: Insulation shall be the following:
    - a. Cellular Glass: 1-1/2 inches thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
  - 2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
    - a. Cellular Glass: 1-1/2 inches thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- D. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F:
  - 1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 1 inch thick.

### **3.14 INDOOR, FIELD-APPLIED JACKET SCHEDULE**

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.

- C. Piping, Concealed:
  - 1. None.
- D. Piping, Exposed:
  - 1. PVC: 30 mils thick.

**3.15 UNDERGROUND, FIELD-APPLIED INSULATION JACKET**

- A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

**END OF SECTION**

**SECTION 221116**  
**DOMESTIC WATER PIPING**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS:**

- A. Section 331415 "Site Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.

**1.02 ACTION SUBMITTALS**

- A. Product Data:
  - 1. Pipe and tube.
  - 2. Fittings.
  - 3. Joining materials.
  - 4. Transition fittings.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.04 FIELD CONDITIONS**

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
  - 1. Notify Engineer and owner no fewer than two days in advance of proposed interruption of water service.
  - 2. Do not interrupt water service without Owner's written permission.

**PART 2 PRODUCTS**

**2.01 PIPING MATERIALS**

- A. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

**2.02 COPPER TUBE AND FITTINGS**

- A. Drawn-Temper Copper Tube: ASTM B88, Type L and ASTM B88, Type M.
- B. Annealed-Temper Copper Tube: ASTM B88, Type K.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Cast Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- G. Wrought Copper Unions: ASME B16.22.
- H. Copper-Tube, Mechanically Formed Tee Fitting: For forming T-branch on copper water tube.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. T-DRILL Industries Inc.
  - 2. Description: Tee formed in copper tube in accordance with ASTM F2014.

**2.03 PIPING JOINING MATERIALS**

- A. Pipe-Flange Gasket Materials:
  - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
  - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B32, lead-free alloys.
- D. Flux: ASTM B813, water flushable.

- E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

#### **2.04 ENCASEMENT FOR PIPING**

- A. Standard: ASTM A674 or AWWA C105/A21.5.
- B. Form: tube.
- C. Color: Black.

#### **2.05 TRANSITION FITTINGS**

- A. General Requirements:
  - 1. Same size as pipes to be joined.
  - 2. Pressure rating at least equal to pipes to be joined.
  - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International.
    - b. Smith-Blair, a Xylem brand.
    - c. Viking Johnson.

#### **2.06 DIELECTRIC FITTINGS**

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. A.Y. McDonald Mfg. Co.
    - b. Capitol Manufacturing Company.
    - c. Central Plastics Company.
    - d. WATTS.
    - e. Zurn Industries, LLC.
  - 2. Standard: ASSE 1079.
  - 3. Pressure Rating: 150 psig.
  - 4. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Company.
    - b. Central Plastics Company.
    - c. WATTS.
    - d. Zurn Industries, LLC.
  - 2. Standard: ASSE 1079.
  - 3. Factory-fabricated, bolted, companion-flange assembly.
  - 4. Pressure Rating: 150 psig.
  - 5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Insulating Kits:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Central Plastics Company.



2. Nonconducting materials for field assembly of companion flanges.
  3. Pressure Rating: 150 psig.
  4. Gasket: Neoprene or phenolic.
  5. Bolt Sleeves: Phenolic or polyethylene.
  6. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Anvil International/Smith-Cooper International; Tailwind Capital, LLC.
    - b. Elster Perfection; a Honeywell Company.
    - c. Precision Plumbing Products.
    - d. Sioux Chief Manufacturing Company, Inc.
    - e. Victaulic Company.
  2. Standard: IAPMO PS 66.
  3. Electroplated steel nipple complying with ASTM F1545.
  4. Pressure Rating and Temperature: 300 psig at 225 deg F.
  5. End Connections: Male threaded or grooved.
  6. Lining: Inert and noncorrosive, propylene.

### **PART 3 EXECUTION**

#### **3.01 PIPING APPLICATIONS**

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.
- D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be the following:
  1. Annealed-temper copper tube, ASTM B88, Type K; wrought-copper, solder-joint fittings; and brazed joints.
- E. Under-building-slab, domestic water piping, NPS 2, shall be the following:
  1. Annealed-temper copper tube, ASTM B88, Type K; joints.
- F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:
  1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
- G. Aboveground domestic water piping, NPS 2-1/2 to NPS 4, shall be one of the following:
  1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.

#### **3.02 EARTHWORK**

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

#### **3.03 INSTALLATION OF PIPING**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install underground copper tube and ductile-iron pipe in PE encasement according to ASTM A674 or AWWA C105/A21.5.

- D. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements for pressure-reducing valves in Section 221119 "Domestic Water Piping Specialties."
- E. Install domestic water piping level and plumb.
- F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- I. Install piping to permit valve servicing.
- J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- K. Install piping free of sags and bends.
- L. Install fittings for changes in direction and branch connections.
- M. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- N. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."
- O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

### **3.04 JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.
- D. Soldered Joints for Copper Tubing: Apply ASTM B813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B828 or CDA's "Copper Tube Handbook."
- E. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

### **3.05 INSTALLATION OF TRANSITION FITTINGS**

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
  1. Fittings for NPS 1-1/2 and Smaller: Fitting-type coupling.
  2. Fittings for NPS 2 and Larger: Sleeve-type coupling.

### **3.06 INSTALLATION OF DIELECTRIC FITTINGS**

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.

### **3.07 INSTALLATION OF HANGERS AND SUPPORTS**

- A. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Install hangers for tubing and piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Support horizontal piping within 12 inches of each fitting.
- D. Support vertical runs of tubing and piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

### **3.08 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
  - 1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
  - 2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
  - 3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

### **3.09 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.10 ADJUSTING**

- A. Perform the following adjustments before operation:
  - 1. Close drain valves, hydrants, and hose bibbs.
  - 2. Open shutoff valves to fully open position.
  - 3. Open throttling valves to proper setting.
  - 4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
  - 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
  - 6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
  - 7. Check plumbing specialties and verify proper settings, adjustments, and operation.

### **3.11 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Piping Inspections:
    - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
    - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
      - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

- 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
  - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
  - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
2. Piping Tests:
- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
  - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
  - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
  - e. Hydrostatic testing and documentation of test results for polypropylene piping to be in accordance with the manufacturer's instructions and submitted to the manufacturer upon successful completion per warranty requirements.
  - f. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
  - g. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
  - C. Prepare test and inspection reports.

### **3.12 CLEANING**

- A. Clean and disinfect potable domestic water piping as follows:
  - 1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  - 2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill and isolate system according to either of the following:
      - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
    - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    - d. Repeat procedures if biological examination shows contamination.
    - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

**END OF SECTION**

**SECTION 221119**  
**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.01 RELATED REQUIREMENTS:**

- A. Section 221116 "Domestic Water Piping" for water meters.
- B. Section 224716 "Pressure Water Coolers" for water filters for water coolers.

**1.02 DEFINITIONS**

- A. AMI: Advanced Metering Infrastructure.
- B. AMR: Automatic Meter Reading.
- C. FKM: A family of fluoroelastomer materials defined by ASTM D1418.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For domestic water piping specialties.
  - 1. Include diagrams for power, signal, and control wiring.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Test and inspection reports.
- B. Field quality-control reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES**

- A. Domestic water piping specialties intended to convey or dispense water for human consumption are to comply with the SDWA, requirements of authorities having jurisdiction, and NSF 61 and NSF 372, or to be certified in compliance with NSF 61 and NSF 372 by an American National Standards Institute (ANSI)-accredited third-party certification body that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.

**2.02 PERFORMANCE REQUIREMENTS**

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

**2.03 VACUUM BREAKERS**

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers :
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    - b. Cash Acme, A Division of Reliance Worldwide Corporation.
    - c. FEBCO; A WATTS Brand.
    - d. WATTS.
    - e. Zurn Industries, LLC.
  - 2. Standard: ASSE 1001.
  - 3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
  - 4. Body: Bronze.
  - 5. Inlet and Outlet Connections: Threaded.
  - 6. Finish: Chrome plated.
- B. Hose-Connection Vacuum Breakers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
- b. Cash Acme, A Division of Reliance Worldwide Corporation.
- c. Legend Valve & Fitting, Inc.
- d. MIFAB, Inc.
- e. WATTS.
- f. Woodford Manufacturing Company.
- g. Zurn Industries, LLC.
2. Standard: ASSE 1011.
3. Body: Bronze, nonremovable, with manual drain.
4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
5. Finish: Chrome or nickel plated.

#### **2.04 BACKFLOW PREVENTERS**

- A. Reduced-Pressure-Principle Backflow Preventers:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Ames Fire & Waterworks; A WATTS Brand.
    - b. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    - c. FEBCO; A WATTS Brand.
    - d. WATTS.
    - e. Zurn Industries, LLC.
  2. Standard: ASSE 1013.
  3. Operation: Continuous-pressure applications.
  4. Pressure Loss: 12 psig maximum, through middle third of flow range.
  5. Body: Bronze for NPS 2 and smaller; ductile or cast iron with interior lining that complies with AWWA C550 or that is FDA approved or stainless steel for NPS 2-1/2 and larger.
  6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
  7. Configuration: Designed for horizontal, straight-through, vertical-inlet, horizontal-center-section, and vertical-outlet or vertical flow.
  8. Accessories:
    - a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
    - b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
    - c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

#### **2.05 WATER PRESSURE-REDUCING VALVES**

- A. Water Regulators:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    - b. Cash Acme, A Division of Reliance Worldwide Corporation.
    - c. WATTS.
    - d. Zurn Industries, LLC.
  2. Standard: ASSE 1003.
  3. Pressure Rating: Initial working pressure of 150 psig.
  4. Body: Bronze for NPS 2 and smaller; bronze for NPS 2-1/2 and NPS 3.
  5. Valves for Booster Heater Water Supply: Include integral bypass.
  6. End Connections: Threaded or solder for NPS 2 and smaller; flanged or solder for NPS 2-1/2 and NPS 3.

#### **2.06 OUTLET BOXES**

- A. Icemaker Outlet Boxes:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Guy Gray, IPS Corporation.

- b. Sioux Chief Manufacturing Company, Inc.
- 2. Mounting: Recessed.
- 3. Material and Finish: Stainless steel box and faceplate.
- 4. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 or smaller copper tube outlet.
- 5. Accessory: Water hammer arrestor.
- 6. Supply Shutoff Fitting: NPS 1/2 ball valve and NPS 1/2 copper, water tubing.

## **2.07 WATER-HAMMER ARRESTERS**

- A. Water-Hammer Arresters:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. AMTROL, Inc.
    - b. Jay R. Smith Mfg Co; a division of Morris Group International.
    - c. Josam Company.
    - d. Precision Plumbing Products.
    - e. Sioux Chief Manufacturing Company, Inc.
    - f. WATTS.
    - g. Zurn Industries, LLC.
  - 2. Standard: ASSE 1010 or PDI-WH 201.
  - 3. Type: Piston or Diaphragm.
  - 4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

## **2.08 FLEXIBLE CONNECTORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flex-Hose Co., Inc.
  - 2. Mason Industries, Inc.
  - 3. Metraflex Company (The).
- B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
  - 1. Working-Pressure Rating: Minimum 200 psig.
  - 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION OF PIPING SPECIALTIES**

- A. Backflow Preventers: Install in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
  - 1. Locate backflow preventers in same room as connected equipment or system.
  - 2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
  - 3. Do not install bypass piping around backflow preventers.
- B. Water Regulators: Install with inlet and outlet shutoff valves and bypass with memory-stop balancing valve. Install pressure gauges on inlet and outlet.
- C. Outlet Boxes: Install boxes recessed in wall or surface mounted on wall. Install 1-1/2-by-3-1/2-inch fire-retardant-treated-wood blocking, wall reinforcement between studs. Comply with requirements for fire-retardant-treated-wood blocking in Section 061000 "Rough Carpentry."
- D. Water-Hammer Arresters: Install in water piping in accordance with PDI-WH 201.

### **3.02 PIPING CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping specialties adjacent to equipment and machines, allow space for service and maintenance.

### **3.03 ELECTRICAL CONNECTIONS**

- A. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, in accordance with NFPA 70 and NECA 1.

### **3.04 CONTROL CONNECTIONS**

- A. Connect control wiring in accordance with Section 260523 "Control-Voltage Electrical Power Cables."

### **3.05 IDENTIFICATION**

- A. Plastic Labels for Equipment: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  - 1. Vacuum breakers.
  - 2. Backflow preventers.
  - 3. Water pressure-reducing valves.
  - 4. Outlet boxes.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.06 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. Perform the following tests and inspections with the assistance of a factory-authorized service representative.
  - 1. Test each pressure vacuum breaker reduced-pressure-principle backflow preventer double-check, backflow-prevention assembly and double-check, detector-assembly backflow preventer according to authorities having jurisdiction and the device's reference standard.
  - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm unit operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

**END OF SECTION**



**SECTION 221316**  
**SANITARY WASTE AND VENT PIPING**

**PART 1 GENERAL**

**1.01 ACTION SUBMITTALS**

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

**1.02 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.03 FIELD CONDITIONS**

- A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:
1. Notify Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
  2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

**1.04 WARRANTY**

- A. Listed manufacturers to provide labeling and warranty of their respective products.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Components and installation are capable of withstanding the following minimum working pressure unless otherwise indicated:
1. Soil, Waste, and Vent Piping: 10 ft. head of water.

**2.02 PIPING MATERIALS**

- A. Piping materials to bear label, stamp, or other markings of specified testing agency.
- B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

**2.03 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Charlotte Pipe and Foundry Company.
  2. Tyler Pipe; a part of McWane family of companies.
- B. Pipe and Fittings:
1. Marked with CISPI collective trademark.
  2. ASTM A888 or CISPI 301.
- C. CISPI, Hubless-Piping Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Charlotte Pipe and Foundry Company.
    - b. Josam Company.
    - c. MIFAB, Inc.
    - d. Tyler Pipe; a subsidiary of McWane Inc.
  2. Standards: ASTM C1277 and CISPI 310.
  3. Description: Stainless steel corrugated shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.
- D. Heavy-Duty, Hubless-Piping Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Charlotte Pipe and Foundry Company.

- b. MIFAB, Inc.
- c. Tyler Pipe; a subsidiary of McWane Inc.
- 2. Standards: ASTM C1277 and ASTM C1540.
- 3. Description: Stainless steel shield with stainless steel bands and tightening devices; and ASTM C564, rubber sleeve with integral, center pipe stop.

#### **2.04 PVC PIPE AND FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Charlotte Pipe and Foundry Company.
  - 2. JM Eagle; J-M Manufacturing Co., Inc.
  - 3. Mueller Industries, Inc.
  - 4. National Pipe and Plastic, Inc.
  - 5. North America Pipe Corporation.
- B. Comply with NSF 14 for plastic piping components. Include "NSF-dwv" marking for plastic drain, waste, and vent piping and "NSF-sewer" marking for plastic sewer piping.
- C. Solid-Wall PVC Pipe: ASTM D2665 drain, waste, and vent.
- D. PVC Socket Fittings: ASTM D2665, made in accordance with ASTM D3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.
- E. Adhesive Primer: ASTM F656.
- F. Solvent Cement: ASTM D2564.

#### **2.05 SPECIALTY PIPE FITTINGS**

- A. Transition Couplings:
  - 1. General Requirements: Fitting or device for joining piping with small differences in ODs or of different materials. Include end connections of same size as and compatible with pipes to be joined.
  - 2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
  - 3. Unshielded, Nonpressure Transition Couplings:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Dallas Specialty & Mfg. Co.
      - 2) Fernco Inc.
      - 3) Mission Rubber Company, LLC; a division of MCP Industries.
      - 4) Plastic Oddities.
    - b. Standard: ASTM C1173.
    - c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    - d. End Connections: Same size as and compatible with pipes to be joined.
    - e. Sleeve Materials:
      - 1) For Cast-Iron Soil Pipes: ASTM C564, rubber.
      - 2) For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926 PVC.
      - 3) For Dissimilar Pipes: ASTM D5926 PVC or other material compatible with pipe materials being joined.
  - 4. Shielded, Nonpressure Transition Couplings:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Cascade Waterworks Mfg. Co.
      - 2) Mission Rubber Company, LLC; a division of MCP Industries.
    - b. Standard: ASTM C1460.

- c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- d. End Connections: Same size as and compatible with pipes to be joined.
- 5. Pressure Transition Couplings:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Apollo Valves; a part of Aalberts Integrated Piping Systems.
    - 2) Cascade Waterworks Mfg. Co.
    - 3) EBAA Iron, Inc.
    - 4) Ford Meter Box Company, Inc. (The).
    - 5) JCM Industries, Inc.
    - 6) Romac Industries, Inc.
  - b. Standard: AWWA C219.
  - c. Description: Metal sleeve-type same size as, with pressure rating at least equal to, and ends compatible with, pipes to be joined.
  - d. Center-Sleeve Material: Carbon steel.
  - e. Gasket Material: Natural or synthetic rubber.
  - f. Metal Component Finish: Corrosion-resistant coating or material.
- B. Dielectric Fittings:
  - 1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
  - 2. Dielectric Unions:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) A.Y. McDonald Mfg. Co.
      - 2) Capitol Manufacturing Company.
      - 3) Central Plastics Company.
      - 4) HART Industrial Unions, LLC.
      - 5) Jomar Valve.
      - 6) Matco-Norca.
      - 7) WATTS.
      - 8) Zurn Industries, LLC.
    - b. Description:
      - 1) Standard: ASSE 1079.
      - 2) Pressure Rating: 125 psig minimum at 180 deg F .
      - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
  - 3. Dielectric Flanges:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Capitol Manufacturing Company.
      - 2) Central Plastics Company.
      - 3) Matco-Norca.
      - 4) WATTS.
      - 5) Zurn Industries, LLC.
    - b. Description:
      - 1) Standard: ASSE 1079.
      - 2) Factory-fabricated, bolted, companion-flange assembly.
      - 3) Pressure Rating: 125 psig minimum at 180 deg F.
      - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
  - 4. Dielectric-Flange Insulating Kits:

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1) Advance Products & Systems, Inc.
  - 2) Calpico, Inc.
  - 3) Central Plastics Company.
  - 4) GPT; a division of EnPRO Industries.
- b. Description:
  - 1) Nonconducting materials for field assembly of companion flanges.
  - 2) Pressure Rating: 150 psig .
  - 3) Gasket: Neoprene or phenolic.
  - 4) Bolt Sleeves: Phenolic or polyethylene.
  - 5) Washers: Phenolic with steel backing washers.
  - 6) .

## **PART 3 EXECUTION**

### **3.01 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.
  - 1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.
  - 2. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.
  - 1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
  - 2. Use long-turn, double Y-branch, and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.
    - a. Straight tees, elbows, and crosses may be used on vent lines.
  - 3. Do not change direction of flow more than 90 degrees.
  - 4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.
    - a. Reducing size of waste piping in direction of flow is prohibited.
- K. Lay buried building waste piping beginning at low point of each system.
  - 1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
  - 2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
  - 3. Maintain swab in piping and pull past each joint as completed.

- L. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:
  - 1. Building Sanitary Waste: Two percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
  - 2. Horizontal Sanitary Waste Piping: Two percent downward in direction of flow.
  - 3. Vent Piping: One percent down toward vertical fixture vent or toward vent stack.
- M. Install cast-iron soil piping in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
  - 1. Install encasement on underground piping in accordance with ASTM A674 or AWWA C105/A 21.5.
- N. Install aboveground PVC piping in accordance with ASTM D2665.
- O. Install underground PVC piping in accordance with ASTM D2321.
- P. Plumbing Specialties:
  - 1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.
    - a. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping.
    - b. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
- Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- R. Install sleeves for piping penetrations of walls, ceilings, and floors.
  - 1. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs.
  - 1. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors.
  - 1. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

### 3.02 JOINT CONSTRUCTION

- A. Hubless, Cast-Iron Soil Piping Coupled Joints:
  - 1. Join hubless, cast-iron soil piping in accordance with CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- B. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings in accordance with the following:
  - 1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. PVC Piping: Join in accordance with ASTM D2855 and ASTM D2665 appendixes.

### 3.03 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
  - 1. Install transition couplings at joints of piping with small differences in ODs.
  - 2. In Waste Drainage Piping: Shielded, nonpressure transition couplings.
- B. Dielectric Fittings:
  - 1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
  - 2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
  - 3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.
  - 4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

### 3.04 VALVE INSTALLATION

- A. General valve installation requirements for general-duty valve installation are specified in the following Sections:
  - 1. Section 220523 "General Duty Valves for Plumbing Piping."
- B. Shutoff Valves:
  - 1. Install shutoff valve on each sewage pump discharge.
  - 2. Install full-port ball valve for piping NPS 2 and smaller.
  - 3. Install gate valve for piping NPS 2-1/2 and larger.
- C. Check Valves: Install swing check valve, between pump and shutoff valve, on each sewage pump discharge.

### 3.05 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for pipe hanger and support devices and installation specified in .
  - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
  - 2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
  - 3. Vertical Piping: MSS Type 8 or Type 42 clamps.
  - 4. Install individual, straight, horizontal piping runs:
    - a. 100 Ft. and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Ft. : MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Ft. if Indicated: MSS Type 49, spring cushion rolls.
  - 5. Multiple, Straight, Horizontal Piping Runs 100 Ft. or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze.
  - 6. Base of Vertical Piping: MSS Type 52 spring hangers.
- B. Install hangers for cast-iron, steel and stainless steel soil piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install hangers for piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- E. Support vertical runs of cast-iron, steel and stainless steel soil piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- F. Support vertical runs of PVC piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

### 3.06 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect waste and vent piping to the following:
  - 1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.
  - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
  - 3. Plumbing Specialties: Connect waste and vent piping in sizes indicated, but not smaller than required by plumbing code.
  - 4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
  - 5. Equipment: Connect waste piping as indicated.
    - a. Provide shutoff valve if indicated and union for each connection.
    - b. Use flanges instead of unions for connections NPS 2-1/2 and larger.

- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections in accordance with the following unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

### **3.07 IDENTIFICATION**

- A. Identify exposed sanitary waste and vent piping.
- B. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.08 FIELD QUALITY CONTROL**

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
  - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary waste and vent piping in accordance with procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
  - 1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.
    - a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  - 2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.
    - a. Expose work that was covered or concealed before it was tested.
  - 3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.
    - a. Close openings in piping system and fill with water to point of overflow, but not less than 10 ft. head of water.
    - b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    - c. Inspect joints for leaks.
  - 4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.
    - a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 inch wg.
    - b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    - c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    - d. Inspect plumbing fixture connections for gas and water leaks.
  - 5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  - 6. Prepare reports for tests and required corrective action.

### **3.09 CLEANING AND PROTECTION**

- A. Clean interior of piping. Remove dirt and debris as work progresses.

- B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.
- D. Exposed PVC Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.
- E. Repair damage to adjacent materials caused by waste and vent piping installation.

### **3.10 PIPING SCHEDULE**

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller are to be any of the following:
  - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
  - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- C. Aboveground, soil and waste piping NPS 5 and larger are to be any of the following:
  - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
  - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- D. Aboveground, vent piping NPS 4 and smaller is to be any of the following:
  - 1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
  - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.
- E. Underground, soil, waste, and vent piping NPS 4 and smaller are to be any of the following:
  - 1. Service cast-iron soil piping; gaskets; and gasketed joints.
  - 2. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
  - 3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

**END OF SECTION**



**SECTION 221319**  
**SANITARY WASTE PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Related Requirements:
  - 1. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashing assemblies.
  - 2. Section 077200 "Roof Accessories" for preformed flashings.
  - 3. Section 078413 "Penetration Firestopping" for through-penetration firestop assemblies.
  - 4. Section 221423 "Storm Drainage Piping Specialties" for trench drains for storm water, channel drainage systems for storm water, roof drains, and catch basins.

**1.03 DEFINITIONS**

- A. ABS: Acrylonitrile butadiene styrene.
- B. PVC: Polyvinyl chloride.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
  - 1. Show fabrication and installation details for frost-resistant vent terminals.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.06 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For sanitary waste piping specialties to include in emergency, operation, and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 ASSEMBLY DESCRIPTIONS**

- A. Sanitary waste piping specialties shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary waste piping specialty components.

**2.02 CLEANOUTS**

- A. Cast-Iron Exposed Cleanouts:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. MIFAB, Inc.
    - d. Tyler Pipe, a subsidiary of McWane Inc.
    - e. WATTS
    - f. Zurn Industries, LLC
  - 2. Standard: ASME A112.36.2M.
  - 3. Size: Same as connected drainage piping
  - 4. Body Material: Hubless, cast-iron soil pipe test tee As required to match connected piping.
  - 5. Closure: Countersunk or raised-head, brass plug.
  - 6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- B. Cast-Iron Exposed Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. MIFAB, Inc
    - d. Sioux Chief Manufacturing Company, Inc.
    - e. WATTS
    - f. Zurn Industries, LLC
  2. Standard: ASME A112.36.2M for threaded, adjustable housing cleanout.
  3. Size: Same as connected branch.
  4. Body Material: As required to match piping.
  5. Closure: Brass plug with tapered threads.
  6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- C. Cast-Iron Wall Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. MIFAB, Inc
    - d. WATTS
    - e. Zurn Industries, LLC
  2. Standard: ASME A112.36.2M. Include wall access.
  3. Size: Same as connected drainage piping.
  4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
  5. Closure Plug:
    - a. Brass.
    - b. Countersunk or raised head.
    - c. Drilled and threaded for cover attachment screw.
    - d. Size: Same as or not more than one size smaller than cleanout size.
  6. Wall Access, Cover Plate: Round, flat, chrome-plated brass or stainless steel cover plate with screw.
  7. Wall Access, Frame and Cover: Round, nickel-bronze, copper-alloy, or stainless steel wall-installation frame and cover.

### **2.03 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES**

- A. Open Drains:
  1. Description: Shop or field fabricate from ASTM A74, Service Class, hub-and-spigot, cast-iron soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C564 rubber gaskets.
  2. Size: Same as connected waste piping.
- B. Air-Gap Fittings:
  1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
  2. Body: Bronze or cast iron.
  3. Inlet: Opening in top of body.
  4. Outlet: Larger than inlet.
  5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.
- C. Sleeve Flashing Device:
  1. Description: Manufactured, cast-iron fitting, with clamping device that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 1 inch above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
  2. Size: As required for close fit to riser or stack piping.

- D. Vent Caps:
  - 1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
  - 2. Size: Same as connected stack vent or vent stack.
- E. Expansion Joints:
  - 1. Standard: ASME A112.6.4.
  - 2. Body: Cast iron with bronze sleeve, packing, and gland.
  - 3. End Connections: Matching connected piping.
  - 4. Size: Same as connected soil, waste, or vent piping.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
  - 1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  - 2. Locate at each change in direction of piping greater than 45 degrees.
  - 3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
  - 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Assemble open drain fittings and install with top of hub 2 inches above floor.
- E. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.
- F. Install sleeve and sleeve seals with each riser and stack passing through floors with waterproof membrane.
- G. Install vent caps on each vent pipe passing through roof.
- H. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- I. Install wood-blocking reinforcement for wall-mounting-type specialties.

#### **3.02 PIPING CONNECTIONS**

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment, to allow service and maintenance.

#### **3.03 LABELING AND IDENTIFYING**

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit.
  - 1. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

#### **3.04 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

### **END OF SECTION**

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SANITARY WASTE PIPING  
SPECIALTIES

## SECTION 221319.13

### SANITARY DRAINS

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene styrene.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene.
- D. PE: Polyethylene.
- E. PP: Polypropylene.
- F. PVC: Polyvinyl chloride.

##### 1.03 ACTION SUBMITTALS

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

#### PART 2 PRODUCTS

##### 2.01 DRAIN ASSEMBLIES

- A. Sanitary drains shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14 for plastic sanitary piping specialty components.

##### 2.02 FLOOR DRAINS

- A. Cast-Iron Floor Drains:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. MIFAB, Inc
    - d. Sioux Chief Manufacturing Company, Inc.
    - e. Wade; a subsidiary of McWane Inc.
    - f. WATTS
    - g. Zurn Industries, LLC
  - 2. Standard: ASME A112.6.3.
  - 3. Pattern: Floor drain.
  - 4. Body Material: Gray iron.
  - 5. Seepage Flange: Required.
  - 6. Outlet: Bottom.
  - 7. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
  - 8. Top or Strainer Material: Nickel bronze.
  - 9. Top of Body and Strainer Finish: Nickel bronze.
  - 10. Top Shape: Round.
  - 11. Dimensions of Top or Strainer: As Scheduled
  - 12. Top Loading Classification: Medium Duty.
  - 13. Inlet Fitting: Not required.
  - 14. Trap Material: Cast iron.
  - 15. Trap Pattern: Standard P-trap.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
  - 1. Position floor drains for easy access and maintenance.
  - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage.
  - 3. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches or Less: Equivalent to 1 percent slope, but not less than 1/4-inch total depression.
    - b. Radius, 30 to 60 Inches: Equivalent to 1 percent slope.
    - c. Radius, 60 Inches or Larger: Equivalent to 1 percent slope, but not greater than 1-inch total depression.
  - 4. Install floor-drain flashing collar or flange, so no leakage occurs between drain and adjoining flooring.
    - a. Maintain integrity of waterproof membranes where penetrated.
  - 5. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- B. Comply with ASME A112.3.1 for installation of stainless-steel channel drainage systems.
  - 1. Install on support devices, so that top will be flush with adjacent surface.
- C. Install plastic channel drainage system components on support devices, so that top will be flush with adjacent surface.
- D. Install open drain fittings with top of hub 1 inch above floor.

### **3.02 CONNECTIONS**

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Comply with requirements in Section 221319 "Sanitary Waste Piping Specialties" for backwater valves, air admittance devices and miscellaneous sanitary drainage piping specialties.
- C. Install piping adjacent to equipment to allow service and maintenance.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### **3.03 LABELING AND IDENTIFYING**

- A. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.04 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION**

**SECTION 223300**  
**ELECTRIC, DOMESTIC-WATER HEATERS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
  - 1. Wiring Diagrams: For power, signal, and control wiring.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of electric, domestic-water heater, from manufacturer.
- B. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- C. Source quality-control reports.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

**1.05 QUALITY ASSURANCE**

- 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. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects".

**1.06 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**1.07 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including storage tank and supports.
    - b. Faulty operation of controls.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
  - 2. Warranty Periods: From date of Substantial Completion.
    - a. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:
      - 1) Storage Tank: Five years.
      - 2) Controls and Other Components: Three years.
    - b. Compression Tanks: Five years.

**PART 2 PRODUCTS**

**2.01 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS**

- A. Commercial, Light-Duty, Storage, Electric, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Bradford White Corporation.
  - b. Lochinvar Corporation.
  - c. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
  - d. State Industries.
  - e. Reliance
2. Standard: UL 174.
3. Storage-Tank Construction: Steel, vertical arrangement.
  - a. Tappings: ASME B1.20.1 pipe thread.
  - b. Pressure Rating: 150 psig.
  - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
4. Factory-Installed Storage-Tank Appurtenances:
  - a. Anode Rod: Replaceable magnesium.
  - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
  - c. Drain Valve: ASSE 1005.
  - d. Insulation: Comply with ASHRAE/IESNA 90.1.
  - e. Jacket: Steel with enameled finish.
  - f. Heat-Trap Fittings: Inlet type in cold-water inlet and outlet type in hot-water outlet.
  - g. Heating Elements: Two; electric, screw-in immersion type; wired for simultaneous operation unless otherwise indicated. Limited to 12 kW total.
  - h. Temperature Control: Adjustable thermostat.
  - i. Safety Control: High-temperature-limit cutoff device or system.
  - j. Relief Valve: ASME rated and stamped for combination temperature-and-pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.
5. Special Requirements: NSF 5 construction with legs for off-floor installation.

## **2.02 DOMESTIC-WATER HEATER ACCESSORIES**

- A. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.
- B. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1.
- C. Heat-Trap Fittings: ASHRAE 90.2.
- D. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.
- E. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.
- F. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.
- G. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

## **2.03 SOURCE QUALITY CONTROL**

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.



- D. Prepare test and inspection reports.

### **PART 3 EXECUTION**

#### **3.01 DOMESTIC-WATER HEATER INSTALLATION**

- A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete".
  - 1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
  - 2. Maintain manufacturer's recommended clearances.
  - 3. Arrange units so controls and devices that require servicing are accessible.
  - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
  - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  - 6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 7. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 8. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
  - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping".
- C. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- D. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties".
- E. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- F. Fill electric, domestic-water heaters with water.
- G. Charge domestic-water compression tanks with air.

#### **3.02 CONNECTIONS**

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping". Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

#### **3.03 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment".

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
  4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

### **3.05 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain, electric, domestic-water heaters.

**END OF SECTION**

**SECTION 224213.13**  
**COMMERCIAL WATER CLOSETS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. Effective Flush Volume: Average of two reduced flushes and one full flush per fixture.
- B. Remote Water Closet: Located more than 30 feet from other drain line connections or fixture and where less than 1.5 drainage fixture units are upstream of the drain line connection.

**1.03 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 water closets.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than one of each type.

**PART 2 PRODUCTS**

**2.01 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS**

- A. Water Closets, Floor Mounted, Bottom Outlet:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Standard.
    - b. Kohler Co.
    - c. Sloan Valve Company.
    - d. TOTO USA, INC.
    - e. Zurn Industries, LLC.
  - 2. Bowl:
    - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    - b. Material: Vitreous china.
    - c. Type: Siphon jet.
    - d. Style: Tank.
    - e. Height: As indicated in Schedule.
    - f. Rim Contour: Elongated.
    - g. Water Consumption: As indicated in Schedule.
  - 3. Bowl-to-Drain Connecting Fitting: ASME A112.4.3.
  - 4. Toilet Seat: As indicated in Schedule.

**2.02 TOILET SEATS**

- A. Toilet Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. American Standard
  - b. Bemis Manufacturing Company
  - c. Centoco Manufacturing Corporation
  - d. Church Seats; Bemis Manufacturing Company
  - e. Jones Stephens Corp.
  - f. Kohler Co
  - g. TOTO USA, INC
  - h. Zurn Industries, LLC
2. Standard: IAPMO/ANSI Z124.5.
3. Material: Plastic.
4. Type: Commercial (Standard).
5. Shape: Elongated rim, open front.
6. Hinge: Self-sustaining, check.
7. Hinge Material: Noncorroding metal.
8. Seat Cover: Not required.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before water-closet installation.
- B. Examine walls and floors for suitable conditions where water closets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION, GENERAL**

- A. Water-Closet Installation:
  1. Install level and plumb according to roughing-in drawings.
  2. Install floor-mounted water closets on bowl-to-drain connecting fitting attachments to piping or building substrate.
- B. Install toilet seats on water closets.
- C. Wall Flange and Escutcheon Installation:
  1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
  2. Install deep-pattern escutcheons if required to conceal protruding fittings.
  3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- D. Joint Sealing:
  1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
  2. Match sealant color to water-closet color.
  3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

#### **3.03 CONNECTIONS**

- A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to water closets, allow space for service and maintenance.

### **3.04 ADJUSTING**

- A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls. Insert number to complete designation. Use these designations to identify each toilet seat.

### **3.05 CLEANING AND PROTECTION**

- A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed water closets and fittings.
- C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

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**SECTION 224213.16**  
**COMMERCIAL URINALS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 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 urinals.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For flushometer valves to include in operation and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 WALL-HUNG URINALS**

- A. Urinals, Wall Hung, Back Outlet, Siphon Jet:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Standard
    - b. Kohler Co
    - c. Zurn Industries, LLC
  - 2. Fixture:
    - a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
    - b. Material: Vitreous china.
    - c. Type: Siphon jet.
    - d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
    - e. Water Consumption: As indicated in Schedule.
    - f. Spud Size and Location: NPS 3/4 (DN 20); top.
    - g. Outlet Size and Location: NPS 2 (DN 50); back.
  - 3. Flushometer Valve: As indicated in Schedule.
  - 4. Waste Fitting:
    - a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
    - b. Size: NPS 2 (DN 50).
  - 5. Support: Type I Urinal Carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.
  - 6. Urinal Mounting Height: As indicated in Plumbing Fixture Schedule.

**2.02 URINAL FLUSHOMETER VALVES**

- A. Lever-Handle, Diaphragm Flushometer Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Standard
    - b. Sloan Valve Company
    - c. Zurn Industries, LLC
  - 2. Standard: ASSE 1037.
  - 3. Minimum Pressure Rating: 125 psig.
  - 4. Features: Include integral check stop and backflow-prevention device.
  - 5. Material: Brass body with corrosion-resistant components.
  - 6. Exposed Flushometer-Valve Finish: Chrome plated.

7. Panel Finish: Chrome plated or stainless steel.
8. Style: Exposed.
9. Consumption: As indicated in Plumbing Fixture Schedule.
10. Minimum Inlet: NPS 1.
11. Minimum Outlet: NPS 1-1/4.

### **2.03 SUPPORTS**

- A. Type I Urinal Carrier:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. Wade Drains
    - d. WATTS
    - e. Zurn Industries, LLC
  2. Standard: ASME A112.6.1M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before urinal installation.
- B. Examine walls and floors for suitable conditions where urinals will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Urinal Installation:
  1. Install urinals level and plumb according to roughing-in drawings.
  2. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.
- B. Support Installation:
  1. Install supports, affixed to building substrate, for wall-hung urinals.
  2. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.
- C. Flushometer-Valve Installation:
  1. Install flushometer-valve water-supply fitting on each supply to each urinal.
  2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
  3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
- D. Wall Flange and Escutcheon Installation:
  1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.
  2. Install deep-pattern escutcheons if required to conceal protruding fittings.
  3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- E. Joint Sealing:
  1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
  2. Match sealant color to urinal color.
  3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

### **3.03 CONNECTIONS**

- A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."



- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."
- D. Where installing piping adjacent to urinals, allow space for service and maintenance.

**3.04 ADJUSTING**

- A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.
- B. Adjust water pressure at flushometer valves to produce proper flow.
- C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

**3.05 CLEANING AND PROTECTION**

- A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.
- B. Install protective covering for installed urinals and fittings.
- C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

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**SECTION 224216.13  
COMMERCIAL LAVATORIES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 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 lavatories.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For lavatories and faucets to include in operation and maintenance manuals.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
  - 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

**PART 2 PRODUCTS**

**2.01 VITREOUS-CHINA, COUNTER-MOUNTED LAVATORIES**

- A. Lavatory: Vitreous china, counter mounted.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Standard
    - b. Kohler Co
    - c. TOTO USA, INC
  - 2. Fixture:
    - a. Standard: ASME A112.19.2/CSA B45.1.
    - b. Faucet-Hole Location: Top.
    - c. Color: White.
    - d. Mounting Material: Sealant.
  - 3. Faucet: Refer to Schedule on Drawings.

**2.02 MANUALLY OPERATED LAVATORY FAUCETS**

- A. Lavatory faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61/NSF 372, or be certified in compliance with NSF 61/NSF 372 by an American National Standards Institute (ANSI) accredited third-party certification body, that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
- B. Lavatory Faucets: Manual-type, commercial, solid-brass valve.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Standard
    - b. Delta Faucet Company

- c. Elkay Manufacturing Co
- d. Just Manufacturing
- e. Kohler Co
- f. Moen Incorporated
- g. Zurn Industries, LLC
- 2. Standard: ASME A112.18.1/CSA B125.1.
- 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
- 4. Body Material: Commercial, solid brass.
- 5. Finish: Polished chrome plate.
- 6. Maximum Flow Rate: 0.5 gpm.

### **2.03 SUPPLY FITTINGS**

- A. NSF Standard: Comply with NSF 372 for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.
- F. Risers:
  - 1. NPS 1/2.
  - 2. ASME A112.18.6, braided- or corrugated-stainless-steel, flexible hose riser.

### **2.04 WASTE FITTINGS**

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/4 offset and straight tailpiece.
- C. Trap:
  - 1. Size: NPS 1-1/2 by NPS 1-1/4.
  - 2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch- thick brass tube to wall; and chrome-plated, brass or steel wall flange.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before lavatory installation.
- B. Examine counters and walls for suitable conditions where lavatories will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install lavatories level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-mounted lavatories.
- C. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- D. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- E. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

### **3.03 CONNECTIONS**

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

### **3.04 ADJUSTING**

- A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

### **3.05 CLEANING AND PROTECTION**

- A. After completing installation of lavatories, inspect and repair damaged finishes.
- B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed lavatories and fittings.
- D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

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**SECTION 224216.16  
COMMERCIAL SINKS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 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 sinks.
  - 2. Include rated capacities, operating characteristics[, electrical characteristics,] and furnished specialties and accessories.
- B. Sustainable Design Submittals:

**1.03 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For sinks to include in maintenance manuals.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Faucet Washers and O-Rings: Equal to 10 percent of amount of each type and size installed.
  - 2. Faucet Cartridges and O-Rings: Equal to 5 percent of amount of each type and size installed.

**PART 2 PRODUCTS**

**2.01 SERVICE SINKS**

- A. Service Sinks - Stand Mounted:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Acorn Engineering Company; a Division of Morris Group International
    - b. Fiat Products
    - c. Florestone Products Co., Inc.
    - d. Mustee
    - e. Stern-Williams Co., Inc
  - 2. Source Limitations: Obtain sinks from single source from single manufacturer.
  - 3. Fixture:
    - a. Shape: Square or Rectangular.
    - b. Drain: Grid with NPS 3 outlet.
  - 4. Mounting: On stand and flush to wall.
  - 5. Faucet: Refer to Schedule on Drawings.

**2.02 KITCHEN/UTILITY SINKS**

- A. Kitchen/Utility Sinks - Stainless steel, counter mounted.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Tabco
    - b. Eagle Group
    - c. Elkay Manufacturing Co
    - d. Just Manufacturing
  - 2. Source Limitations: Obtain sinks from single source from single manufacturer.

3. Fixture:
  - a. Standard: ASME A112.19.3/CSA B45.4.
  - b. Type: Stainless steel, self-rimming, sound-deadened unit.
  - c. Number of Compartments: As scheduled on Drawings.
  - d. Overall Dimensions: As scheduled on Drawings.
  - e. Metal Thickness: 0.050 inch.
4. Faucet(s): Refer to Schedule on Drawings.
5. Mounting: On counter with sealant.

### **2.03 MANUALLY OPERATED SINK FAUCETS**

- A. Sink faucets intended to convey or dispense water for human consumption are to comply with the U.S. Safe Drinking Water Act (SDWA), with requirements of the Authority Having Jurisdiction (AHJ), and with NSF 61 and NSF 372, or be certified in compliance with NSF 61 and NSF 372 by an ANSI-accredited third-party certification body, in that the weighted average lead content at wetted surfaces is less than or equal to 0.25 percent.
- B. Sink Faucets: Manual type, mixing valve.
  1. Commercial, Solid-Brass Faucets:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) American Standard
      - 2) Chicago Faucets; Geberit Company
      - 3) Delta Faucet Company
      - 4) Elkay Manufacturing Co
      - 5) Just Manufacturing
      - 6) Kohler Co
      - 7) Moen Incorporated
    2. Source Limitations: Obtain sink faucets from single source from single manufacturer.
    3. Standard: ASME A112.18.1/CSA B125.1.
    4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
    5. Body Type: Refer to Schedule on Drawings.
    6. Body Material: Commercial, solid brass.
    7. Finish: Chrome plated.
    8. Maximum Flow Rate: Refer to Schedule on Drawings.
    9. Handle(s): Refer to Schedule on Drawings.
    10. Mounting Type: Refer to Schedule on Drawings.
    11. Spout Type: Refer to Schedule on Drawings.
    12. Vacuum Breaker: Not required.
    13. Spout Outlet: Aerator.

### **2.04 SINK SUPPORTS**

- A. Sink Carrier:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Jay R. Smith Mfg Co; a division of Morris Group International
    - b. Josam Company
    - c. MIFAB, Inc
    - d. Wade Drains
    - e. WATTS
    - f. Zurn Industries, LLC
  2. Source Limitations: Obtain sink supports from single source from single manufacturer.
  3. Standard: ASME A112.6.1M.



## **2.05 SUPPLY FITTINGS**

- A. NSF Standard: Comply with NSF 372 for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type valve with inlet connection matching supply piping.
- E. Operation: Wheel handle.
- F. Risers:
  - 1. NPS 3/8.
  - 2. ASME A112.18.6, braided or corrugated stainless-steel flexible hose.

## **2.06 WASTE FITTINGS**

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.
- C. Trap:
  - 1. Size: NPS 1-1/2.
  - 2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.

## **2.07 GROUT**

- A. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-hung sinks.
- C. Install accessible wall-mounted sinks at handicapped/elderly mounting height according to ICC/ANSI A117.1.
- D. Set floor-mounted sinks in leveling bed of cement grout.
- E. Install water-supply piping with stop on each supply to each sink faucet.
  - 1. Exception: Use ball or gate valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523.12 "Ball Valves for Plumbing Piping" and Section 220523.15 "Gate Valves for Plumbing Piping."
  - 2. Install stops in locations where they can be easily reached for operation.
- F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

- G. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."
- H. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

### **3.03 CONNECTIONS**

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

### **3.04 ADJUSTING**

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

### **3.05 CLEANING AND PROTECTION**

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

**SECTION 224716**  
**PRESSURE WATER COOLERS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of pressure water cooler.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Sustainable Design Submittals:
  - 1. Product Data: For water consumption.
- C. Shop Drawings: Include diagrams for power, signal, and control wiring.

**1.03 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

**1.04 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Filter Cartridges: Equal to 10 percent of quantity installed for each type and size indicated, but no fewer than 1 of each.

**PART 2 PRODUCTS**

**2.01 PRESSURE WATER COOLERS**

- A. Pressure Water Coolers: Wall mounted, wheelchair accessible.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Elkay Manufacturing Co.
    - b. Halsey Taylor.
    - c. Haws Corporation.
    - d. Larco Inc.
    - e. Tri Palm International, LLC.
  - 2. Cabinet: Single, all stainless steel.
  - 3. Bubbler: One, with adjustable stream regulator, located on each cabinet deck.
  - 4. Bottle Filling Station:
    - a. Bottle Filler: Fill rate 0.5 to 1.5 gpm.
    - b. Electronic Filler Sensor.
    - c. Bottle filler counter: Digital display showing 20 oz. plastic water bottles saved from waste.
  - 5. Control: Push bar.
  - 6. Drain: Grid with NPS 1-1/4 tailpiece.
  - 7. Supply: NPS 3/8 with shutoff valve.
  - 8. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 brass P-trap.
  - 9. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.
  - 10. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

- 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.
- 11. Capacities and Characteristics:
  - a. Cooled Water: 8 gph.
  - b. Ambient-Air Temperature: 90 deg F.
  - c. Inlet-Water Temperature: 80 deg F.
  - d. Cooled-Water Temperature: 50 deg F.
  - e. Electrical Characteristics:
    - 1) Volts: 120-V ac.
    - 2) Phase: Single.
    - 3) Hertz: 60.
    - 4) Full-Load Amperes: 6.
- 12. Support: Type I Water Cooler Carrier.
- 13. Water Cooler Mounting Height: Handicapped/elderly according to ICC A117.1.

## **2.02 SUPPORTS**

- A. Type I Water Cooler Carrier:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.
    - d. Wade Drains.
    - e. Watts; a Watts Water Technologies company.
    - f. Zurn Industries, LLC.
  - 2. Standard: ASME A112.6.1M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.
- B. Examine walls and floors for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.
- B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.
- C. Install mounting frames, affixed to building construction, and attach recessed, pressure water coolers to mounting frames.
- D. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball or gate valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523.12 "Ball Valves for Plumbing Piping" and Section 220523.15 "Gate Valves for Plumbing Piping."
- E. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.
- F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."
- G. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

### **3.03 CONNECTIONS**

- A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."
- C. Install ball shutoff valve on water supply to each fixture. Install valve upstream from filter for water cooler.
- D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

### **3.04 ADJUSTING**

- A. Adjust fixture flow regulators for proper flow and stream height.
- B. Adjust pressure water-cooler temperature settings.

### **3.05 CLEANING**

- A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.
- B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.
- C. Provide protective covering for installed fixtures.
- D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

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**SECTION 230500**  
**COMMON WORK RESULTS FOR HVAC**

**PART 1 GENERAL**

**1.01 DESCRIPTION**

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

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Piping materials and installation instructions common to most piping systems.
  - 2. Transition fittings.
  - 3. Dielectric fittings.
  - 4. Mechanical sleeve seals.
  - 5. Sleeves.
  - 6. Escutcheons.
  - 7. Grout.
  - 8. HVAC demolition.
  - 9. Equipment installation requirements common to equipment sections.
  - 10. Painting and finishing.
  - 11. Supports and anchorages.

**1.03 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
  - 1. CPVC: Chlorinated polyvinyl chloride plastic.
  - 2. PE: Polyethylene plastic.
  - 3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
  - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.
  - 2. NBR: Acrylonitrile-butadiene rubber.

**1.04 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Transition fittings.
  - 2. Dielectric fittings.
  - 3. Mechanical sleeve seals.
  - 4. Escutcheons.
- B. Welding certificates.

## **1.05 QUALITY ASSURANCE**

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel".
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications".
  - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping".
  - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. All costs, regardless of discipline, associated with providing alternate equipment shall be the responsibility of contractor providing equipment. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

## **1.07 COORDINATION**

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors".

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### **2.02 PIPE, TUBE, AND FITTINGS**

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### **2.03 JOINING MATERIALS**

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.



- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

#### **2.04 DIELECTRIC FITTINGS**

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
  - 1. Manufacturers:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Eclipse, Inc.
    - d. Epco Sales, Inc.
    - e. Hart Industries, International, Inc.
    - f. Watts Industries, Inc.; Water Products Div.
    - g. Zurn Industries, Inc.; Wilkins Div.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300-psig minimum working pressure as required to suit system pressures.
  - 1. Manufacturers:
    - a. Capitol Manufacturing Co.
    - b. Central Plastics Company.
    - c. Epco Sales, Inc.
    - d. Watts Industries, Inc.; Water Products Div.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
  - 1. Manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Central Plastics Company.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Separate companion flanges and steel bolts and nuts shall have 150 or 300-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
  - 1. Manufacturers:
    - a. Calpico, Inc.
    - b. Lochinvar Corp.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.
  - 1. Manufacturers:
    - a. Perfection Corp.
    - b. Precision Plumbing Products, Inc.
    - c. Sioux Chief Manufacturing Co., Inc.
    - d. Victaulic Co. of America.

#### **2.05 GROUT**

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

### **PART 3 EXECUTION**

#### **3.01 HVAC DEMOLITION**

- A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.
  1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
  3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
  4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
  5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
  7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

#### **3.02 PIPING SYSTEMS - COMMON REQUIREMENTS**

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.

- L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- M. Verify final equipment locations for roughing-in.
- N. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### **3.03 PIPING JOINT CONSTRUCTION**

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipefittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

### **3.04 PIPING CONNECTIONS**

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
  - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

### **3.05 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS**

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

### **3.06 PAINTING**

- A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting".
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### **3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- B. Field Welding: Comply with AWS D1.1.

### **3.08 GROUTING**

- A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

**END OF SECTION**

## SECTION 230513

### COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  1. Motor controllers.
  2. Torque, speed, and horsepower requirements of the load.
  3. Ratings and characteristics of supply circuit and required control sequence.
  4. Ambient and environmental conditions of installation location.

##### 1.03 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of motors that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, the following:
    2. Motor winding failure.
    3. Warranty Period: Five years from date of Substantial Completion.

#### PART 2 PRODUCTS

##### 2.01 GENERAL MOTOR REQUIREMENTS

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

##### 2.02 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 104 deg F and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

##### 2.03 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Premium efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
  1. For motors with 2:1 speed ratio, consequent pole, single winding.
  2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Class B.
- I. Insulation: Class F.
- J. Code Letter Designation:
  1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
- K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

- L. Provide shaft grounding (diverter) ring on drive end of all vertical motors.

#### **2.04 SINGLE-PHASE MOTORS**

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
  - 1. Permanent-split capacitor.
  - 2. Split phase.
  - 3. Capacitor start, inductor run.
  - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

#### **PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

**SECTION 230517**  
**SLEEVES AND SLEEVE SEALS FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Sleeves without waterstop.
  - 2. Sleeves with waterstop.
  - 3. Stack-sleeve fittings.
  - 4. Sleeve-seal systems.
  - 5. Grout.

**1.02 ACTION SUBMITTALS**

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

**1.03 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**PART 2 PRODUCTS**

**2.01 SLEEVES WITHOUT WATERSTOP**

- A. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends.
- B. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, hot-dip galvanized, with plain ends.
- C. Steel Sheet Sleeves: ASTM A653/A653M, 0.0239-inch minimum thickness; hot-dip galvanized, round tube closed with welded longitudinal joint.
- D. PVC Pipe Sleeves: ASTM D1785, Schedule 40.
- E. Molded-PVC Sleeves: With nailing flange for attaching to wooden forms.

**2.02 SLEEVES WITH WATERSTOP**

- A. Description: Manufactured galvanized steel, sleeve-type, waterstop assembly, made for imbedding in concrete slab or wall.

**2.03 STACK-SLEEVE FITTINGS**

- A. Description: Manufactured, Dura-coated or Duco-coated cast-iron sleeve with integral cast flashing flange for use in waterproof floors and roofs. Include clamping ring, bolts, and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with setscrews.

**2.04 SLEEVE-SEAL SYSTEMS**

- A. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
  - 1. Designed to form a hydrostatic seal of 20 psig.
  - 2. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size.
  - 3. Pressure Plates: Carbon steel.
  - 4. Connecting Bolts and Nuts: Carbon steel, with ASTM B633 coating of length required to secure pressure plates to sealing elements.

**2.05 GROUT**

- A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000 psi, 28-day compressive strength.

- D. Packaging: Premixed and factory packaged.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION OF SLEEVES - GENERAL**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  - 1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
  - 2. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 3. Using grout, seal space outside of sleeves in slabs and walls without sleeve-seal system.
- D. Install sleeves for pipes passing through interior partitions.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 3. Seal annular space between sleeve and piping or piping insulation; use sealants appropriate for size, depth, and location of joint.

#### **3.02 INSTALLATION OF SLEEVES WITH WATERSTOP**

- A. Install sleeve with waterstop as new walls and slabs are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal space around outside of sleeves.

#### **3.03 INSTALLATION OF STACK-SLEEVE FITTINGS**

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
  - 1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Comply with requirements for flashing specified in Section 076200 "Sheet Metal Flashing and Trim."
  - 3. Install section of cast-iron soil pipe to extend sleeve to 3 inches above finished floor level.
  - 4. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 5. Using waterproof silicone sealant, seal space between top hub of stack-sleeve fitting and pipe.
- B. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

#### **3.04 INSTALLATION OF SLEEVE-SEAL SYSTEMS**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building, and passing through exterior walls.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal-system components, and install in annular space between piping and



sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### **3.05 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.
  - 2. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.
- B. Prepare test and inspection reports.

### **3.06 SLEEVE SCHEDULE**

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls above and below Grade:
    - a. Sleeves with waterstops.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 2. Concrete Slabs-on-Grade:
    - a. Sleeves with waterstops.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 3. Concrete Slabs above Grade:
    - a. Sleeves with waterstops or stack-sleeve fittings.
  - 4. Interior Walls and Partitions:
    - a. Sleeves without waterstops.

**END OF SECTION**

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**SECTION 230518**  
**ESCUTCHEONS FOR HVAC PIPING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Escutcheons.
  - 2. Floor plates.

**1.03 DEFINITIONS**

- A. Existing Piping to Remain: Existing piping that is not to be removed and that is not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

**1.04 ACTION SUBMITTALS**

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

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

**2.02 ESCUTCHEONS**

- A. One-Piece, Steel Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Stainless-Steel Type: With polished stainless-steel finish.
- C. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- D. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped with polished, chrome-plated finish and spring-clip fasteners.
- E. One-Piece, Stamped-Steel Type: With polished, chrome-plated finish and spring-clip fasteners.
- F. Split-Plate, Stamped-Steel Type: With polished, chrome-plated finish; concealed and exposed-rivet hinge; and spring-clip fasteners.

**2.03 FLOOR PLATES**

- A. Split Floor Plates: Steel with concealed hinge.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping and Relocated Existing Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep pattern.
    - b. Chrome-Plated Piping: One-piece steel with polished, chrome-plated finish.
    - c. Insulated Piping: One-piece steel with polished, chrome-plated finish.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
    - e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece steel with polished, chrome-plated finish.
    - f. Bare Piping in Unfinished Service Spaces: One-piece steel with polished, chrome-plated finish.

- g. Bare Piping in Equipment Rooms: One-piece steel with polished, chrome-plated finish.
- 2. Escutcheons for Existing Piping to Remain:
  - a. Chrome-Plated Piping: Split-plate, stamped steel with concealed hinge with polished, chrome-plated finish.
  - b. Insulated Piping: Split-plate, stamped steel with concealed or exposed-rivet hinge with polished, chrome-plated finish.
  - c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-plate, stamped steel with concealed or exposed-rivet hinge with polished, chrome-plated finish.
  - d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-plate, stamped steel with concealed or exposed-rivet hinge with polished, chrome-plated finish.
  - e. Bare Piping in Unfinished Service Spaces: Split-plate, stamped steel with concealed or exposed-rivet hinge with polished, chrome-plated finish.
  - f. Bare Piping in Equipment Rooms: Split-plate, stamped steel with concealed or exposed-rivet hinge with polished, chrome-plated finish.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. New Piping and Relocated Existing Piping: Split floor plate.
  - 2. Existing Piping to Remain: Split floor plate.

### **3.02 FIELD QUALITY CONTROL**

- A. Using new materials, replace broken and damaged escutcheons and floor plates.

**END OF SECTION**

## SECTION 230529

### HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 DEFINITIONS

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

##### 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
  - 1. Metal framing systems.
  - 2. Pipe stands.
  - 3. Equipment supports.

##### 1.04 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

##### 1.05 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel".
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

#### PART 2 PRODUCTS

##### 2.01 METAL PIPE HANGERS AND SUPPORTS

- A. Carbon-Steel Pipe Hangers and Supports:
  - 1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  - 2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  - 3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
  - 4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  - 5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
  - 1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
  - 2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

##### 2.02 METAL FRAMING SYSTEMS

- A. Non-MFMA Manufacturer Metal Framing Systems:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Anvil International; a subsidiary of Mueller Water Products Inc.
    - b. ERICO International Corporation.
    - c. Haydon Corporation; H-Strut Division.
    - d. NIBCO INC.
    - e. PHD Manufacturing, Inc.
    - f. PHS Industries, Inc.
  - 2. Description: Shop- or field-fabricated pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
  - 3. Standard: Comply with MFMA-4.

4. Channels: Continuous slotted steel channel with inturned lips.
5. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
6. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
7. Coating: Paint.

### **2.03 THERMAL-HANGER SHIELD INSERTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Carpenter & Paterson, Inc.
  2. Clement Support Services.
  3. ERICO International Corporation.
  4. National Pipe Hanger Corporation.
  5. PHS Industries, Inc.
  6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
  7. Piping Technology & Products, Inc.
  8. Rilco Manufacturing Co., Inc.
- B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

### **2.04 EQUIPMENT SUPPORTS**

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

### **2.05 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi, 28-day compressive strength.

## **PART 3 EXECUTION**

### **3.01 HANGER AND SUPPORT INSTALLATION**

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
  1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.

- I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4 (DN 100): 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
  - 5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
  - 6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### **3.02 EQUIPMENT SUPPORTS**

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### **3.03 METAL FABRICATIONS**

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.04 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.05 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.06 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and metal framing systems and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F, pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
  - 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
  - 5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8.
  - 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8.
  - 10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8.
  - 11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3.



12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
  15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- M. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

**END OF SECTION**

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## SECTION 230553

### IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

#### PART 1 GENERAL

##### 1.01 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment-Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve-numbering scheme.
- E. Valve Schedules: Provide for each piping system. Include in operation and maintenance manuals.

#### PART 2 PRODUCTS

##### 2.01 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Brady Corporation.
    - b. Craftmark Pipe Markers.
    - c. Seton Identification Products; a Brady Corporation company.
  - 2. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
  - 3. Letter and Background Color: As indicated for specific application under Part 3.
  - 4. Maximum Temperature: Able to withstand temperatures of up to 160 deg F.
  - 5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  - 6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  - 7. Fasteners: Stainless steel rivets or self-tapping screws.
  - 8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

##### 2.02 WARNING SIGNS AND LABELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Brady Corporation.
  - 2. Craftmark Pipe Markers.
  - 3. Seton Identification Products; a Brady Corporation company.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, with predrilled holes for attachment hardware.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Maximum Temperature: Able to withstand temperatures of up to 160 deg F .
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch).
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater

viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

- G. Fasteners: Stainless steel rivets or self-taping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Arc-Flash Warning Signs: Provide arc-flash warning signs in locations and with content in accordance with requirements of OSHA and NFPA70E and other applicable codes and standards.
- J. Label Content: Include caution and warning information plus emergency notification instructions.

### **2.03 PIPE LABELS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Brady Corporation.
  - 2. Craftmark Pipe Markers.
  - 3. Seton Identification Products; a Brady Corporation company.
- B. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service and showing flow direction in accordance with ASME A13.1.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- E. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- F. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings. Also include:
  - 1. Pipe size.
  - 2. Flow-Direction Arrows: Include flow-direction arrows on distribution piping. Arrows may be either integral with label or applied separately.
  - 3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

### **2.04 DUCT LABELS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Brady Corporation.
  - 2. Craftmark Pipe Markers.
  - 3. Seton Identification Products; a Brady Corporation company.
- B. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving 1/8 inch thick, and having predrilled holes for attachment hardware.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances of up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings. Also include the following:
  - 1. Duct size.

2. Flow-Direction Arrows: Include flow-direction arrows on distribution ducts. Arrows may be either integral with label or may be applied separately.
3. Lettering Size: At least 1/2 inch for viewing distances of up to 72 inches and proportionately larger lettering for greater viewing distances.

## **2.05 VALVE TAGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Brady Corporation.
  2. Craftmark Pipe Markers.
  3. Seton Identification Products; a Brady Corporation company.
- B. Description: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
  1. Tag Material: Brass, 0.04-inch minimum thickness, with predrilled or stamped holes for attachment hardware.
  2. Fasteners: Brasslink chain or beaded chain or S-hook.
- C. Letter and Background Color: As indicated for specific application under Part 3.
- D. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
  1. Include valve-tag schedule in operation and maintenance data.

## **2.06 WARNING TAGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Brady Corporation.
  2. Craftmark Pipe Markers.
  3. Seton Identification Products; a Brady Corporation company.
- B. Description: Preprinted or partially preprinted accident-prevention tags of plasticized card stock with matte finish suitable for writing.
  1. Size: Approximately 4 by 7 inches .
  2. Fasteners: Brass grommet and wire.
  3. Nomenclature: Large-size primary caption, such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Letter and Background Color: As indicated for specific application under Part 3.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Clean piping and equipment surfaces of incompatible primers, paints, and encapsulants, as well as dirt, oil, grease, release agents, and other substances that could impair bond of identification devices.

### **3.02 INSTALLATION, GENERAL REQUIREMENTS**

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Locate identifying devices so that they are readily visible from the point of normal approach.

### **3.03 INSTALLATION OF EQUIPMENT LABELS, WARNING SIGNS, AND LABELS**

- A. Permanently fasten labels on each item of mechanical equipment.
- B. Sign and Label Colors:
  1. White letters on an ANSI Z535.1 safety-blue background.

- C. Locate equipment labels where accessible and visible.
- D. Arc-Flash Warning Signs: Provide arc-flash warning signs on electrical disconnects and other equipment where arc-flash hazard exists, as indicated on Drawings, and in accordance with requirements of OSHA and NFPA 70E, and other applicable codes and standards.

### **3.04 INSTALLATION OF PIPE LABELS**

- A. Install pipe labels showing service and flow direction with permanent adhesive on pipes.
- B. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Within 3 ft. of each valve and control device.
  - 2. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 3. Within 3 ft. of equipment items and other points of origination and termination.
  - 4. Spaced at maximum intervals of 25 ft. along each run. Reduce intervals to 10 ft. in areas of congested piping, ductwork, and equipment.
- C. Do not apply plastic pipe labels or plastic tapes directly to bare pipes conveying fluids at temperatures of 125 deg F or higher. Where these pipes are to remain uninsulated, use a short section of insulation or use stenciled labels.
- D. Flow-Direction Arrows: Use arrows to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.
- E. Pipe-Label Color Schedule:
  - 1. Refrigerant Piping: White letters on an ANSI Z535.1 safety-blue background.
  - 2. Flammable Fluids: Black letters on an ANSI Z535.1 safety-yellow background.

### **3.05 INSTALLATION OF DUCT LABELS**

- A. Install plastic-laminated, self-adhesive duct labels showing service and flow direction with permanent adhesive on air ducts.
  - 1. Provide labels in the following color codes:
    - a. For air supply ducts: White letters on blue background.
    - b. For air return ducts: White letters on blue background.
    - c. For exhaust-, outside-, relief-, return-, and mixed-air ducts: White letters on blue background.
- B. Locate label near each point where ducts enter into and exit from concealed spaces and at maximum intervals of 20 ft. where exposed or are concealed by removable ceiling system.

### **3.06 INSTALLATION OF VALVE TAGS**

- A. Install tags on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, shutoff valves, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule in the operating and maintenance manual.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below.
  - 1. Valve-Tag Size and Shape:
    - a. Refrigerant: 2 inches, round.
    - b. Gas: 2 inches, round.
  - 2. Valve-Tag Colors:
    - a. For each piping system, use the same lettering and background coloring system on valve tags as used for the Pipe Label Schedule text and background.

### **3.07 INSTALLATION OF WARNING TAGS**

- A. Warning Tag Color: Black letters on an ANSI Z535.1 safety-yellow background.

- B. Attach warning tags, with proper message, to equipment and other items where indicated on Drawings.

**END OF SECTION**

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**SECTION 230593**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An independent entity meeting qualifications to perform TAB work.
- F. TDH: Total dynamic head.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Certified TAB reports.
- C. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

**1.04 QUALITY ASSURANCE**

- A. TAB Specialists Qualifications, Certified by AABC:
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
  - 2. TAB Technician: Employee of the TAB specialist and certified by AABC.
- B. TAB Specialists Qualifications, Certified by NEBB or TABB:
  - 1. TAB Field Supervisor: Employee of the TAB specialist and certified by NEBB or TABB.
  - 2. TAB Technician: Employee of the TAB specialist and certified by NEBB or TABB.
- C. Code and AHJ Compliance: TAB is required to comply with governing codes and requirements of authorities having jurisdiction.

**1.05 FIELD CONDITIONS**

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION**

**3.01 TAB SPECIALISTS**

- A. Subject to compliance with requirements with either AABC, NEBB, or TABB certified test and balance firm.
- B. Subject to compliance with requirements, engage one of the following:
  - 1. Design Control Inc.
    - a. 1529 4th Avenus North
    - b. Fargo, North Dakota 58102

- c. (701) 237-3037
- 2. Balancing Professionals
  - a. 2000 University Drive, Suite 3
  - b. Bismarck, North Dakota 68504
  - c. (701) 751-4871
- 3. Pre-Approved Equal.

### 3.02 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.
- B. Examine installed systems for balancing devices, such as test ports, gauge cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine ceiling plenums and underfloor air plenums used for HVAC to verify that they are properly separated from adjacent areas and sealed.
- F. Examine equipment performance data, including fan and pump curves.
- G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- H. Examine test reports specified in individual system and equipment Sections.
- I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.
- J. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- K. Examine operating safety interlocks and controls on HVAC equipment.
- L. Examine control dampers for proper installation for their intended function of isolating, throttling, diverting, or mixing air flows.
- M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.03 PREPARATION

- A. Prepare a TAB plan that includes the following:
  - 1. Equipment and systems to be tested.
  - 2. Strategies and step-by-step procedures for balancing the systems.
  - 3. Instrumentation to be used.
  - 4. Sample forms with specific identification for all equipment.
- B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:
  - 1. Airside:
    - a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
    - b. Duct systems are complete with terminals installed.
    - c. Volume, smoke, and fire dampers are open and functional.
    - d. Clean filters are installed.
    - e. Fans are operating, free of vibration, and rotating in correct direction.
    - f. Variable-frequency controllers' startup is complete and safeties are verified.
    - g. Automatic temperature-control systems are operational.

- h. Ceilings are installed.
- i. Windows and doors are installed.
- j. Suitable access to balancing devices and equipment is provided.

### **3.04 GENERAL PROCEDURES FOR TESTING AND BALANCING**

- A. Perform testing and balancing procedures on each system in accordance with the procedures contained in AABC's "National Standards for Total System Balance" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and in this Section.
- B. Cut insulation, ducts, pipes, and equipment casings for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
  - 3. Where holes for probes are required in piping or hydronic equipment, install pressure and temperature test plugs to seal systems.
  - 4. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish in accordance with Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### **3.05 TESTING, ADJUSTING, AND BALANCING OF HVAC EQUIPMENT**

- A. Test, adjust, and balance HVAC equipment indicated on Drawings, including, but not limited to, the following:
  - 1. Motors.
  - 2. Fans and ventilators.
  - 3. Furnaces.
  - 4. Unit heaters.
  - 5. Split-system air conditioners.
  - 6. Valance heating and cooling units.
  - 7. Humidifiers.

### **3.06 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS**

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' Record drawings duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.

### 3.07 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
    - b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses close to the fan and prior to any outlets, to obtain total airflow.
    - c. Where duct conditions are unsuitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
  - 2. Measure fan static pressures as follows:
    - a. Measure static pressure directly at the fan outlet or through the flexible connection.
    - b. Measure static pressure directly at the fan inlet or through the flexible connection.
    - c. Measure static pressure across each component that makes up the air-handling system.
    - d. Report artificial loading of filters at the time static pressures are measured.
  - 3. Review Contractor-prepared shop drawings and Record drawings to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  - 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
  - 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.
  - 1. Measure airflow of submain and branch ducts.
  - 2. Adjust submain and branch duct volume dampers for specified airflow.
  - 3. Re-measure each submain and branch duct after all have been adjusted.
- C. Adjust air inlets and outlets for each space to indicated airflows.
  - 1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
  - 2. Measure inlets and outlets airflow.
  - 3. Adjust each inlet and outlet for specified airflow.
  - 4. Re-measure each inlet and outlet after they have been adjusted.
- D. Verify final system conditions.
  - 1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
  - 2. Re-measure and confirm that total airflow is within design.
  - 3. Re-measure all final fan operating data, speed, volts, amps, and static profile.
  - 4. Mark all final settings.
  - 5. Test system in economizer mode. Verify proper operation and adjust if necessary.
  - 6. Measure and record all operating data.
  - 7. Record final fan-performance data.

### 3.08 PROCEDURES FOR MOTORS

- A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:
  - 1. Manufacturer's name, model number, and serial number.
  - 2. Motor horsepower rating.
  - 3. Motor rpm.

4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

### **3.09 PROCEDURES FOR AIR-COOLED CONDENSING UNITS**

- A. Verify proper rotation of fan(s).
- B. Measure and record entering- and leaving-air temperatures.
- C. Measure and record entering and leaving refrigerant pressures.
- D. Measure and record operating data of compressor(s), fan(s), and motors.

### **3.10 DUCT LEAKAGE TESTS**

- A. Witness the duct leakage testing performed by Installer.
- B. Verify that proper test methods are used and that leakage rates are within specified limits.
- C. Report deficiencies observed.

### **3.11 TOLERANCES**

- A. Set HVAC system's airflow rates and water flow rates within the following tolerances:
  1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus 10 percent or minus 5 percent . If design value is less than 100 cfm, within 10 cfm.
  2. Air Outlets and Inlets: Plus or minus 10 percent. If design value is less than 100 cfm, within 10 cfm.
- B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

### **3.12 FINAL REPORT**

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
  1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  2. Include a list of instruments used for procedures, along with proof of calibration.
  3. Certify validity and accuracy of field data.
- B. Final Report Contents: In addition to certified field-report data, include the following:
  1. Fan curves.
  2. Manufacturers' test data.
  3. Field test reports prepared by system and equipment installers.
  4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.
- C. General Report Data: In addition to form titles and entries, include the following data:
  1. Title page.
  2. Name and address of the TAB specialist.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents, including the following:
    - a. Indicated versus final performance.

- b. Notable characteristics of systems.
  - c. Description of system operation sequence if it varies from the Contract Documents.
12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans performance forms, including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Heating coil, dry-bulb conditions.
    - e. Fan drive settings, including settings and percentage of maximum pitch diameter.
    - f. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
  2. Duct, outlet, and inlet sizes.
  3. Position of balancing devices.
- E. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:
1. Unit Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Fuel type in input data.
    - g. Output capacity in Btu/h.
    - h. Ignition type.
    - i. Burner-control types.
    - j. Motor horsepower and speed.
    - k. Motor volts, phase, and hertz.
    - l. Motor full-load amperage and service factor.
    - m. Sheave make, size in inches, and bore.
    - n. Center-to-center dimensions of sheave and amount of adjustments in inches.
  2. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Entering-air temperature in deg F.
    - c. Leaving-air temperature in deg F.
    - d. Air temperature differential in deg F.
    - e. Entering-air static pressure in inches wg.
    - f. Leaving-air static pressure in inches wg.
    - g. Air static-pressure differential in inches wg.
    - h. Low-fire fuel input in Btu/h.
    - i. High-fire fuel input in Btu/h.
    - j. Manifold pressure in psig.
    - k. High-temperature-limit setting in deg F.
    - l. Operating set point in Btu/h.
    - m. Motor voltage at each connection.
    - n. Motor amperage for each phase.
    - o. Heating value of fuel in Btu/h.
- F. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:

- a. System fan and air-handling-unit number.
  - b. Location and zone.
  - c. Traverse air temperature in deg F.
  - d. Duct static pressure in inches wg.
  - e. Duct size in inches.
  - f. Duct area in sq. ft..
  - g. Indicated airflow rate in cfm.
  - h. Indicated velocity in fpm.
  - i. Actual airflow rate in cfm.
  - j. Actual average velocity in fpm.
  - k. Barometric pressure in psig.
- G. Instrument Calibration Reports:
- 1. Report Data:
    - a. Instrument type and make.
    - b. Serial number.
    - c. Application.
    - d. Dates of use.
    - e. Dates of calibration.

### **3.13 VERIFICATION OF TAB REPORT**

- A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.
- B. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to the lesser of either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
- C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
- D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the TAB shall be considered incomplete and shall be rejected.
- E. If recheck measurements find the number of failed measurements noncompliant with requirements indicated, proceed as follows:
  - 1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection. All changes shall be tracked to show changes made to previous report.
  - 2. If the second final inspection also fails, Owner may pursue others Contract options to complete TAB work.
- F. Prepare test and inspection reports.

### **3.14 ADDITIONAL TESTS**

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.
- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

**END OF SECTION**

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**SECTION 230713**  
**DUCT INSULATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Related Sections:
  - 1. Section 230719 "HVAC Piping Insulation."

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.07 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

**1.08 SCHEDULING**

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## **PART 2 PRODUCTS**

### **2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C553, Type II and ASTM C1290, Type I. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation; Saint-Gobain North America.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Knauf Insulation.
    - d. Manson Insulation Inc.
    - e. Owens Corning.
- G. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation; Saint-Gobain North America.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Knauf Insulation.
    - d. Manson Insulation Inc.
    - e. Owens Corning.
- H. Mineral-Fiber, Pipe and Tank Insulation: Mineral or glass fibers bonded with a thermosetting resin. Semirigid board material with factory-applied ASJ complying with ASTM C1393, Type II or Type IIIA Category 2, or with properties similar to ASTM C612, Type IB. Nominal density is 2.5 lb/cu. ft. or more. Thermal conductivity (k-value) at 100 deg F is 0.29 Btu x in./h x sq. ft. x deg F or less. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation; Saint-Gobain North America.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Knauf Insulation.
    - d. Manson Insulation Inc.
    - e. Owens Corning.

### **2.02 ADHESIVES**

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Childers Brand; H. B. Fuller Construction Products.
  - b. Foster Brand; H. B. Fuller Construction Products.
- C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
- D. PVC Jacket Adhesive: Compatible with PVC jacket.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Johns Manville; a Berkshire Hathaway company.
    - b. The Dow Chemical Company.

### 2.03 MASTICS AND COATINGS

- A. Materials shall be compatible with insulation materials, jackets, and substrates.
- B. Vapor-Retarder Mastic: Water based; suitable for indoor use on below ambient services.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
    - c. Knauf Insulation.
  - 2. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.
  - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
  - 4. Comply with MIL-PRF-19565C, Type II, for permeance requirements.
  - 5. Color: White.
- C. Vapor-Retarder Mastic: Solvent based; suitable for indoor use on below ambient services.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
  - 2. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.
  - 3. Service Temperature Range: 0 to 180 deg F.
  - 4. Color: White.
- D. Vapor-Retarder Mastic: Solvent based; suitable for outdoor use on below ambient services.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
  - 2. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.
  - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
  - 4. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
    - c. Knauf Insulation.
  - 2. Water-Vapor Permeance: ASTM E96, greater than 1.0 perm at manufacturer's recommended dry film thickness.

3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Color: White.

#### **2.04 LAGGING ADHESIVES**

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
    - b. Foster Brand; H. B. Fuller Construction Products.
  2. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
  3. Service Temperature Range: 0 to plus 180 deg F.
  4. Color: White.

#### **2.05 SEALANTS**

- A. ASJ Flashing Sealants, and Vinyl and PVC Jacket Flashing Sealants:
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Childers Brand; H. B. Fuller Construction Products.
  2. Materials shall be compatible with insulation materials, jackets, and substrates.
  3. Fire- and water-resistant, flexible, elastomeric sealant.
  4. Service Temperature Range: Minus 40 to plus 250 deg F.
  5. Color: White.

#### **2.06 FACTORY-APPLIED JACKETS**

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
  1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C1136, Type I.
  2. FSP Jacket: Aluminum-foil, fiberglass-reinforced scrim with polyethylene backing; complying with ASTM C1136, Type II.
  3. Vinyl Jacket: White vinyl with a permeance of 1.3 perms when tested according to ASTM E96/E96M, Procedure A, and complying with NFPA 90A and NFPA 90B.

#### **2.07 TAPES**

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C1136.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.
    - b. Compac Corporation.
    - c. Ideal Tape Co., Inc., an American Biltrite Company.
    - d. Knauf Insulation.
    - e. Venture Tape.
  2. Width: 3 inches.
  3. Thickness: 11.5 mils.
  4. Adhesion: 90 ounces force/inch in width.
  5. Elongation: 2 percent.
  6. Tensile Strength: 40 lbf/inch in width.
  7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.

- b. Compac Corporation.
    - c. Ideal Tape Co., Inc., an American Biltrite Company.
    - d. Knauf Insulation.
    - e. Venture Tape.
  - 2. Width: 3 inches.
  - 3. Thickness: 6.5 mils .
  - 4. Adhesion: 90 ounces force/inch in width.
  - 5. Elongation: 2 percent.
  - 6. Tensile Strength: 40 lbf/inch in width.
  - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Compac Corporation.
    - b. Ideal Tape Co., Inc., an American Biltrite Company.
    - c. Venture Tape.
  - 2. Width: 2 inches.
  - 3. Thickness: 6 mils.
  - 4. Adhesion: 64 ounces force/inch in width.
  - 5. Elongation: 500 percent.
  - 6. Tensile Strength: 18 lbf/inch in width.
- D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division.
    - b. Compac Corporation.
    - c. Ideal Tape Co., Inc., an American Biltrite Company.
    - d. Knauf Insulation.
    - e. Venture Tape.
  - 2. Width: 2 inches.
  - 3. Thickness: 3.7 mils.
  - 4. Adhesion: 100 ounces force/inch in width.
  - 5. Elongation: 5 percent.
  - 6. Tensile Strength: 34 lbf/inch in width.

## 2.08 SECUREMENTS

- A. Bands:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ITW Insulation Systems; Illinois Tool Works, Inc.
    - b. RPR Products, Inc.
  - 2. Stainless Steel: ASTM A167 or ASTM A240/A240M, Type 304 or Type 316; 0.015 inch thick, 1/2 inch wide with wing seal or closed seal.
  - 3. Aluminum: ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
  - 4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.
- B. Insulation Pins and Hangers:
- 1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch- diameter shank, length to suit depth of insulation indicated.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) AGM Industries, Inc.
  - 2) Gemco.
  - 3) Hardcast; a Carlisle Company.
  - 4) Midwest Fasteners, Inc.
  - 5) Nelson Stud Welding.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) AGM Industries, Inc.
      - 2) Gemco.
      - 3) Hardcast; a Carlisle Company.
      - 4) Midwest Fasteners, Inc.
      - 5) Nelson Stud Welding.
    - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
  - C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
  - D. Wire: 0.080-inch nickel-copper alloy.
    1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      - a. C & F Wire.

## **2.09 CORNER ANGLES**

- A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  1. Verify that systems to be insulated have been tested and are free of defects.
  2. Verify that surfaces to be insulated are clean and dry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.

- I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

### 3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  - 4. Seal jacket to wall flashing with flashing sealant.

- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
  - 1. Comply with requirements in Section 078413 "Penetration Firestopping."
- E. Insulation Installation at Floor Penetrations:
  - 1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
  - 2. Seal penetrations through fire-rated assemblies.

### **3.05 INSTALLATION OF MINERAL-FIBER INSULATION**

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
  - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
    - e. Impale insulation over pins and attach speed washers.
    - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
  - 5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
  - 6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  - 7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.



- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
  - 1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  - 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  - 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
    - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  - 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
  - 5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  - 6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

### 3.06 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### 3.07 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
  - 1. Indoor, concealed supply and outdoor air.
  - 2. Indoor, exposed supply and outdoor air.
  - 3. Indoor, concealed return located in unconditioned space.

4. Indoor, exposed return located in unconditioned space.
  5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
  6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
- B. Items Not Insulated:
1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
  2. Factory-insulated flexible ducts.
  3. Factory-insulated plenums and casings.
  4. Flexible connectors.
  5. Vibration-control devices.
  6. Factory-insulated access panels and doors.

### **3.08 INDOOR DUCT AND PLENUM INSULATION SCHEDULE**

- A. Concealed, round and flat-oval, supply-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- B. Concealed, round and flat-oval, return-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- C. Concealed, round and flat-oval, outdoor-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- D. Concealed, round and flat-oval, exhaust-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- E. Concealed, rectangular, supply-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 3-lb/cu. ft. nominal density.
- F. Concealed, rectangular, return-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- G. Concealed, rectangular, outdoor-air duct insulation shall be the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.
- H. Concealed, rectangular, exhaust-air duct insulation between isolation damper and penetration of building exterior shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- I. Exposed, round and flat-oval, supply-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- J. Exposed, round and flat-oval, return-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- K. Exposed, round and flat-oval, outdoor-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- L. Exposed, round and flat-oval, exhaust-air duct insulation shall be one of the following:
  1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- M. Exposed, rectangular, supply-air duct insulation shall be one of the following:

1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- N. Exposed, rectangular, return-air duct insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- O. Exposed, rectangular, outdoor-air duct insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.
- P. Exposed, rectangular, exhaust-air duct insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 1.5-lb/cu. ft. nominal density.
  2. Mineral-Fiber Board: 1-1/2 inches thick and 2-lb/cu. ft. nominal density.

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**SECTION 230719**  
**HVAC PIPING INSULATION**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft-training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.06 COORDINATION**

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

**1.07 SCHEDULING**

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 PRODUCTS**

**2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.

## 2.02 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA, Inc.; Aero seal.
    - b. Armacell LCC; Armaflex 520 Adhesive.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.03 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
  - 1. For indoor applications, use mastics that have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    - b. Vimasco Corporation; 749.
  - 2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
  - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
  - 4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
  - 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for indoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-30.
    - b. Eagle Bridges - Marathon Industries; 501.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-35.
    - d. Mon-Eco Industries, Inc.; 55-10.
  - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 35-mil dry film thickness.
  - 3. Service Temperature Range: 0 to 180 deg F.
  - 4. Solids Content: ASTM D 1644, 44 percent by volume and 62 percent by weight.
  - 5. Color: White.

- D. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
    - b. Eagle Bridges - Marathon Industries; 570.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.
  - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
  - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
  - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
  - 5. Color: White.
- E. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
    - b. Eagle Bridges - Marathon Industries; 550.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
    - d. Mon-Eco Industries, Inc.; 55-50.
    - e. Vimasco Corporation; WC-1/WC-5.
  - 2. Water-Vapor Permeance: ASTM F 1249, 3 perms at 0.0625-inch dry film thickness.
  - 3. Service Temperature Range: Minus 20 to plus 200 deg F.
  - 4. Solids Content: 63 percent by volume and 73 percent by weight.
  - 5. Color: White.

#### **2.04 LAGGING ADHESIVES**

- A. Description: Comply with MIL-A-3316C Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
  - 1. For indoor applications, use lagging adhesives that have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
    - c. Vimasco Corporation; 713 and 714.
  - 3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct, equipment, and pipe insulation.
  - 4. Service Temperature Range: Minus 50 to plus 180 deg F.
  - 5. Color: White.

#### **2.05 SEALANTS**

- A. Joint Sealants:
  - 1. Materials shall be compatible with insulation materials, jackets, and substrates.
  - 2. Permanently flexible, elastomeric sealant.
  - 3. Color: White or gray.
- B. FSK and Metal Jacket Flashing Sealants:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
    - b. Eagle Bridges - Marathon Industries, Inc.; 405.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
    - d. Mon-Eco Industries, Inc.; 44-05.

2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F.
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.06 FIELD-APPLIED JACKETS

- A. Metal Jacket:
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
    - b. RPR Products, Inc.; Insul-Mate.
  2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105 or 5005, Temper H-14.
    - a. Factory cut and rolled to size.
    - b. Finish and thickness are indicated in field-applied jacket schedules.
    - c. Moisture Barrier for Indoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
    - d. Moisture Barrier for Outdoor Applications: 2.5-mil-thick Polysurlyn].
    - e. Factory-Fabricated Fitting Covers:
      - 1) Same material, finish, and thickness as jacket.
      - 2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      - 3) Tee covers.
      - 4) Flange and union covers.
      - 5) End caps.
      - 6) Beveled collars.
      - 7) Valve covers.
      - 8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- B. Self-Adhesive Outdoor Jacket: 60-mil-thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with stucco-embossed aluminum-foil facing.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Polyguard Products, Inc.; Alumaguard 60.

## 2.07 SECUREMENTS

- A. Bands:
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
  2. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing or closed seal.
- B. Wire: 0.080-inch nickel-copper alloy.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C & F Wire.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  2. Verify that surfaces to be insulated are clean and dry.



3. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
  1. Stainless Steel: Coat 300 series stainless steel with epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
  2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
- C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  1. Install insulation continuously through hangers and around anchor attachments.
  2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  1. Draw jacket tight and smooth.

2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
  2. Testing agency labels and stamps.
  3. Nameplates and data plates.
  4. Manholes.
  5. Handholes.
  6. Cleanouts.

### 3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

- E. Insulation Installation at Floor Penetrations:
  - 1. Pipe: Install insulation continuously through floor penetrations.
  - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

### **3.05 GENERAL PIPE INSULATION INSTALLATION**

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
  - 1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  - 2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  - 3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  - 4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  - 5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
  - 6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  - 7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  - 8. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
  - 1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  - 2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.

3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical centerline of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### **3.06 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION**

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Fittings and Elbows:
  1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Valves and Pipe Specialties:
  1. Install preformed valve covers manufactured of same material as pipe insulation when available.
  2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.
  4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### **3.07 FIELD-APPLIED JACKET INSTALLATION**

- A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

### **3.08 FINISHES**

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- B. Do not field paint aluminum or stainless steel jackets.

### **3.09 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### **3.10 PIPING INSULATION SCHEDULE, GENERAL**

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  1. Drainage piping located in crawl spaces.
  2. Underground piping.
  3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

### **3.11 INDOOR PIPING INSULATION SCHEDULE**

- A. Refrigerant Suction and Hot-Gas Piping:

1. All Pipe Sizes: Insulation shall be the following:
  - a. Flexible Elastomeric: 1-inch thick.
- B. Refrigerant Suction and Hot-Gas Flexible Tubing:
  1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 1-inch thick.

### **3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE**

- A. Refrigerant Suction and Hot-Gas Piping:
  1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 2 inches thick.
- B. Refrigerant Suction and Hot-Gas Flexible Tubing:
  1. All Pipe Sizes: Insulation shall be the following:
    - a. Flexible Elastomeric: 2 inches thick.

### **3.13 INDOOR, FIELD-APPLIED JACKET SCHEDULE**

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
  1. None.
- D. Piping, Exposed:
  1. None.

### **3.14 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE**

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
  1. Aluminum, Stucco Embossed with Z-Shaped Locking Seam: 0.020 inch thick.

**END OF SECTION**

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**SECTION 231126**  
**FACILITY LIQUEFIED-PETROLEUM GAS PIPING**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. LPG: Liquefied-petroleum gas.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Minimum Operating-Pressure Ratings:
  - 1. For Piping Containing Only Vapor:
    - a. Piping and Valves: 125 psig unless otherwise indicated.
  - 2. For Piping Containing Liquid:
    - a. Piping between Shutoff Valves: 350 psig unless otherwise indicated.
    - b. Piping Other Than Above: 250 psig unless otherwise indicated.
    - c. Valves and Fittings: 250 psig unless otherwise indicated.
  - 3. Minimum Operating Pressure of Service Meter: 5 psig.
- B. LPG System Pressure within Buildings: One pressure range. 0.5 psig or less.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of the following:
  - 1. Piping specialties.
  - 2. Corrugated stainless-steel tubing with associated components.
  - 3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
  - 4. Pressure regulators. Indicate pressure ratings and capacities.
  - 5. Dielectric fittings.
  - 6. Storage containers.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.
- B. Field quality-control reports.

**1.06 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For LPG equipment and accessories to include in emergency, operation, and maintenance manuals.

**1.07 QUALITY ASSURANCE**

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel".
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. 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.

## **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing LPG piping according to requirements of authorities having jurisdiction.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store pipes and tubes with protective PE coating to avoid damaging coating and protect from direct sunlight.
- D. Protect stored PE pipes and valves from direct sunlight.

## **1.09 PROJECT CONDITIONS**

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Interruption of Existing LPG Service: Do not interrupt LPG service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of LPG supply according to requirements indicated:
  - 1. Notify Engineer no fewer than two days in advance of proposed interruption of LPG service.
  - 2. Do not proceed with interruption of LPG service without Engineer's written permission.

## **1.10 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 08 Section "Access Doors and Frames".

## **PART 2 PRODUCTS**

### **2.01 PIPES, TUBES, AND FITTINGS**

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedules 40 and 80, Type E or S, Grade B.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  - 2. Wrought-Steel Welding Fittings: ASTM A 234 for butt-welding and socket welding.
  - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
  - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
    - a. Material Group: 1.1.
    - b. End Connections: Threaded or butt welding to match pipe.
    - c. Lapped Face: Not permitted underground.
    - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
    - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground, and stainless steel underground.
  - 5. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
    - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
  - 6. Mechanical Couplings:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Dresser Piping Specialties; Division of Dresser, Inc.
      - 2) Smith-Blair, Inc.
    - b. Steel flanges and tube with epoxy finish.
    - c. Buna-nitrile seals.
    - d. Steel bolts, washers, and nuts.



- e. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
- f. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.

## 2.02 PIPING SPECIALTIES

- A. Flexible Piping Joints:
  - 1. Approved for LPG service.
  - 2. Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
  - 3. Minimum working pressure of 250 psig and 250 deg F operating temperature.
  - 4. Flanged- or threaded-end connections to match equipment connected and shall be capable of minimum 3/4-inch misalignment.
  - 5. Maximum 36-inch length for liquid LPG lines.

## 2.03 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for LPG.
- B. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

## 2.04 MANUAL GAS SHUTOFF VALVES

- A. Metallic Valves, NPS 2 and smaller for Liquid Service: Comply with ASME B16.33 and UL 842.
  - 1. CWP Rating: 250 psig.
  - 2. Threaded Ends: Comply with ASME B1.20.1.
  - 3. Socket ends for brazed joints.
  - 4. Listing by CSA or agency acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  - 5. Valves 1-1/4 inch and larger shall be suitable for LPG service, with "WOG" indicated on valve body.
- B. General Requirements for Metallic Valves, NPS 2 and smaller for Vapor Service: Comply with ASME B16.33.
  - 1. CWP Rating: 125 psig.
  - 2. Threaded Ends: Comply with ASME B1.20.1.
  - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
  - 4. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  - 5. Service Mark: Valves 1-1/4 inch to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. Bronze Plug Valves: MSS SP-78.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Lee Brass Company.
    - b. McDonald, A. Y. Mfg. Co.
  - 2. Body: Bronze, complying with ASTM B 584.
  - 3. Plug: Bronze.
  - 4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  - 5. Operator: Square head or lug type with tamperproof feature where indicated.
  - 6. Pressure Class: 125 psig.
  - 7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  - 8. Service: Suitable for LPG service with "WOG" indicated on valve body.
- D. Cast-Iron, Lubricated Plug Valves: MSS SP-78.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Flowserve.
  - b. Homestead Valve; a Division of Olson Technologies, Inc.
  - c. McDonald, A. Y. Mfg. Co.
  - d. Milliken Valve Company.
  - e. Mueller Co.; Gas Products Div.
  - f. R&M Energy Systems; a subsidiary of Robbins & Myers, Inc.
2. Body: Cast iron, complying with ASTM A 126 Class B.
  3. Plug: Bronze or nickel-plated cast iron.
  4. Seat: Coated with thermoplastic.
  5. Stem Seal: Compatible with LPG.
  6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  7. Operator: Square head or lug type with tamperproof feature where indicated.
  8. Pressure Class: 125 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for LPG service with "WOG" indicated on valve body.
- E. Valve Boxes:
1. Cast-iron, two-section box.
  2. Top section with cover with "GAS" lettering.
  3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.
  4. Adjustable cast-iron extensions of length required for depth of bury.
  5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head and with stem of length required to operate valve.

## 2.05 PRESSURE REGULATORS

- A. General Requirements:
1. Single stage and suitable for LPG.
  2. Steel jacket and corrosion-resistant components.
  3. Elevation compensator.
  4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.
- B. Service Pressure Regulators: Comply with ANSI Z21.80.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Actaris.
    - b. American Meter Company.
    - c. Fisher Control Valves and Regulators; Division of Emerson Process Management.
    - d. Invensys.
    - e. Richards Industries; Jordan Valve Div.
  2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
  6. Orifice: Aluminum; interchangeable.
  7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure sensing piping external to the regulator.
  9. Pressure regulator shall maintain discharge pressure setting downstream and not exceed 150 percent of design discharge pressure at shutoff.
  10. Overpressure Protection Device: Factory mounted on pressure regulator.
  11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.

12. Maximum Inlet Pressure: 100 psig.
- C. Line Pressure Regulators: Comply with ANSI Z21.80.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Actaris.
    - b. American Meter Company.
    - c. Eclipse Combustion, Inc.
    - d. Fisher Control Valves and Regulators; Division of Emerson Process Management.
    - e. Invensys.
    - f. Maxitrol Company.
    - g. Richards Industries; Jordan Valve Div.
  2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
  6. Orifice: Aluminum; interchangeable.
  7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure sensing piping external to the regulator.
  9. Pressure regulator shall maintain discharge pressure setting downstream and not exceed 150 percent of design discharge pressure at shutoff.
  10. Overpressure Protection Device: Factory mounted on pressure regulator.
  11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
  12. Maximum Inlet Pressure: 2 psig.
- D. Appliance Pressure Regulators: Comply with ANSI Z21.18.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Canadian Meter Company Inc.
    - b. Eaton Corporation; Controls Div.
    - c. Harper Wyman Co.
    - d. Maxitrol Company.
    - e. SCP, Inc.
  2. Body and Diaphragm Case: Die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber.
  6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
  8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
  9. Maximum Inlet Pressure: 1 psig.

## 2.06 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Company.
    - b. Central Plastics Company.
    - c. Hart Industries International, Inc.
    - d. McDonald, A. Y. Mfg. Co.

- e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
- f. Wilkins; a Zurn company.
- 2. Description:
  - a. Standard: ASSE 1079.
  - b. Pressure Rating: 150 psig.
  - c. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Company.
    - b. Central Plastics Company.
    - c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    - d. Wilkins; a Zurn company.
  - 2. Description:
    - a. Standard: ASSE 1079.
    - b. Factory-fabricated, bolted, companion-flange assembly.
    - c. Pressure Rating: 150 psig.
    - d. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Kits:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico Inc.
    - c. Central Plastics Company.
    - d. Pipeline Seal and Insulator, Inc.
  - 2. Description:
    - a. Nonconducting materials for field assembly of companion flanges.
    - b. Pressure Rating: 150 psig.
    - c. Gasket: Neoprene or phenolic.
    - d. Bolt Sleeves: Phenolic or polyethylene.
    - e. Washers: Phenolic with steel backing washers.

## **2.07 LABELING AND IDENTIFYING**

- A. Detectable Warning Tape: Acid- and alkali-resistant PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine roughing-in for LPG piping system to verify actual locations of piping connections before equipment installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Close equipment shutoff valves before turning off LPG to premises or piping section.
- B. Inspect LPG piping according to NFPA 58 and the International Fuel Gas Code to determine that LPG utilization devices are turned off in piping section affected.
- C. Comply with NFPA 58 and the International Fuel Gas Code requirements for prevention of accidental ignition.

### 3.03 INDOOR PIPING INSTALLATION

- A. Comply with the International Fuel Gas Code for installation and purging of LPG piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install LPG piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- O. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.
- P. Concealed Location Installations: Except as specified below, install concealed LPG piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.
  - 1. Above Accessible Ceilings: LPG piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.
  - 2. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.
    - a. Exception: Tubing passing through partitions or walls does not require striker barriers.
  - 3. Prohibited Locations:
    - a. Do not install LPG piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    - b. Do not install LPG piping in solid walls or partitions.
- Q. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- R. Connect branch piping from top or side of horizontal piping.

- S. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.
- T. Do not use LPG piping as grounding electrode.
- U. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- V. Install pressure gauge upstream and downstream from each line regulator.
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping".
- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping".
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section "Escutcheons for HVAC Piping".

### **3.04 VALVE INSTALLATION**

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.
- B. Install underground valves with valve boxes.
- C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- D. Install earthquake valves aboveground outside buildings according to listing.
- E. Install anode for metallic valves in underground PE piping.

### **3.05 PIPING JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
  - 1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
  - 2. Cut threads full and clean using sharp dies.
  - 3. Ream threaded pipe ends to remove burrs and restore full ID of pipe.
  - 4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
  - 5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints:
  - 1. Construct joints according to AWS D10.12, using qualified processes and welding operators.
  - 2. Bevel plain ends of steel pipe.
  - 3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for LPG service. Install gasket concentrically positioned.
- F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

### **3.06 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for pipe hangers and supports specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment".
- B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 1 and smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
  2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
- C. Install hangers for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
1. NPS 3/8: Maximum span, 48 inches; minimum rod size, 3/8 inch.
  2. NPS 1/2: Maximum span, 72 inches; minimum rod size, 3/8 inch.
  3. NPS 3/4 and larger: Maximum span, 96 inches; minimum rod, 3/8 inch.

### **3.07 CONNECTIONS**

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install LPG piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliances and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

### **3.08 LABELING AND IDENTIFYING**

- A. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

### **3.09 PAINTING**

- A. Comply with requirements in Division 09 painting Sections for painting interior and exterior LPG piping.
- B. Paint exposed, interior metal piping, valves, service regulators, service meters and meter bars, earthquake valves, and piping specialties, except components with factory-applied paint or protective coating.
  1. Alkyd System: MPI INT 5.1E.
    - a. Prime Coat: Alkyd anticorrosive metal primer.
    - b. Intermediate Coat: Interior alkyd matching topcoat.
    - c. Topcoat: Interior alkyd (gloss).
    - d. Color: Gray.
- C. Damage and Touchup: Repair marred and damaged factory-applied finishes with materials and by procedures to match original factory finish.

### **3.10 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Tests and Inspections:
  1. Test, inspect, and purge LPG according to NFPA 58 and the International Fuel Gas Code and requirements of authorities having jurisdiction.
- C. LPG piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### **3.11 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain LPG equipment.

### **3.12 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG**

- A. Aboveground, branch piping NPS 1 and smaller shall be the following:
  - 1. Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
  - 2. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be the following:
  - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
  - 2. Schedule 40, steel pipe with wrought-steel fittings and welded joints.
- C. Containment Conduit: Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- D. Containment Conduit Vent Piping: Schedule 40, steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

### **3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES MORE THAN 0.5 PSIG AND LESS THAN 5 PSIG**

- A. Aboveground, branch piping NPS 1 and smaller shall be the following:
  - 1. Corrugated stainless-steel tubing with mechanical fittings having socket or threaded ends to match adjacent piping.
  - 2. Annealed-temper, tin-lined copper tube with flared joints and fittings.
  - 3. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be the following:
  - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.
  - 2. Schedule 40, steel pipe with steel welding fittings and welded joints.
- C. Containment Conduit: Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat underground pipe and fittings with protective coating for steel piping.
- D. Containment Conduit Vent Piping: Schedule 40, steel pipe with malleable-iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

### **3.14 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE**

- A. Aboveground Liquid Piping:
  - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- B. Valves for pipe NPS 2 and smaller at service meter shall be the following:
  - 1. One-piece, bronze ball valve with bronze trim.
  - 2. Bronze plug valve.
- C. Valves for pipe NPS 2-1/2 and larger at service meter shall be the following:
  - 1. Bronze plug valve.
  - 2. Cast-iron, nonlubricated plug valve.
- D. Distribution piping valves for pipe NPS 2 and smaller shall be the following:
  - 1. One-piece, bronze ball valve with bronze trim.
  - 2. Bronze plug valve.
- E. Distribution piping valves for pipe NPS 2-1/2 and larger shall be the following:
  - 1. Bronze plug valve.
  - 2. Cast-iron, nonlubricated plug valve.
- F. Valves in branch piping for single appliance shall be the following:
  - 1. One-piece, bronze ball valve with bronze trim.
  - 2. Bronze plug valve.

**END OF SECTION**



**SECTION 232300**  
**REFRIGERANT PIPING**

**PART 1 GENERAL**

**1.01 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Solenoid valves.
  - 2. Thermostatic expansion valves.
  - 3. Hot-gas bypass valves.
  - 4. Strainers.
  - 5. Filter dryers.
  - 6. Pressure-regulating valves.
- B. Product Data Submittals: For each product.
  - 1. Submit data for each type of refrigerant piping, fitting, valve, piping specialty, and refrigerant.

**1.02 INFORMATIONAL SUBMITTALS**

- A. Welding Certificates: For each welder performing shop or field welding on Project.
- B. Field Quality-Control Reports: For each field quality control test and inspection.

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

**1.04 QUALITY ASSURANCE**

- A. Welding Qualifications: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding, Brazing, and Fusing Qualifications."

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store piping with end caps in place to ensure that piping interior and exterior are clean when installed.
- B. Prepare valves and specialties for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads and other end connections.
- C. Use the following precautions during storage:
  - 1. Maintain valve and specialty end protection.
  - 2. Store valves and specialties indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Comply with ASHRAE 15.
- B. Comply with ASME B31.5.
- C. Test Pressure for Refrigerant R-32A:
  - 1. Suction Tubing for Refrigeration and Air-Conditioning Applications Other than Heat Pumps: 300 psig.

**2.02 COPPER TUBE AND FITTINGS**

- A. Copper Tube: ASTM B280, Type ACR.
- B. Wrought-Copper Fittings, Solder Joint: ASME B16.22.
- C. Wrought-Copper Fittings, Brazed Joint: ASME B16.50.
- D. Wrought-Copper Unions: ASME B16.22.

- E. Solder Filler Metals: ASTM B32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- F. Brazing Filler Metals: AWS A5.8M/A5.8.
- G. Flexible Connectors:
  - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
  - 2. End Connections: Socket ends.
  - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
  - 4. Working Pressure Rating: Factory test at minimum 500 psig.
  - 5. Maximum Operating Temperature: 250 deg F.

### 2.03 VALVES AND SPECIALTIES

- A. Diaphragm Packless Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  - 2. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
  - 3. Diaphragm: Phosphor bronze and stainless steel with stainless steel spring.
  - 4. Operator: Rising stem and hand wheel.
  - 5. Seat: Nylon.
  - 6. End Connections: Socket, union, or flanged.
  - 7. Working Pressure Rating: 500 psig.
  - 8. Maximum Operating Temperature: 240 deg F.
- B. Packed-Angle Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  - 2. Body and Bonnet: Forged brass or cast bronze.
  - 3. Packing: Molded stem, back seating, and replaceable under pressure.
  - 4. Operator: Rising stem.
  - 5. Seat: Nonrotating, self-aligning polytetrafluoroethylene.
  - 6. Seal Cap: Forged-brass or valox hex cap.
  - 7. End Connections: Socket, union, threaded, or flanged.
  - 8. Working Pressure Rating: 500 psig.
  - 9. Maximum Operating Temperature: 275 deg F.
- C. Check Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Apollo Valves; a part of Aalberts Integrated Piping Systems.
    - b. Danfoss, Inc.
    - c. Emerson Climate Technologies; Emerson Electric Co.
    - d. Henry Technologies Inc.; The Henry Group.
    - e. Parker Hannifin Corporation.
  - 2. Body: Ductile iron, forged brass, or cast bronze; globe pattern.
  - 3. Bonnet: Bolted ductile iron, forged brass, or cast bronze; or brass hex plug.
  - 4. Piston: Removable polytetrafluoroethylene seat.
  - 5. Closing Spring: Stainless steel.

6. End Connections: Socket, union, threaded, or flanged.
  7. Maximum Opening Pressure: 0.50 psig.
  8. Working Pressure Rating: 500 psig.
  9. Maximum Operating Temperature: 275 deg F.
- D. Service Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin Corporation.
  2. Body: Forged brass with brass cap, including key end to remove core.
  3. Core: Removable ball-type check valve with stainless steel spring.
  4. Seat: Polytetrafluoroethylene.
  5. End Connections: Copper spring.
  6. Working Pressure Rating: 500 psig.
  7. Maximum Operating Temperature: 275 deg F.
- E. Refrigerant Locking Caps:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C & D Valve, LLC.
    - b. JB Industries.
    - c. RectorSeal HVAC; a CSW Industrials Company.
    - d. Refrigeration Sales, Inc.
  2. Description: Locking-type, tamper-resistant, threaded caps to protect refrigerant-charging ports from unauthorized refrigerant access and leakage.
  3. Material: Brass, with protective shroud or sleeve.
  4. Refrigerant Identification: Color-coded, refrigerant specific based on AHRI Guideline N or Universal design.
  5. Special Tool: For installing and unlocking.
- F. Solenoid Valves: Comply with AHRI 760 I-P and UL 429; listed and labeled by an NRTL.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin Corporation.
  2. Body and Bonnet: Plated steel.
  3. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
  4. Seat: Polytetrafluoroethylene.
  5. End Connections: Threaded.
  6. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch conduit adapter, and 24 V ac coil.
  7. Working Pressure Rating: 400 psig.
  8. Maximum Operating Temperature: 240 deg F.
- G. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  2. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.

3. Piston, Closing Spring, and Seat Insert: Stainless steel.
  4. Seat: Polytetrafluoroethylene.
  5. End Connections: Threaded.
  6. Working Pressure Rating: 400 psig.
  7. Maximum Operating Temperature: 240 deg F.
- H. Thermostatic Expansion Valves: Comply with AHRI 750 I-P.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin; Sporlan Division (Zoomlock).
  2. Body, Bonnet, and Seal Cap: Forged brass or steel.
  3. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.
  4. Packing and Gaskets: Non-asbestos.
  5. Capillary and Bulb: Copper tubing filled with refrigerant charge.
  6. Suction Temperature: 40 deg F.
  7. Superheat: Adjustable.
  8. Reverse-flow option (for heat-pump applications).
  9. End Connections: Socket, flare, or threaded union.
  10. Working Pressure Rating: 700 psig.
- I. Straight-Type Strainers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  2. Body: Welded steel with corrosion-resistant coating.
  3. Screen: 100-mesh stainless steel.
  4. End Connections: Socket or flare.
  5. Working Pressure Rating: 500 psig.
  6. Maximum Operating Temperature: 275 deg F.
- J. Angle-Type Strainers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  2. Body: Forged brass or cast bronze.
  3. Drain Plug: Brass hex plug.
  4. Screen: 100-mesh monel.
  5. End Connections: Socket or flare.
  6. Working Pressure Rating: 500 psig.
  7. Maximum Operating Temperature: 275 deg F.
- K. Moisture/Liquid Indicators:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin Corporation.
  2. Body: Forged brass.

3. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
  4. Indicator: Color-coded to show moisture content in parts per million (ppm).
  5. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
  6. End Connections: Socket or flare.
  7. Working Pressure Rating: 500 psig.
  8. Maximum Operating Temperature: 240 deg F.
- L. Replaceable-Core Filter Dryers: Comply with AHRI 730 I-P.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin Corporation.
  2. Body and Cover: Painted-steel shell with ductile-iron cover, stainless steel screws, and neoprene gaskets.
  3. Filter Media: 10 micron, pleated with integral end rings; stainless steel support.
  4. Desiccant Media: Activated alumina.
  5. Design: Reverse flow (for heat-pump applications).
  6. End Connections: Socket.
  7. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
  8. Maximum Pressure Loss: 2 psig.
  9. Rated Flow: Based upon equipment capacity.
  10. Working Pressure Rating: 500 psig.
  11. Maximum Operating Temperature: 240 deg F.
- M. Permanent Filter Dryers: Comply with AHRI 730 I-P.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Danfoss, Inc.
    - b. Emerson Climate Technologies; Emerson Electric Co.
    - c. Henry Technologies Inc.; The Henry Group.
    - d. Parker Hannifin Corporation.
  2. Body and Cover: Painted-steel shell.
  3. Filter Media: 10 micron, pleated with integral end rings; stainless steel support.
  4. Desiccant Media: Activated charcoal.
  5. Design: Reverse flow (for heat-pump applications).
  6. End Connections: Socket.
  7. Access Ports: NPS 1/4 connections at entering and leaving sides for pressure differential measurement.
  8. Maximum Pressure Loss: 2 psig.
  9. Rated Flow: Based upon equipment capacity.
  10. Working Pressure Rating: 500 psig.
  11. Maximum Operating Temperature: 240 deg F.
- N. Receivers: Comply with AHRI 495.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Henry Technologies Inc.; The Henry Group.
    - b. Parker Hannifin; Sporlan Division (Zoomlock).
  2. Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
  3. Comply with UL 207; listed and labeled by an NRTL.
  4. Body: Welded steel with corrosion-resistant coating.
  5. Tappings: Inlet, outlet, liquid-level indicator, and safety-relief valve.

6. End Connections: Socket or threaded.
  7. Working Pressure Rating: 450 psig.
  8. Maximum Operating Temperature: 250 deg F.
- O. Liquid Accumulators: Comply with AHRI 495.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Emerson Climate Technologies; Emerson Electric Co.
    - b. Henry Technologies Inc.; The Henry Group.
    - c. Parker Hannifin Corporation.
  2. Body: Welded steel with corrosion-resistant coating.
  3. End Connections: Socket or threaded.
  4. Working Pressure Rating: 500 psig.
  5. Maximum Operating Temperature: 275 deg F.

## **2.04 REFRIGERANTS**

- A. R-32, ASHRAE 15:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Arkema Inc.
    - b. DuPont Fluorochemicals Div.
    - c. Genetron Refrigerants; Honeywell International Inc.
    - d. Mexichem Fluor, Inc. (Koura).

## **PART 3 EXECUTION**

### **3.01 PIPING APPLICATION SCHEDULES**

- A. Refrigerant: R-32
- B. Suction, Hot-Gas, and Liquid Tubing for Conventional Air-Conditioning (Cooling-Only) Applications, NPS 1-1/2 (DN 40) and Smaller: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed joints.
- C. Suction, Hot-Gas, and Liquid Tubing for Conventional Air-Conditioning (Cooling-Only) Applications, NPS 4 (DN 100) and Smaller: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.
- D. Suction, Hot-Gas, and Liquid Tubing for Conventional Air-Conditioning (Cooling-Only) Applications, NPS 2 to NPS 4 (DN 50 to DN 100): Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.
- E. Safety-Relief-Valve Discharge Tubing for Conventional Air-Conditioning (Cooling-Only) Applications, Copper: Type ACR, drawn-temper tubing and wrought-copper fittings with brazed joints.

### **3.02 VALVE AND SPECIALTY APPLICATIONS**

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gauge taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.
- D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- E. Install a full-size, three-valve bypass around filter dryers.
- F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
  1. Install valve so diaphragm case is warmer than bulb.

2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
  3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- H. Install safety-relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside in accordance with ASHRAE 15.
  - I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
  - J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:
    1. Solenoid valves.
    2. Thermostatic expansion valves.
    3. Hot-gas bypass valves.
    4. Compressor.
  - K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
  - L. Install receivers sized to accommodate pump-down charge.
  - M. Install flexible connectors at compressors.
  - N. Provide refrigerant locking caps on refrigerant charging ports that are located outdoors unless otherwise protected from unauthorized access by a means acceptable to authority having jurisdiction.

### **3.03 INSTALLATION OF PIPING, GENERAL**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping in accordance with ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
  2. Install horizontal suction lines with a uniform slope downward to compressor.
  3. Install traps and double risers to entrain oil in vertical runs.
  4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- Q. Identify refrigerant piping and valves in accordance with Section 230553 "Identification for HVAC Piping and Equipment."
- R. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- S. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230517 "Sleeves and Sleeve Seals for HVAC Piping."
- T. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230518 "Escutcheons for HVAC Piping."

### **3.04 PIPE JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Braze Joints: Construct joints in accordance with AWS BRH, "Brazing Handbook," Ch. 35, "Pipe and Tubing."
1. Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
  2. Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.

### **3.05 INSTALLATION OF HANGERS AND SUPPORTS**

- A. Comply with Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- B. Install the following pipe attachments:
1. Adjustable steel clevis hangers for individual horizontal runs less than 20 ft. long.
  2. Roller hangers and spring hangers for individual horizontal runs 20 ft. or longer.
  3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 ft. or longer, supported on a trapeze.
  4. Spring hangers to support vertical runs.
  5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Support horizontal piping within 12 inches of each fitting.
- E. Support vertical runs of copper tubing to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

### **3.06 FIELD QUALITY CONTROL**

- A. Tests and Inspections:



1. Comply with ASME B31.5, Chapter VI.
  2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
  3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
    - a. Fill system with nitrogen to the required test pressure.
    - b. System must maintain test pressure at the manifold gauge throughout duration of test.
    - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.
- B. Prepare test and inspection reports.

### **3.07 SYSTEM CHARGING**

- A. Charge system using the following procedures:
1. Install core in filter dryers after leak test but before evacuation.
  2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
  3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
  4. Charge system with a new filter-dryer core in charging line.

### **3.08 ADJUSTING**

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
1. Open shutoff valves in condenser water circuit.
  2. Verify that compressor oil level is correct.
  3. Open compressor suction and discharge valves.
  4. Open refrigerant valves but not bypass valves that are used for other purposes.
  5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

**END OF SECTION**

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**SECTION 233113**  
**METAL DUCTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of the following products:
  - 1. Sealants and gaskets.
- B. Shop Drawings:
  - 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
  - 2. Factory- and shop-fabricated ducts and fittings.
  - 3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
  - 4. Elevation of top of ducts.
  - 5. Dimensions of main duct runs from building grid lines.
  - 6. Fittings.
  - 7. Reinforcement and spacing.
  - 8. Seam and joint construction.
  - 9. Penetrations through fire-rated and other partitions.
  - 10. Equipment installation based on equipment being used on Project.
  - 11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
  - 12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.
- B. Field quality-control reports.

**1.04 QUALITY ASSURANCE**

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel," for hangers and supports.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code - Steel," for hangers and supports.
  - 2. AWS D1.2, "Structural Welding Code - Aluminum," for aluminum supports.
  - 3. AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

**PART 2 PRODUCTS**

**2.01 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved,

duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

## **2.02 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. McGill AirFlow LLC.
    - b. SEMCO Incorporated.
    - c. Sheet Metal Connectors, Inc.
    - d. Spiral Manufacturing Co., Inc.
- B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter of the round sides connecting the flat portions of the duct (minor dimension).
- C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
  - 1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- D. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
  - 1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
  - 2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

## **2.03 SHEET METAL MATERIALS**

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653.
  - 1. Galvanized Coating Designation: G60.
  - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Reinforcement Shapes and Plates: ASTM A 36, steel plates, shapes, and bars; black and galvanized.
  - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.04 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
  - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
  - 2. Tape Width: 4 inches.
  - 3. Sealant: Modified styrene acrylic.
  - 4. Water resistant.
  - 5. Mold and mildew resistant.
  - 6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  - 7. Service: Indoor and outdoor.
  - 8. Service Temperature: Minus 40 to plus 200 deg F.
  - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
  - 10. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
  - 1. Application Method: Brush on.
  - 2. Solids Content: Minimum 65 percent.
  - 3. Shore A Hardness: Minimum 20.
  - 4. Water resistant.
  - 5. Mold and mildew resistant.
  - 6. VOC: Maximum 75 g/L (less water).
  - 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  - 8. Service: Indoor or outdoor.
  - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Solvent-Based Joint and Seam Sealant:
  - 1. Application Method: Brush on.
  - 2. Base: Synthetic rubber resin.
  - 3. Solvent: Toluene and heptane.
  - 4. Solids Content: Minimum 60 percent.
  - 5. Shore A Hardness: Minimum 60.
  - 6. Water resistant.
  - 7. Mold and mildew resistant.
  - 8. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 9. VOC: Maximum 395 g/L.
  - 10. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
  - 11. Service: Indoor or outdoor.
  - 12. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- E. Flanged Joint Sealant: Comply with ASTM C 920.
  - 1. General: Single-component, acid-curing, silicone, elastomeric.
  - 2. Type: S.
  - 3. Grade: NS.
  - 4. Class: 25.
  - 5. Use: O.

- 6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- G. Round Duct Joint O-Ring Seals:
  - 1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
  - 2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
  - 3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

## **2.05 HANGERS AND SUPPORTS**

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct".
- C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- D. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

## **PART 3 EXECUTION**

### **3.01 DUCT INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts and flat oval in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines".

### 3.02 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### 3.03 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
  - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".
  - 2. Outdoor, Supply-Air Ducts: Seal Class A.
  - 3. Outdoor, Exhaust Ducts: Seal Class C.
  - 4. Outdoor, Return-Air Ducts: Seal Class C.
  - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
  - 6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
  - 7. Unconditioned Space, Exhaust Ducts: Seal Class C.
  - 8. Unconditioned Space, Return-Air Ducts: Seal Class B.
  - 9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
  - 10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
  - 11. Conditioned Space, Exhaust Ducts: Seal Class B.
  - 12. Conditioned Space, Return-Air Ducts: Seal Class C.

### 3.04 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports".
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  - 1. Where practical, install concrete inserts before placing concrete.
  - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 (Table 5-1M), "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.

- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### **3.05 CONNECTIONS**

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories".
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### **3.06 PAINTING**

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

### **3.07 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
- B. Leakage Tests:
  - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual". Submit a test report for each test.
  - 2. Test the following systems:
    - a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 25 percent of total installed duct area for each designated pressure class.
    - b. Supply Ducts with a Pressure Class of 2-Inch wg 3-Inch wg or Higher: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
    - c. Return Ducts with a Pressure Class of 2 inch wg or Higher: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
    - d. Exhaust Ducts with a Pressure Class of 2 inch wg or Higher: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
    - e. Outdoor Air Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections, selected by Engineer from sections installed, totaling no less than 50 percent of total installed duct area for each designated pressure class.
  - 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
  - 4. Test for leaks before applying external insulation.
  - 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
  - 6. Give seven days' advance notice for testing.
- C. Duct System Cleanliness Tests:
  - 1. Visually inspect duct system to ensure that no visible contaminants are present.
  - 2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems".
    - a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/15.5 sq. in.
- D. Duct system will be considered defective if it does not pass tests and inspections.



- E. Prepare test and inspection reports.

### **3.08 DUCT CLEANING**

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
  - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
  - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
  - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
  - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
  - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
  - 1. Air outlets and inlets (registers, grilles, and diffusers).
  - 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
  - 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
  - 4. Coils and related components.
  - 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
  - 6. Supply-air ducts, dampers, actuators, and turning vanes.
  - 7. Dedicated exhaust and ventilation components and makeup air systems.
- E. Mechanical Cleaning Methodology:
  - 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
  - 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
  - 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
  - 4. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
  - 5. Provide drainage and cleanup for wash-down procedures.
  - 6. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

### **3.09 START UP**

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC".

### **3.10 DUCT SCHEDULE**

- A. Supply Ducts:
  - 1. Ducts Connected to Fan Coil Units, Furnaces, Furnaces, Heat Pumps, and Terminal Units:
    - a. Pressure Class: Positive 2-inch wg.

- b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
  - 2. Ducts Connected to Equipment Not Listed Above:
    - a. Pressure Class: Positive 3-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- B. Return Ducts:
  - 1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
    - a. Pressure Class: Positive or negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
  - 2. Ducts Connected to Equipment Not Listed Above:
    - a. Pressure Class: Positive or negative 3-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- C. Exhaust Ducts:
  - 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
    - a. Pressure Class: Negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
  - 2. Ducts Connected to Equipment Not Listed Above:
    - a. Pressure Class: Positive or negative 3-inch wg.
    - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- D. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
  - 1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
    - a. Pressure Class: Positive or negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
  - 2. Ducts Connected to Equipment Not Listed Above:
    - a. Pressure Class: Positive or negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 6.
- E. Intermediate Reinforcement:
  - 1. Galvanized-Steel Ducts: Galvanized steel.
- F. Elbow Configuration:
  - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows".
    - a. Velocity 1000 fpm or Lower:
      - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      - 2) Mitered Type RE 4 without vanes.
    - b. Velocity 1000 to 1500 fpm:
      - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
      - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

- 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows".
- c. Velocity 1500 fpm or Higher:
  - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows".
- 2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows".
  - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows".
- 3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows".
  - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows". Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
    - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
    - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
    - 4) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
- G. Branch Configuration:
  - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections".
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.
    - b. Rectangular Main to Round Branch: 45-degree, high-efficiency entry.
  - 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees". Saddle taps are permitted in existing duct.
    - a. Velocity 1000 fpm or Lower: 90-degree tap.
    - b. Velocity 1000 to 1500 fpm: Conical tap.
    - c. Velocity 1500 fpm or Higher: 45-degree lateral.

**END OF SECTION**

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**SECTION 233300**  
**AIR DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

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

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 ASSEMBLY DESCRIPTION**

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems".
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

**2.02 MATERIALS**

- A. Galvanized Sheet Steel: Comply with ASTM A 653.
  - 1. Galvanized Coating Designation: G60.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Stainless-Steel Sheets: Comply with ASTM A 480, Type 304, and having a No. 2 finish for concealed ducts and No. 3 finish for exposed ducts.
- C. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- D. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless steel ducts.
- F. Tie Rods: Galvanized steel, 1/4 inch minimum diameter for lengths 36 inches or less; 3/8 inch minimum diameter for lengths longer than 36 inches.

**2.03 MANUAL VOLUME DAMPERS**

- A. Low-Leakage, Steel, Manual Volume Dampers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Air Balance Inc.; a division of Mestek, Inc.
    - b. Flexmaster U.S.A., Inc.
    - c. McGill AirFlow LLC.
    - d. METALAIRE, Inc.
    - e. Nailor Industries Inc.
    - f. Ruskin Company.
    - g. Vent Products Company, Inc.
  - 2. Comply with AMCA 500-D testing for damper rating.
  - 3. Low-leakage rating, with linkage outside air stream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
  - 4. Suitable for horizontal or vertical applications.
  - 5. Frames:

- a. Hat shaped.
  - b. 0.094 inch thick, galvanized sheet steel.
  - c. Mitered and welded corners.
  - d. Flanges for attaching to walls and flangeless frames for installing in ducts.
6. Blades:
- a. Multiple or single blade.
  - b. Parallel- or opposed-blade design.
  - c. Stiffen damper blades for stability.
  - d. Galvanized, roll-formed steel, 0.064 inch thick.
7. Blade Axles: Galvanized steel.
8. Bearings:
- a. Dampers in ducts with pressure classes of 3 inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
9. Blade Seals: Neoprene.
10. Jamb Seals: Cambered stainless steel.
11. Tie Bars and Brackets: Galvanized steel.
12. Accessories:
- a. Include locking device to hold single-blade dampers in a fixed position without vibration.
- B. Jackshaft:
- 1. Size: 1 inch diameter.
  - 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
  - 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
- C. Damper Hardware:
- 1. Zinc-plated, die-cast core with dial and handle made of 3/32 inch-thick zinc-plated steel, and a 3/4 inch hexagon-locking nut.
  - 2. Include center hole to suit damper operating-rod size.
  - 3. Include elevated platform for insulated duct mounting.

#### 2.04 CONTROL DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Cesco Products; a division of Mestek, Inc.
  - 2. Greenheck Fan Corporation.
  - 3. Nailor Industries Inc.
  - 4. Ruskin Company.
- B. Low-leakage rating, with linkage outside air stream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
- C. Frames:
- 1. Hat shaped.
  - 2. 0.094 inch thick, galvanized sheet steel.
  - 3. Mitered and welded corners.
- D. Blades:
- 1. Multiple blade with maximum blade width of 8 inches.
  - 2. Parallel- and opposed-blade design.
  - 3. Galvanized-steel.
  - 4. 0.064 inch thick single skin.
  - 5. Blade Edging: Closed-cell neoprene.
  - 6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.
- E. Blade Axles: 1/2 inch diameter; galvanized steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.

1. Operating Temperature Range: From minus 40 to plus 200 deg F.
- F. Bearings:
1. Molded synthetic or Stainless-steel sleeve.
  2. Dampers in ducts with pressure classes of 3 inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
  3. Thrust bearings at each end of every blade.

## **2.05 FLANGE CONNECTORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ductmate Industries, Inc.
  2. Nexus PDQ; Division of Shilco Holdings Inc.
  3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel.
- D. gauge and Shape: Match connecting ductwork.

## **2.06 TURNING VANES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ductmate Industries, Inc.
  2. Duro Dyne Inc.
  3. METALAIRE, Inc.
  4. SEMCO Incorporated.
  5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows".
- E. Vane Construction: Single wall.

## **2.07 DUCT-MOUNTED ACCESS DOORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cesco Products; a division of Mestek, Inc.
  2. Ductmate Industries, Inc.
  3. Greenheck Fan Corporation.
  4. Nailor Industries Inc.
  5. Ventfabrics, Inc.
  6. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2 (7-2M), "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct".
1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.

- c. Vision panel.
- d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
- e. Fabricate doors airtight and suitable for duct pressure class.
- 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
- 3. Number of Hinges and Locks:
  - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
  - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
  - c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches.
  - d. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.

## **2.08 DUCT ACCESS PANEL ASSEMBLIES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Flame Gard, Inc.
  - 3. 3M.
- B. Labeled according to UL 1978 by an NRTL.
- C. Panel and Frame: Minimum thickness 0.0528 inch carbon steel.
- D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.
- E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.
- F. Minimum Pressure Rating: 10 inch wg, positive or negative.

## **2.09 FLEXIBLE CONNECTORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Duro Dyne Inc.
  - 3. Ventfabrics, Inc.
  - 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3 1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028 inch thick, galvanized sheet steel or 0.032 inch thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd.
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 200 deg F.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install



dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.

1. Install steel volume dampers in steel ducts.
  2. Install aluminum volume dampers in aluminum ducts.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
1. Upstream from duct filters.
  2. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  3. At each change in direction and at maximum 50 foot spacing.
  4. Upstream from turning vanes.
  5. Control devices requiring inspection.
  6. Elsewhere as indicated.
- G. Install access doors with swing against duct static pressure.
- H. Access Door Sizes:
1. One-Hand or Inspection Access: 8 by 5 inches.
  2. Two-Hand Access: 12 by 6 inches.
  3. Head and Hand Access: 18 by 10 inches.
  4. Head and Shoulders Access: 21 by 14 inches.
  5. Body Access: 25 by 14 inches.
  6. Body plus Ladder Access: 25 by 17 inches.
- I. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- J. Install flexible connectors to connect ducts to equipment.
- K. Connect terminal units to supply ducts with maximum 12 inch lengths of flexible duct. Do not use flexible ducts to change directions.
- L. Connect diffusers or light troffer boots to ducts with maximum 60 inch lengths of flexible duct clamped or strapped in place.
- M. Connect flexible ducts to metal ducts with draw bands.
- N. Install duct test holes where required for testing and balancing purposes.
- O. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4 inch movement during start and stop of fans.

### **3.02 FIELD QUALITY CONTROL**

- A. Tests and Inspections:
1. Operate dampers to verify full range of movement.
  2. Inspect locations of access doors and verify that purpose of access door can be performed.
  3. Inspect turning vanes for proper and secure installation.

**END OF SECTION**

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**SECTION 233346**  
**FLEXIBLE DUCTS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

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

**PART 2 PRODUCTS**

**2.01 ASSEMBLY DESCRIPTION**

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- C. Comply with the Air Diffusion Council's "ADC Flexible Air Duct Test Code FD 72-R1."
- D. Comply with ASTM E96/E96M, "Test Methods for Water Vapor Transmission of Materials."

**2.02 INSULATED FLEXIBLE DUCTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flexmaster U.S.A., Inc
  - 2. JP Lamborn Co.
  - 3. McGill AirFlow LLC
  - 4. Thermaflex; a Flex-Tek Group company
  - 5. Ward Industries; a brand of Hart & Cooley, Inc
- B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
  - 1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
  - 2. Maximum Air Velocity: 4000 fpm.
  - 3. Temperature Range: Minus 20 to plus 175 deg F.
  - 4. Insulation R-Value: R8.

**2.03 FLEXIBLE DUCT CONNECTORS**

- A. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
- B. Non-Clamp Connectors: Adhesive plus sheet metal screws.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install flexible ducts according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install in indoor applications only. Flexible ductwork should not be exposed to UV lighting.
- C. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- D. Connect diffusers or light troffer boots to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- E. Connect flexible ducts to metal ducts with draw bands.

- F. Install duct test holes where required for testing and balancing purposes.
- G. Installation:
  - 1. Install ducts fully extended.
  - 2. Do not bend ducts across sharp corners.
  - 3. Bends of flexible ducting shall not exceed a minimum of one duct diameter.
  - 4. Avoid contact with metal fixtures, water lines, pipes, or conduits.
  - 5. Install flexible ducts in a direct line, without sags, twists, or turns.
- H. Supporting Flexible Ducts:
  - 1. Suspend flexible ducts with bands 1-1/2 inches wide or wider and spaced a maximum of 48 inches apart. Maximum centerline sag between supports shall not exceed 1/2 inch per 12 inches.
  - 2. Install extra supports at bends placed approximately one duct diameter from center line of the bend.
  - 3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
  - 4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches o.c.

**END OF SECTION**

**SECTION 233416**  
**CENTRIFUGAL HVAC FANS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Forward-curved centrifugal fans.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes for fans.
  - 2. Rated capacities, operating characteristics, and furnished specialties and accessories.
  - 3. Certified fan performance curves with system operating conditions indicated.
  - 4. Certified fan sound-power ratings.
  - 5. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  - 6. Material thickness and finishes, including color charts.
  - 7. Dampers, including housings, linkages, and operators.
  - 8. Fan speed controllers.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For centrifugal fans to include in normal operation, emergency operation, and maintenance manuals with replacement parts listing.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Unusual Service Conditions
  - 1. Base fan-performance ratings on the following:
    - a. Ambient Temperature: 70 deg F dry bulb.
    - b. Altitude: 1800 feet above sea level.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.

**2.02 FORWARD-CURVED CENTRIFUGAL FANS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Description:
  - 1. Factory-fabricated, -assembled, -tested, and -finished, direct-driven centrifugal fans, consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure.
  - 2. Deliver fans as factory-assembled units, to the extent allowable by shipping limitations.
  - 3. Factory-installed and -wired disconnect switch.
- C. Housings:
  - 1. Housing Material: Galvanized steel.
  - 2. Housing Coating: Hot-dip galvanized.
  - 3. Formed panels to make curved-scroll housings with shaped cutoff.

- D. Wheels:
  - 1. Wheel Configuration: SWSI construction with a curved inlet flange, and a backplate fastened to shaft with setscrews.
  - 2. Wheel and Blade Material: Steel.
  - 3. Wheel and Blade Coating: Hot-dip galvanized.
  - 4. Forward-Curved Wheels:
    - a. Black-enameled or galvanized-steel construction with inlet flange, backplate, and shallow blades with inlet and tip curved forward in direction of airflow.
    - b. Mechanically secured to flange and backplate; cast-steel hub swaged to backplate and fastened to shaft with setscrews.
- E. Shafts:
  - 1. Statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with adjustable alignment and belt tensioning.
  - 2. Turned, ground, and polished hot-rolled steel with keyway. Ship with protective coating of lubricating oil.
  - 3. Designed to operate at no more than 70 percent of first critical speed at top of fan's speed range.
- F. Bearings:
  - 1. Prelubricated and Sealed Shaft Bearings:
    - a. Self-aligning, pillow-block-type ball bearings.
    - b. Ball-Bearing Rating Life: ABMA 9, L(10) at 50,000 hours.
    - c. Roller-Bearing Rating Life: ABMA 11, L(10) at 50,000 hours.
- G. Direct Drive:
  - 1. High efficiency variable-speed motor controlled by solid state speed controller.
- H. Motor Enclosure: Totally enclosed, air over.
- I. Accessories:
  - 1. Scroll Drain Connection: NPS 1 steel pipe coupling welded to low point of fan scroll.
  - 2. Companion Flanges: Rolled flanges for duct connections of same material as housing.
  - 3. Discharge Dampers: Assembly with blades constructed of two plates formed around, and to, shaft, channel frame, and sealed ball bearings; with blades linked outside of airstream to single control lever of same material as housing.
  - 4. Shaft Seals: Airtight seals installed around shaft on drive side of single-width fans.

## **2.03 MOTORS**

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."

## **2.04 SOURCE QUALITY CONTROL**

- A. Operating Limits: Classify fans in accordance with AMCA 99, Section 14.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Install centrifugal fans level and plumb.
- B. Equipment Mounting:
  - 1. Support duct-mounted and other hanging centrifugal fans directly from the building structure, using suitable hanging systems as specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- C. Install units with clearances for service and maintenance.
- D. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

### **3.02 DUCTWORK AND PIPING CONNECTIONS**

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."
- B. Install ducts adjacent to fans to allow service and maintenance.

### **3.03 ELECTRICAL CONNECTIONS**

- A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- D. 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.

### **3.04 CONTROL CONNECTIONS**

- A. Install control and electrical power wiring to field-mounted control devices.

### **3.05 STARTUP SERVICE:**

- A. Perform startup service.
  - 1. Complete installation and startup checks in accordance with 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 ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  - 4. Verify that cleaning and adjusting are complete.
  - 5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.
  - 6. Adjust damper linkages for proper damper operation.
  - 7. Verify lubrication for bearings and other moving parts.
  - 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  - 9. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  - 10. Shut unit down and reconnect automatic temperature-control operators.
  - 11. Remove and replace malfunctioning units and retest as specified above.

### **3.06 ADJUSTING**

- A. Adjust damper linkages for proper damper operation.
- B. Lubricate bearings.
- C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

### **3.07 CLEANING**

- A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust

### **3.08 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.

1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Fans and components will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

### **3.09 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

**END OF SECTION**



**SECTION 233713**  
**DIFFUSERS, REGISTERS, AND GRILLES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated, include the following:
  - 1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
  - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

**PART 2 PRODUCTS**

**2.01 DIFFUSERS, REGISTERS AND GRILLES**

- A. Manufacturers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Krueger.
    - b. Price Industries.
    - c. Titus.
  - 2. Material: as scheduled.
  - 3. Finish: Baked enamel, white.
  - 4. Face Size: as scheduled.
  - 5. Face Style: as scheduled.
  - 6. Mounting: as scheduled
  - 7. Pattern: as scheduled.
  - 8. Dampers: Combination damper and grid.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where Engineerural features or other items conflict with installation, notify Engineer for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

**3.03 ADJUSTING**

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION**

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**SECTION 234100**  
**PARTICULATE AIR FILTRATION**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include dimensions; operating characteristics; required clearances and access; rated flow capacity, including initial and final pressure drop at rated airflow; efficiency and test method; fire classification; furnished specialties; and accessories for each model indicated.

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each type of filter and rack to include in emergency, operation, and maintenance manuals.

**1.04 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Provide one complete set of filters for each filter bank. If system includes prefilters, provide only prefilters.

**1.05 QUALITY ASSURANCE**

- 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. ASHRAE Compliance:
  - 1. Comply with ASHRAE 52.1 for arrestance and ASHRAE 52.2 for MERV for methods of testing and rating air-filter units.
- C. Comply with NFPA 90A and NFPA 90B.

**1.06 COORDINATION**

- A. Coordinate sizes and locations of concrete bases. Cast anchor-bolt inserts into bases.

**PART 2 PRODUCTS**

**2.01 PLEATED PANEL FILTERS**

- A. Description: Factory-fabricated, self-supported, extended-surface, pleated, panel-type, disposable air filters with holding frames.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. AAF International.
    - b. Camfil Farr.
    - c. Flanders-Precisionaire.
    - d. Koch Filter Corporation.
    - e. Purafil, Inc.
- B. Filter Unit Class: UL 900, Class 1.
- C. Media: Interlaced glass or synthetic fibers coated with nonflammable adhesive.
  - 1. Media shall be coated with an antimicrobial agent.
  - 2. Separators shall be bonded to the media to maintain pleat configuration.
  - 3. Welded wire grid shall be on downstream side to maintain pleat.
  - 4. Media shall be bonded to frame to prevent air bypass.
  - 5. Support members on upstream and downstream sides to maintain pleat spacing.
- D. Filter-Media Frame: Cardboard frame with perforated metal retainer sealed or bonded to the media.

- E. MERV Rating: Refer to plans for requirements.
- F. Mounting Frames: Welded galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.

## **2.02 FRONT- AND REAR-ACCESS FILTER FRAMES**

- A. Framing System: Galvanized-steel framing members with access for either upstream (front) or downstream (rear) filter servicing, cut to size and prepunched for assembly into modules. Vertically support filters to prevent deflection of horizontal members without interfering with either filter installation or operation.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. AAF International.
    - b. Camfil Farr.
    - c. Flanders-Precisionaire.
    - d. Koch Filter Corporation.
    - e. Purafil, Inc.
- B. Sealing: Factory-installed, positive-sealing device for each row of filters, to ensure seal between gasketed filter elements and to prevent bypass of unfiltered air.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Position each filter unit with clearance for normal service and maintenance. Anchor filter holding frames to substrate.
- B. Install filters in position to prevent passage of unfiltered air.
- C. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.
- D. Coordinate filter installations with duct and air-handling-unit installations.

### **3.02 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
- C. Air filter will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### **3.03 CLEANING**

- A. After completing system installation and testing, adjusting, and balancing of air-handling and air-distribution systems, clean filter housings and install new filter media.

**END OF SECTION**

**SECTION 235400**  
**FURNACES**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each of the following:
  - 1. Furnace.
  - 2. Thermostat.
  - 3. Air filter.
  - 4. Refrigeration components.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Wiring Diagrams: Power, signal, and control wiring.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Warranty: Special warranty specified in this Section.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each furnace to include in emergency, operation, and maintenance manuals for each of the following:
  - 1. Furnace and accessories complete with controls.
  - 2. Air filter.
  - 3. Refrigeration components.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- 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. Disposable Air Filters: Furnish two complete sets.
  - 2. Disposable Air-Cleaner Media: Furnish one complete set.

**1.06 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

**1.07 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

**1.08 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:
  - 1. Warranty Period, Commencing on Date of Substantial Completion:
    - a. Furnace Heat Exchanger: 10 years.
    - b. Integrated Ignition and Blower Control Circuit Board: Five years.
    - c. Draft-Inducer Motor: Five years.
    - d. Refrigeration Compressors: 10 years.
    - e. Evaporator and Condenser Coils: Five years.

## **PART 2 PRODUCTS**

### **2.01 GAS-FIRED FURNACES, CONDENSING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bryant Heating & Cooling Systems; Div. of United Technologies Corp.
  - 2. Carrier Corporation; Div. of United Technologies Corp.
  - 3. Daikin.
  - 4. York International Corp.; a division of Unitary Products Group.
- B. Manufacturers: Manufacturer of furnace and condensing unit must match. Miss-match of manufactures will not be accepted.
- C. General Requirements for Gas-Fired, Condensing Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47, "Gas-Fired Central Furnaces," and with NFPA 54.
- D. Cabinet: Steel or Galvanized steel.
  - 1. Cabinet interior around heat exchanger shall be factory-installed insulation.
  - 2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
  - 3. Factory paint external cabinets in manufacturer's standard color.
- E. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.
  - 1. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment".
- F. Type of Gas: Propane.
- G. Heat Exchanger:
  - 1. Primary: Stainless steel.
  - 2. Secondary: Stainless steel.
- H. Burner:
  - 1. Gas Valve: 100 percent safety two-stage main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
  - 2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.
- I. Gas-Burner Safety Controls:
  - 1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
  - 2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
  - 3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.
- J. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.
- K. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories.
- L. Accessories:
  - 1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through outside wall or roof.
  - 2. CPVC Plastic Vent Materials.
    - a. CPVC Plastic Pipe: Schedule 40, complying with ASTM F 441.
    - b. CPVC Plastic Fittings: Schedule 40, complying with ASTM F 438, socket type.
    - c. CPVC Solvent Cement: ASTM F 493.
      - 1) Use CPVC solvent cement that has a VOC content of 490 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
      - 2) Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## **2.02 THERMOSTATS**

- A. Solid-State Thermostat: Wall-mounting, programmable, microprocessor-based unit with automatic switching from heating to cooling, preferential rate control, seven-day programmability with minimum of four temperature presets per day, and battery backup protection against power failure for program settings.
- B. Humidistat: Adjustable, wall-mounting unit. Refer to plans for humidifier and humidistat requirements.

## **2.03 HUMIDIFIERS**

- A. Refer to plans for humidifier and humidistat requirements.
- B. Comply with applicable requirements in ASHRAE 62.1-2004.

## **2.04 REFRIGERATION COMPONENTS**

- A. Refrigerant Line Kits: Annealed-copper suction and liquid lines factory cleaned, dried, pressurized with nitrogen, sealed, and with suction line insulated. Provide in standard lengths for installation without joints, except at equipment connections.
  - 1. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I, 1 inch thick.
- B. Refrigerant Piping: Comply with requirements in Division 23 Section "Refrigerant Piping".
- C. Air-Cooled, Compressor-Condenser Unit:
  - 1. Casing: Steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gauge ports on exterior of casing.
  - 2. Compressor: Hermetically sealed reciprocating or scroll type.
    - a. Crankcase heater.
    - b. Vibration isolation mounts for compressor.
    - c. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
    - d. Two-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
    - e. Refrigerant Charge: R-32.
  - 3. Fan: Aluminum-propeller type, directly connected to motor.
  - 4. Motor: Permanently lubricated, with integral thermal-overload protection.
  - 5. Low Ambient Kit: Permits operation down to 20 deg F.
  - 6. Mounting Base: Polyethylene.

## **PART 3 EXECUTION**

### **3.01 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. Examine factory-installed insulation before furnace installation. Reject units that are wet, moisture damaged, or mold damaged.
- C. Examine roughing-in for gas and refrigerant piping systems to verify actual locations of piping connections before equipment installation.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.
- B. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.

- C. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.
- D. Install ground-mounted, compressor-condenser components on 4 inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete". Coordinate anchor installation with concrete base.

### 3.03 CONNECTIONS

- A. Gas piping installation requirements are specified in Division 23 Section "Facility Liquefied-Petroleum Gas Piping." Drawings indicate general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.
  - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
  - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
  - 3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
    - a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
    - b. CPVC Piping: Join according to ASTM D 2846 Appendix.
  - 4. Slope pipe vent back to furnace or to outside terminal.
- D. Connect ducts to furnace with flexible connector. Comply with requirements in Division 23 Section "Air Duct Accessories".
- E. Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.
  - 1. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
  - 2. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Comply with requirements in Division 23 Section "Refrigerant Piping" for installation and joint construction of refrigerant piping.

### 3.04 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Perform electrical test and visual and mechanical inspection.
  - 2. Leak Test: After installation, charge systems with refrigerant and oil and test for leaks. Repair leaks, replace lost refrigerant and oil, and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
  - 4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
  - 5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

### 3.05 STARTUP SERVICE

- A. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
  - 1. Inspect for physical damage to unit casings.



2. Verify that access doors move freely and are weathertight.
  3. Clean units and inspect for construction debris.
  4. Verify that all bolts and screws are tight.
  5. Adjust vibration isolation and flexible connections.
  6. Verify that controls are connected and operational.
- B. Adjust fan belts to proper alignment and tension.
  - C. Start unit according to manufacturer's written instructions and complete manufacturer's operational checklist.
  - D. Measure and record airflows.
  - E. Verify proper operation of capacity control device.
  - F. After startup and performance test, lubricate bearings, and adjust belt tension.

### **3.06 ADJUSTING**

- A. Adjust initial temperature and humidity set points.
- B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

### **3.07 CLEANING**

- A. After completing installation, clean furnaces internally according to manufacturer's written instructions.
- B. Install new filters in each furnace within 14 days after Substantial Completion.

### **3.08 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain condensing units. Refer to Division 01 Section "Demonstration and Training".

**END OF SECTION**

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**SECTION 236313**  
**AIR-COOLED REFRIGERANT CONDENSERS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each air-cooled refrigerant condenser. Include rated capacities, operating characteristics, furnished specialties, and accessories. Include equipment dimensions, weights and structural loads, required clearances, method of field assembly, components, and location and size of each field connection.

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For air-cooled refrigerant condensers to include in emergency, operation, and maintenance manuals.

**1.04 QUALITY ASSURANCE**

- A. Fabricate and label refrigeration system according to ASHRAE 15, "Safety Standard for Refrigeration Systems".

**1.05 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Hatches".
- C. Coordinate location of refrigerant piping and electrical rough-ins.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bryant Heating & Cooling Systems; Div. of United Technologies Corp.
  - 2. Carrier Corporation; Commercial HVAC Systems.
  - 3. Lennox Industries Inc.
  - 4. Dakin
  - 5. YORK; a Johnson Controls company.
- B. Manufacturers: Manufacturer of furnace and condensing unit must match. Miss-match of manufactures will not be accepted.

**2.02 MANUFACTURED UNITS**

- A. Description: Factory assembled and tested; consisting of casing, condenser coils, condenser fans and motors, and unit controls.
- B. Refrigerant: R-32.
- C. Condenser Coil: Factory tested at 425 psig.
  - 1. Tube: 1/2 inch diameter seamless copper.
  - 2. Coil Fin: Aluminum.
  - 3. Circuit: To match compressors
- D. Condenser Fans and Drives: Propeller fans with aluminum or galvanized-steel fan blades, for vertical air discharge; directly driven with permanently lubricated ball-bearing motors with integral current- and thermal-overload protection.
- E. Operating and Safety Controls: Include condenser fan motor thermal and overload cutouts; 115-V control transformer, if required; magnetic contactors for condenser fan motors and a

nonfused factory-mounted and -wired disconnect switch for single external electrical power connection.

1. Provide refrigerant leak detection as required per ASHRAE Standard 15.
- F. Casings: Galvanized or zinc-coated steel treated and finished with manufacturer's standard paint coating, designed for outdoor installation with weather protection for components and controls, and with the following:
1. Removable panels for access to controls, condenser fans, motors, and drives.
  2. Plated-steel fan guards.

### **2.03 MOTORS**

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment".
1. Enclosure Type: Totally enclosed, fan cooled.
  2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  3. Mount unit-mounted disconnect switches on exterior of unit.

### **2.04 SOURCE QUALITY CONTROL**

- A. Verification of Performance: Rate air-cooled refrigerant condensers according to ARI 460.
- B. Testing Requirements: Factory test sound-power-level ratings according to ARI 270.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of air-cooled refrigerant condensers.
- B. Examine roughing-in for refrigerant piping systems to verify actual locations of piping connections before equipment installation.
- C. Examine walls, floors, and roofs for suitable conditions where air-cooled condensers will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install units level and plumb, firmly anchored in locations indicated; maintain manufacturer's recommended clearances.
- B. Maintain manufacturer's recommended clearances for service and maintenance.
- C. Loose Components: Install electrical components, devices, and accessories that are not factory mounted.

### **3.03 CONNECTIONS**

- A. Install piping adjacent to machine to allow service and maintenance.
- B. Refrigerant Piping: Connect piping to unit with pressure relief, service valve, filter-dryer, and moisture indicator on each refrigerant-circuit liquid line. Refrigerant piping and specialties are specified in Section 232300 "Refrigerant Piping".

### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
1. Perform electrical test and visual and mechanical inspection.

2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Complete manufacturer's starting checklist.
  4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  5. Verify proper airflow over coils.
- C. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
- D. Air-cooled refrigerant condensers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

### **3.05 STARTUP SERVICE**

- A. Perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
    - a. Inspect for physical damage to unit casing.
    - b. Verify that access doors move freely and are weathertight.
    - c. Clean units and inspect for construction debris.
    - d. Verify that all bolts and screws are tight.
    - e. Adjust vibration isolation and flexible connections.
    - f. Verify that controls are connected and operational.
  2. Lubricate bearings on fan motors.
  3. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
  4. Adjust fan belts to proper alignment and tension.
  5. Start unit according to manufacturer's written instructions and complete manufacturer's startup checklist.
  6. Measure and record airflow and air temperature rise over coils.
  7. Verify proper operation of capacity control device.
  8. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.
  9. After startup and performance test, lubricate bearings.

### **3.06 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain air-cooled refrigerant condensers.

**END OF SECTION**

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**SECTION 260500**  
**COMMON WORK RESULTS FOR ELECTRICAL**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
  1. Electrical equipment coordination and installation.
  2. Sleeves for raceways and cables.
  3. Sleeve seals.
  4. Grout.
  5. Common electrical installation requirements.

**1.03 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

**1.04 SUBMITTALS**

- A. Product Data: For sleeve seals.

**1.05 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  3. To allow right of way for piping and conduit installed at required slope.
  4. So connecting raceways, cables, wireways, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping".

**PART 2 PRODUCTS**

**2.01 SLEEVES FOR RACEWAYS AND CABLES**

- A. Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

**2.02 SLEEVE SEALS**

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Advance Products & Systems, Inc.
  - b. Calpico, Inc.
  - c. Metraflex Co.
  - d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### **2.03 GROUT**

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## **PART 3 EXECUTION**

### **3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION**

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

### **3.02 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Electrical penetrations occur when raceways, cables or wireways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire stop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4 inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants".
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable



penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping".

- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1 inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1 inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### **3.03 SLEEVE-SEAL INSTALLATION**

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### **3.04 FIRESTOPPING**

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping".

**END OF SECTION**

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**SECTION 260510**  
**COMMON MOTOR REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 COORDINATION**

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  - 1. Motor controllers.
  - 2. Torque, speed, and horsepower requirements of the load.
  - 3. Ratings and characteristics of supply circuit and required control sequence.
  - 4. Ambient and environmental conditions of installation location.

**1.03 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of motors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
  - 2. Motor winding failure.
  - 3. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 GENERAL MOTOR REQUIREMENTS**

- A. Comply with requirements in this Section except when stricter requirements are specified in plumbing equipment schedules or Sections.
- B. Comply with NEMA MG 1 unless otherwise indicated.

**2.02 MOTOR CHARACTERISTICS**

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

**2.03 POLYPHASE MOTORS**

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Manufacturers:
  - 1. US Motor
  - 2. General Electric Company
  - 3. Westinghouse
  - 4. Approved Equal.
- C. Efficiency: Premium efficient, as defined in NEMA MG 1.
- D. Service Factor: 1.15.
- E. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters. Winding insulation shall be rated for 1000 volts minimum.
- F. Multispeed Motors: Separate winding for each speed.
- G. Rotor: Random-wound, squirrel cage.
- H. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- I. Temperature Rise: Class B.

- J. Insulation: Class F.
- K. Peak Voltage Rating of stator wiring to be a minimum of 2,200 volts.
- L. Code Letter Designation:
  - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
  - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- M. Enclosure Material: Cast iron frame and end bells.
- N. Thermal Protection: Comply with NEMA MG 1.
- O. Provide shaft grounding (diverter) ring on drive end of all vertical motors.
- P. Provide shaft grounding (diverter) ring on drive end and insulated bearing on the non-drive end of all motors 25 hp and larger controlled by variable-frequency motor controllers.

#### **2.04 SINGLE-PHASE MOTORS**

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
  - 1. Permanent-split capacitor.
  - 2. Split phase.
  - 3. Capacitor start, inductor run.
  - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

#### **PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## SECTION 260519

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 DEFINITIONS

- A. VFC: Variable frequency controller.

#### PART 2 PRODUCTS

##### 2.01 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Alcan Products Corporation; Alcan Cable Division.
  2. Alpha Wire.
  3. Belden Inc.
  4. Encore Wire Corporation.
  5. General Cable Technologies Corporation.
  6. Southwire Incorporated.
- B. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- C. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2.

##### 2.02 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. AFC Cable Systems, Inc.
  2. Hubbell Power Systems, Inc.
  3. O-Z/Gedney; a brand of the EGS Electrical Group.
  4. 3M; Electrical Markets Division.
  5. Tyco Electronics.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

##### 2.03 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

#### PART 3 EXECUTION

##### 3.01 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

##### 3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-2-THWN-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-2-THWN-2, single conductors in raceway.

- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.
- E. Exposed Branch Circuits: Type THHN-2-THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-2-THWN-2, single conductors in raceway.

### **3.03 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Division 26 Section "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems".

### **3.04 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

### **3.05 IDENTIFICATION**

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems".
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### **3.06 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Common Work Results for Electrical".

### **3.07 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping".

### **3.08 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections :
  1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeders \_\_\_\_\_ for compliance with requirements.
  2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- B. Test and Inspection Reports: Prepare a written report to record the following:

1. Procedures used.
  2. Results that comply with requirements.
  3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- C. Cables will be considered defective if they do not pass tests and inspections.

**END OF SECTION**

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**SECTION 260523**  
**CONTROL-VOLTAGE ELECTRICAL POWER CABLES**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. EMI: Electromagnetic interference.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- C. Plenum: A space forming part of the air distribution system to which one or more air ducts are connected. An air duct is a passageway, other than a plenum, for transporting air to or from heating, ventilating, or air-conditioning equipment.
- D. UTP: Unshielded twisted pair.

**PART 2 PRODUCTS**

**2.01 SYSTEM DESCRIPTION**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**2.02 PERFORMANCE REQUIREMENTS**

- A. Flame Travel and Smoke Density in Plenums: As determined by testing identical products according to NFPA 262 by a qualified testing agency. Identify products for installation in plenums with appropriate markings of applicable testing agency.
  - 1. Flame Travel Distance: 60 inches or less.
  - 2. Peak Optical Smoke Density: 0.5 or less.
  - 3. Average Optical Smoke Density: 0.15 or less.
- B. Flame Travel and Smoke Density for Riser Cables in Non-Plenum Building Spaces: As determined by testing identical products according to UL 1666.
- C. Flame Travel and Smoke Density for Cables in Non-Riser Applications and Non-Plenum Building Spaces: As determined by testing identical products according to UL 1685.

**2.03 UTP CABLE HARDWARE**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. ADC.
  - 2. American Technology Systems Industries, Inc.
  - 3. Belden Inc.
  - 4. Dynacom Inc.
  - 5. Hubbell Incorporated.
  - 6. Leviton Commercial Networks Division.
  - 7. Panduit Corp.
  - 8. Siemon Company (The).
  - 9. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
- B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Jacks and Jack Assemblies: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-C.1.
- D. Workstation Outlets: Two and four port-connector assemblies, as indicated, mounted in single faceplate.

- E. Faceplates:
  - 1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices".
  - 2. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices".
  - 3. For use with snap-in jacks accommodating any combination of UTP, optical-fiber, and coaxial work area cords.
    - a. Flush-mounted jacks, positioning the cord at a 45-degree angle.
- F. Legend:
  - 1. Factory labeled by silk-screening or engraving for stainless steel faceplates.
  - 2. Machine printed, in the field, using adhesive-tape label.
  - 3. Snap-in, clear-label covers and machine-printed paper inserts.

## **2.04 LOW-VOLTAGE CONTROL CABLE**

- A. Paired Cable: NFPA 70, Type CMG.
  - 1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
  - 2. PVC insulation.
  - 3. Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with UL 1685.
- B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
  - 1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
  - 2. PVC insulation.
  - 3. Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with NFPA 262.

## **2.05 CONTROL-CIRCUIT CONDUCTORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Encore Wire Corporation.
  - 2. General Cable Technologies Corporation.
  - 3. Southwire Company.
- B. Class 1 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway, complying with UL 83.
- C. Class 2 Control Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway \_\_\_\_\_, complying with UL 83.
- D. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type THHN-2-THWN-2, in raceway \_\_\_\_\_, complying with UL 83.

## **2.06 SOURCE QUALITY CONTROL**

- A. Cable will be considered defective if it does not pass tests and inspections.
- B. Prepare test and inspection reports.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

### **3.02 INSTALLATION OF RACEWAYS AND BOXES**

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for raceway selection and installation requirements for boxes, conduits, and wireways as supplemented or modified in this Section.
  - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.
  - 2. Flexible metal conduit shall not be used.

- B. Comply with TIA-569-B for pull-box sizing and length of conduit and number of bends between pull points.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.

### **3.03 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Comply with NECA 1 and NFPA 70.
- B. General Requirements for Cabling:
  - 1. Comply with TIA-568-C Series of standards.
  - 2. Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems".
  - 3. Terminate all conductors; no cable shall contain unterminated elements.
  - 4. Cables may not be spliced.
  - 5. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - 6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems".
  - 7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  - 8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Do not use heat lamps for heating.
  - 9. Pulling Cable: Comply with BICSI ITSIMM, Ch. 5, "Copper Structured Cabling Systems". Monitor cable pull tensions.
  - 10. Support: Do not allow cables to lay on removable ceiling tiles.
  - 11. Secure: Fasten securely in place with hardware specifically designed and installed so as to not damage cables.
- C. Installation of Control-Circuit Conductors:
  - 1. Install wiring in raceways. Comply with requirements specified in Division 26 Section "Raceways and Boxes for Electrical Systems".
- D. Separation from EMI Sources:
  - 1. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
    - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 5 inches.
    - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 12 inches.
    - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 24 inches.
  - 2. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
    - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: A minimum of 2 1/2 inches.
    - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 6 inches.
    - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 12 inches.
  - 3. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
    - a. Electrical Equipment or Circuit Rating Less Than 2 kVA: No requirement.
    - b. Electrical Equipment or Circuit Rating between 2 and 5 kVA: A minimum of 3 inches.
    - c. Electrical Equipment or Circuit Rating More Than 5 kVA: A minimum of 6 inches.
  - 4. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or 5 HP and Larger: A minimum of 48 inches.

### **3.04 REMOVAL OF CONDUCTORS AND CABLES**

- A. Remove abandoned conductors and cables. Abandoned conductors and cables are those installed that are not terminated at equipment and are not identified for future use with a tag.

### **3.05 CONTROL-CIRCUIT CONDUCTORS**

- A. Minimum Conductor Sizes:
  - 1. Class 1 remote-control and signal circuits; No 14 AWG.
  - 2. Class 2 low-energy, remote-control, and signal circuits; No. 16 AWG.
  - 3. Class 3 low-energy, remote-control, alarm, and signal circuits; No 12 AWG.

### **3.06 FIRESTOPPING**

- A. Comply with requirements in Division 07 Section "Penetration Firestopping".
- B. Comply with TIA-569-B, Annex A, "Firestopping".
- C. Comply with BICSI TDMM, "Firestopping" Chapter.

### **3.07 GROUNDING**

- A. For data communication wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Bonding and Grounding (Earthing)" Chapter.
- B. For low-voltage control wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems".

### **3.08 IDENTIFICATION**

- A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems".
- B. Identify data and communications system components, wiring, and cabling according to TIA-606-A; label printers shall use label stocks, laminating adhesives, and inks complying with UL 969.

### **3.09 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests and inspections:
  - 1. Visually inspect UTP cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
  - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  - 3. Test UTP cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not after cross-connection.
    - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

**END OF SECTION**

## SECTION 260526

### GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 ACTION SUBMITTALS

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

##### 1.03 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Burndy; Part of Hubbell Electrical Systems.
  2. Dossert; AFL Telecommunications LLC.
  3. ERICO International Corporation.
  4. Fushi Copperweld Inc.
  5. Galvan Industries, Inc.; Electrical Products Division, LLC.
  6. Harger Lightning and Grounding.
  7. ILSCO.
  8. O-Z/Gedney; A Brand of the EGS Electrical Group.
  9. Siemens Power Transmission & Distribution, Inc.

##### 2.02 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
- B. Comply with UL 467 for grounding and bonding materials and equipment

##### 2.03 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  1. Solid Conductors: ASTM B 3.
  2. Stranded Conductors: ASTM B 8.
  3. Tinned Conductors: ASTM B 33.
  4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1 5/8 inches wide and 1/16 inch thick.
  7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1 5/8 inches wide and 1/16 inch thick.

##### 2.04 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

## **2.05 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

## **PART 3 EXECUTION**

### **3.01 APPLICATIONS**

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
  - 1. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors.
  - 3. Connections to Structural Steel: Welded connectors.

### **3.02 EQUIPMENT GROUNDING**

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Three-phase motor and appliance branch circuits.
  - 6. Flexible raceway runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

### **3.03 INSTALLATION**

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.

2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
  3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
- F. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

**END OF SECTION**

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## SECTION 260529

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

#### PART 1 GENERAL

##### 1.01 SUMMARY

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

##### 1.02 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

##### 1.03 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

##### 1.04 ACTION SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze hangers. Include Product Data for components.
  - 2. Equipment supports.

##### 1.05 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel".
- B. Comply with NFPA 70.

##### 1.06 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

#### PART 2 PRODUCTS

##### 2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36, steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
  - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1) Hilti Inc.
  - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
  - 3) MKT Fastening, LLC.
  - 4) Simpson Strong-Tie Co., Inc.
2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Cooper B-Line, Inc.
    - 2) Hilti, Inc.
    - 3) ITW Ramset/Red Head; Illinois Tool Works, Inc.
    - 4) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## **2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES**

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

## **PART 3 EXECUTION**

### **3.01 APPLICATION**

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where it's Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1 1/2 inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### **3.02 SUPPORT INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### **3.03 INSTALLATION OF FABRICATED METAL SUPPORTS**

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### **3.04 CONCRETE BASES**

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete".
- C. Anchor equipment to concrete base.
  - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

### **3.05 PAINTING**

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION**

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**SECTION 260533**  
**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Structural members in the paths of conduit groups with common supports.
  - 2. HVAC and plumbing items and Engineerural features in the paths of conduit groups with common supports.
- B. Qualification Data: For professional engineer.
- C. Source quality-control test reports.

**PART 2 PRODUCTS**

**2.01 METAL CONDUITS, TUBING, AND FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Allied Tube & Conduit.
  - 3. Anamet Electrical, Inc.
  - 4. Electri-Flex Company.
  - 5. O-Z/Gedney.
  - 6. Wheatland Tube Company.
- B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. GRC: Comply with ANSI C80.1 and UL 6.
- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. FMC: Comply with UL 1; zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
- G. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  - 1. Fittings for EMT:
    - a. Material: Steel.
    - b. Type: Compression.
  - 2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- H. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## **2.02 NONMETALLIC CONDUITS, TUBING, AND FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Anamet Electrical, Inc.
  - 3. Arnco Corporation.
  - 4. CANTEX Inc.
  - 5. CertainTeed Corporation.
  - 6. Condux International, Inc.
  - 7. Electri-Flex Company.
  - 8. Lamson & Sessions; Carlon Electrical Products.
  - 9. RACO; Hubbell.
  - 10. Thomas & Betts Corporation.
- B. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
- C. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- D. LFNC: Comply with UL 1660.
- E. RTRC: Comply with UL 1684A and NEMA TC 14.
- F. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- G. Fittings for LFNC: Comply with UL 514B.
- H. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## **2.03 METAL WIREWAYS AND AUXILIARY GUTTERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper B-Line, Inc.
  - 2. Hoffman.
  - 3. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.
  - 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Flanged and gasketed.
- E. Finish: Manufacturer's standard enamel finish.

## **2.04 BOXES, ENCLOSURES, AND CABINETS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper Technologies Company; Cooper Crouse-Hinds.
  - 2. EGS/Appleton Electric.
  - 3. Erickson Electrical Equipment Company.
  - 4. Hoffman.
  - 5. Hubbell Incorporated.
  - 6. O-Z/Gedney.
  - 7. RACO; Hubbell.
  - 8. Robroy Industries.

9. Spring City Electrical Manufacturing Company.
  10. Thomas & Betts Corporation.
  11. Wiremold / Legrand.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
  - C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
  - D. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
  - E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
  - F. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
    1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1, cast aluminum with gasketed cover.
  - H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
  - I. Device Box Dimensions: 4 inches by 2 1/8 inches by 2 1/8 inches deep.
  - J. Gangable boxes are allowed.
  - K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
    1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
    2. Nonmetallic Enclosures: Plastic.
    3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
  - L. Cabinets:
    1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
    2. Hinged door in front cover with flush latch and concealed hinge.
    3. Key latch to match panelboards.
    4. Metal barriers to separate wiring of different systems and voltage.
    5. Accessory feet where required for freestanding equipment.
    6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### **PART 3 EXECUTION**

#### **3.01 RACEWAY APPLICATION**

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
  1. Exposed Conduit: Rigid steel conduit.
  2. Concealed Conduit, Aboveground: EMT.
  3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated:
  1. Exposed, Not Subject to Physical Damage: EMT.
  2. Exposed, Not Subject to Severe Physical Damage: EMT.
  3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Raceway locations include the following:
    - a. Mechanical rooms.
  4. Concealed in Ceilings and Interior Walls and Partitions: EMT.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  6. Damp or Wet Locations: Rigid steel conduit.
  7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.
- C. Minimum Raceway Size: 3/4 inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
  3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz.
- F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

### 3.02 INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Complete with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- H. Support conduit within 12 inches of enclosures to which attached.
- I. Stub-ups to Above Recessed Ceilings:
  1. Use EMT, IMC, or RMC for raceways.
  2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1 1/4 inch trade size and insulated throat metal bushings on 1 1/2 inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.



- O. Cut conduit perpendicular to the length. For conduits 2 inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- Q. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- R. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where an underground service raceway enters a building or structure.
  - 3. Where otherwise required by NFPA 70.
- S. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- T. Expansion-Joint Fittings:
  - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
  - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    - c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
    - d. Attics: 135 deg F temperature change.
  - 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.00078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
  - 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
  - 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- U. Flexible Conduit Connections: Use maximum of 36 inches of flexible conduit for lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- V. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- W. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- X. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

- Y. Locate boxes so that cover or plate will not span different building finishes.
- Z. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- AA. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

### **3.03 INSTALLATION OF UNDERGROUND CONDUIT**

- A. Direct-Buried Conduit:
  - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom.
  - 2. Install backfill.
  - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
  - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
  - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
    - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
  - 6. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems".

### **3.04 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Common Work Results for Electrical Raceways".

### **3.05 FIRESTOPPING**

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping".

### **3.06 PROTECTION**

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

**END OF SECTION**

**SECTION 260553**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 QUALITY ASSURANCE**

- A. Comply with ANSI A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

**1.03 COORDINATION**

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

**PART 2 PRODUCTS**

**2.01 POWER RACEWAY IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4 inch wide black stripes on 10 inch centers diagonally over orange background that extends full length of raceway or duct and is 12 inches wide. Stop stripes at legends.

**2.02 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing ends of legend label.

- C. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3 mil thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the cable diameter such that the clear shield overlaps the entire printed legend.
- D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

### **2.03 CONDUCTOR IDENTIFICATION MATERIALS**

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3 mil thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

### **2.04 FLOOR MARKING TAPE**

- A. 2 inch wide, 5 mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

### **2.05 WARNING LABELS AND SIGNS**

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
  1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  2. 1/4 inch grommets in corners for mounting.
  3. Nominal size, 7 by 10 inches.
- D. Metal-Backed, Butyrate Warning Signs:
  1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396 inch galvanized-steel backing; and with colors, legend, and size required for application.
  2. 1/4 inch grommets in corners for mounting.
  3. Nominal size, 10 by 14 inches.
- E. Warning label and sign shall include, but are not limited to, the following legends:
  1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES".
  2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES".

## **2.06 INSTRUCTION SIGNS**

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
  - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

## **2.07 EQUIPMENT IDENTIFICATION LABELS**

- A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- B. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

## **2.08 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.
- G. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- I. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

### **3.02 IDENTIFICATION SCHEDULE**

- A. Concealed Raceways, Duct Banks, and More Than 600 V, within Buildings: Tape and stencil 4 inch wide black stripes on 10 inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH

VOLTAGE WIRING" with 3 inch high black letters on 20 inch centers. Stop stripes at legends.  
Apply to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
  2. Wall surfaces directly external to raceways concealed within wall.
  3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 30-foot maximum intervals.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
    - a. Color shall be factory applied.
    - b. Colors for 120/240-Volt Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
    - c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
  2. Identify system voltage with black letters on an orange background.
  3. Apply to exterior of door, cover, or other access.
  4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- J. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control

panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
  - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2 inch high letters on 1 1/2 inch high label; where two lines of text are required, use labels 2 inches high.
  - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label. Stenciled legend 4 inches high.
  - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
  - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
2. Equipment to Be Labeled:
  - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
  - b. Enclosures and electrical cabinets.
  - c. Access doors and panels for concealed electrical items.
  - d. Enclosed switches.
  - e. Push-button stations.
  - f. Remote-controlled switches, dimmer modules, and control devices.
  - g. Monitoring and control equipment.

**END OF SECTION**

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**SECTION 260923**  
**LIGHTING CONTROL DEVICES**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
  - 1. Interconnection diagrams showing field-installed wiring.
  - 2. Include diagrams for power, signal, and control wiring.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Field quality-control test reports.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

**PART 2 PRODUCTS**

**2.01 INDOOR OCCUPANCY SENSORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hubbell Building Automation, Inc.
  - 2. Leviton Manufacturing Co., Inc.
  - 3. Lithonia Lighting; Acuity Lighting Group, Inc.
  - 4. Watt Stopper.
- B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
  - 3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the power pack.
  - 4. Power Pack: Dry contacts rated for 20-A LED load at 120-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
  - 5. Mounting:
    - a. Sensor: Suitable for mounting in any position on a standard outlet box.
    - b. Relay: Externally mounted through a 1/2 inch knockout in a standard electrical enclosure.
    - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
  - 6. Indicator: Digital display, to show when motion is being detected during testing and normal operation of the sensor.
  - 7. Bypass Switch: Override the "on" function in case of sensor failure.
- C. PIR Type: Wall and Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.
  - 1. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. in.
  - 2. Detection Coverage (Room, Ceiling Mounted): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96 inch high ceiling.

3. Detection Converag (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of 1000 square feet when mounted 48 inches above finished floor.
  4. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot high ceiling.
- D. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
  2. Detector Sensitivity: Detect occurrences of 6 inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
  3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96 inch high ceiling.

## **2.02 CONDUCTORS AND CABLES**

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables".
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 22 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables".
- C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 16 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables".

## **PART 3 EXECUTION**

### **3.01 SENSOR INSTALLATION**

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

### **3.02 CONTACTOR INSTALLATION**

- A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

### **3.03 WIRING INSTALLATION**

- A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables". Minimum conduit size shall be 1/2 inch.
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

### **3.04 IDENTIFICATION**

- A. Identify components and power and control wiring according Section 260553 "Identification for Electrical Systems".

1. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

### **3.05 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  1. Operational Test: After installing sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
  2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Lighting control devices that fail tests and inspections are defective work.
- D. Prepare test and inspection reports.

### **3.06 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
  1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

### **3.07 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Refer to Division 01 Section "Demonstration and Training".

**END OF SECTION**

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**SECTION 262416**  
**PANELBOARDS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
  - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
  - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
  - 3. Detail bus configuration, current, and voltage ratings.
  - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
  - 5. Include evidence of NRTL listing for series rating of installed devices.
  - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  - 7. Include wiring diagrams for power, signal, and control wiring.
  - 8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Field Quality-Control Reports:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data", include the following:
  - 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
  - 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Keys: Two spares for each type of panelboard cabinet lock.

**1.06 QUALITY ASSURANCE**

- A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NEMA PB 1.

### **1.08 PROJECT CONDITIONS**

- A. Environmental Limitations:
  - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
  - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    - a. Ambient Temperature: Not exceeding minus 22 deg F to plus 104 deg F.
    - b. Altitude: Not exceeding 1500 feet.
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
  - 1. Ambient temperatures within limits specified.
  - 2. Altitude not exceeding 1500 feet.
- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Engineer no fewer than two days in advance of proposed interruption of electric service.
  - 2. Do not proceed with interruption of electric service without Owner's written permission.
  - 3. Comply with NFPA 70E.

### **1.09 COORDINATION**

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

### **1.10 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS FOR PANELBOARDS**

- A. Enclosures: Flush- and surface-mounted cabinets.
  - 1. Rated for environmental conditions at installed location.
    - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
  - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
  - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

4. Skirt for Surface-Mounted Panelboards: Same gauge and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
  5. Finishes:
    - a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
    - b. Back Boxes: Same finish as panels and trim.
  6. Directory Card: Inside panelboard door, mounted in metal frame with transparent protective cover.
- B. Incoming Mains Location: Top and bottom.
- C. Phase, Neutral, and Ground Buses:
1. Material: Hard-drawn copper, 98 percent conductivity.
  2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
1. Material: Hard-drawn copper, 98 percent conductivity.
  2. Main and Neutral Lugs: Mechanical type.
  3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
- E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

## **2.02 DISTRIBUTION PANELBOARDS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. Siemens Energy & Automation, Inc.
  3. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
1. For doors more than 36 inches high, provide two latches, keyed alike.
- D. Mains: As Indicated
- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.
- G. Branch Overcurrent Protective Devices: Fused switches.

## **2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  2. Siemens Energy & Automation, Inc.
  3. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: As indicated.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

## **2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. Siemens Energy & Automation, Inc.
  - 3. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - 3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:
    - a. Instantaneous trip.
    - b. Long- and short-time pickup levels.
    - c. Long- and short-time time adjustments.
    - d. Ground-fault pickup level, time delay, and I<sup>2</sup>t response.
  - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - 5. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    - c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    - d. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.
    - e. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
    - f. Handle Padlocking Device: Fixed attachment for locking circuit breaker handle in off position.
    - g. Handle Clamp: Loose attachment for holding circuit breaker handle in on position.

## **2.05 ACCESSORY COMPONENTS AND FEATURES**

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION**

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.



- C. Mount top of trim 72 inches above finished floor unless otherwise indicated.
- D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- E. Install overcurrent protective devices and controllers not already factory installed.
  - 1. Set field-adjustable, circuit-breaker trip ranges.
- F. Install filler plates in unused spaces.
- G. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- H. Comply with NECA 1.

### **3.03 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems".
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems".
- D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems".

### **3.04 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- D. Tests and Inspections:
  - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- E. Panelboards will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### **3.05 ADJUSTING**

- A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

### **3.06 PROTECTION**

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

**END OF SECTION**



**SECTION 262726**  
**WIRING DEVICES**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. UTP: Unshielded twisted pair.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Field quality-control test reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

**1.06 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Service Outlet Assemblies: One for every 10, but no less than one.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
  - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
  - 3. Leviton Mfg. Company Inc. (Leviton).
  - 4. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

**2.02 GENERAL WIRING-DEVICE REQUIREMENTS**

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

### 2.03 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; 5351 (single), CR5352 (duplex).
    - b. Hubbell; HBL5351 (single), HBL5352 (duplex).
    - c. Leviton; 5891 (single), 5352 (duplex).
    - d. Pass & Seymour; 5361 (single), 5362 (duplex).

### 2.04 GFCI RECEPTACLES

- A. General Description:
  - 1. Straight blade, feed-through type.
  - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
  - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Cooper; VGF20.
    - b. Pass & Seymour; 2095.

### 2.05 USB RECEPTACLES

- A. USB Charging Receptacles:
  - 1. Products: Submit to compliance with requirements, provide one of the following:
    - a. Cooper: TR7756
    - b. Hubbell: USB20A5
    - c. Legrand: TM826USB
    - d. Leviton: T5832
  - 2. Description: Single-piece, rivetless, nickel-plated, all-brass grounding system. Nickel-plated brass mounting strap.
  - 3. USB Receptacles: Dual, USB Type A, 5 Vdc, and 2.1 A per receptacle (minimum).
  - 4. Standards: Comply with UL 1310 and USB 3.0 devices.

### 2.06 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Single Pole:
      - 1) Cooper; AH1221.
      - 2) Hubbell; HBL1221.
      - 3) Leviton; 1221-2.
      - 4) Pass & Seymour; CSB20AC1.
    - b. Two Pole:
      - 1) Cooper; AH1222.
      - 2) Hubbell; HBL1222.
      - 3) Leviton; 1222-2.
      - 4) Pass & Seymour; CSB20AC2.

### 2.07 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: White, powdercoated painted metal finish. .
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant thermoplastic with lockable cover.

## **2.08 FINISHES**

- A. Device Color:
  - 1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.
- B. Wall Plate Color: For plastic covers, match device color.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
  - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  - 4. Existing Conductors:
    - a. Cut back and pigtail, or replace all damaged conductors.
    - b. Straighten conductors that remain and remove corrosion and foreign matter.
    - c. Pigtailing existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
  - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
  - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
  - 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
  - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
  - 8. Tighten unused terminal screws on the device.
  - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
  - 1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

2. Mount bottom of receptacles at 16" in commercial/office environment. Mount counter top receptacles at 4" above counter top backsplash.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
1. Install dimmers within terms of their listing.
  2. Verify that dimmers used for fan speed control are listed for that application.
  3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
- H. Lighting Switch Height: Mount top of switch at 48" above finished floor.
- I. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- J. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

### **3.02 IDENTIFICATION**

- A. Comply with Section 260553 "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
1. Test Instruments: Use instruments that comply with UL 1436.
  2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
1. Line Voltage: Acceptable range is 105 to 132 V.
  2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
  3. Ground Impedance: Values of up to 2 ohms are acceptable.
  4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  5. Using the test plug, verify that the device and its outlet box are securely mounted.
  6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- C. Wiring device will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

**END OF SECTION**

**SECTION 262816**  
**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
  - 1. Enclosure types and details for types other than NEMA 250, Type 1.
  - 2. Current and voltage ratings.
  - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
  - 4. Include evidence of NRTL listing for series rating of installed devices.
  - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
  - 6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Field quality-control reports.
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- C. Manufacturer's field service report.

**1.06 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
  - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
  - 2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

### **1.07 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
  - 2. Fuse Pullers: Two for each size and type.

### **1.08 QUALITY ASSURANCE**

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NFPA 70.

### **1.09 PROJECT CONDITIONS**

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
  - 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
  - 2. Altitude: Not exceeding 1500 feet.
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
  - 1. Notify Engineer no fewer than seven days in advance of proposed interruption of electric service.
  - 2. Indicate method of providing temporary electric service.
  - 3. Do not proceed with interruption of electric service without Owner's written permission.
  - 4. Comply with NFPA 70E.

### **1.10 COORDINATION**

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

## **PART 2 PRODUCTS**

### **2.01 NONFUSIBLE SWITCHES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. Siemens Energy & Automation, Inc.
  - 3. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 240 or 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
  - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
  - 2. Hookstick Handle: Allows use of a hookstick to operate the handle.
  - 3. Lugs: Mechanical type, suitable for number, size, and conductor material.

### **2.02 ENCLOSURES**

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.



2. Outdoor Locations: NEMA 250, Type 3R.
3. Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INSTALLATION**

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

#### **3.03 IDENTIFICATION**

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems".
  1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  2. Label each enclosure with engraved metal or laminated-plastic nameplate.

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
  1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
  2. Test continuity of each circuit.
- C. Tests and Inspections:
  1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
  3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

#### **3.05 ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

**END OF SECTION**

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**SECTION 265119**  
**LED INTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire".
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Arrange in order of luminaire designation.
  - 2. Include data on features, accessories, and finishes.
  - 3. Include physical description and dimensions of luminaires.
  - 4. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
  - 5. Photometric data and adjustment factors based on laboratory tests, complying with IESNA Lighting Measurements Testing and Calculation Guides, of each lighting fixture type. The adjustment factors shall be for lamps and accessories identical to those indicated for the lighting fixture as applied in this Project.
    - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
- B. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
  - 1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

**1.05 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps: Ten for every 100 of each type and rating installed. Furnish at least one of each type.
  - 2. Diffusers and Lenses: One for every 100 of each type and rating installed. Furnish at least one of each type.
  - 3. Globes and Guards: One for every 20 of each type and rating installed. Furnish at least one of each type.

**1.06 QUALITY ASSURANCE**

- A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.
- B. Provide luminaires from a single manufacturer for each luminaire type.
- C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

## **1.08 WARRANTY**

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 LUMINAIRE TYPES**

- A. Refer to Lighting Fixture Schedule on drawings.

### **2.02 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Recessed Fixtures: Comply with NEMA LE 4.
- C. Bulb shape complying with ANSI C79.1.
- D. Lamp base complying with ANSI C81.61.
- E. CRI of 80. CCT of 3500 K.
- F. Rated minimum lamp life to L70 of 50,000 hours.
- G. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- H. Internal driver.
- I. Nominal Operating Voltage: 120 V ac.
- J. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

### **2.03 MATERIALS**

- A. Metal Parts:
  - 1. Free of burrs and sharp corners and edges.
  - 2. Sheet metal components shall be steel unless otherwise indicated.
  - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
  - 1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
  - 2. Glass: Annealed crystal glass unless otherwise indicated.
  - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- D. Housings:
  - 1. Extruded-aluminum housing and heat sink.
- E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
  - 1. Label shall include the following lamp characteristics:
    - a. "USE ONLY" and include specific lamp type.
    - b. Lamp diameter, shape, size, wattage, and coating.
    - c. CCT and CRI for all luminaires.

## **2.04 METAL FINISHES**

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

## **2.05 LUMINAIRE FIXTURE SUPPORT COMPONENTS**

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Wires: ASTM A 641, Class 3, soft temper, zinc-coated steel, 12 gauge.
- C. Rod Hangers: 3/16 inch minimum diameter, cadmium-plated, threaded steel rod.
- D. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 TEMPORARY LIGHTING**

- A. If approved by the Engineer, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

### **3.03 INSTALLATION**

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Provide support for luminaire without causing deflection of ceiling or wall.
  - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaire Support:
  - 1. Secured to outlet box.
  - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
  - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaire Support:
  - 1. Attached to a minimum 20 gauge backing plate attached to wall structural members.
  - 2. Do not attach luminaires directly to gypsum board.
- G. Ceiling-Mounted Luminaire Support:
  - 1. Ceiling mount with two 5/32 inch-diameter aircraft cable supports adjustable to 120 inches.
  - 2. Ceiling mount with pendant mount with 5/32 inch-diameter aircraft cable supports adjustable to 120 inches.
  - 3. Ceiling mount with hook mount.
- H. Ceiling-Grid-Mounted Luminaires:
  - 1. Secure to any required outlet box.

2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
  3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.
- I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

**END OF SECTION**

**SECTION 265619**  
**LED EXTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

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

**1.02 DEFINITIONS**

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire".
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

**1.03 ACTION SUBMITTALS**

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

**1.04 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
- B. Product Certificates: For each type of the following:
  - 1. Luminaire.
- C. Sample warranty.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data:
  - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
  - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

**1.06 FIELD CONDITIONS**

- A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.
- B. Mark locations of exterior luminaires for approval by Engineer prior to the start of luminaire installation.

**1.07 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs or alterations from special warranty coverage.
  - 1. Warranty Period for Luminaires: Five years from date of Substantial Completion.
  - 2. Warranty Period for Metal Corrosion: Five years from date of Substantial Completion.
  - 3. Warranty Period for Color Retention: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.

- C. UL Compliance: Comply with UL 1598 and listed for wet location.
- D. Lamp base complying with ANSI C81.61.
- E. CRI of 80. CCT of 4000 K.
- F. L70 minimum lamp life of 35,000 hours.
- G. Nominal Operating Voltage: 120 V ac.
- H. Lamp Rating: Lamp marked for outdoor use and in enclosed locations.
- I. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

## **2.02 LUMINAIRE TYPES**

- A. Refer to Schedule on Drawings.

## **2.03 MATERIALS**

- A. Metal Parts: Free of burrs and sharp corners and edges.
- B. Sheet Metal Components: Corrosion-resistant aluminum or Stainless steel. Form and support to prevent warping and sagging.
- C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- D. Diffusers and Globes:
  - 1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
  - 2. Glass: Annealed crystal glass unless otherwise indicated.
  - 3. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
- E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
  - 1. White Surfaces: 85 percent.
  - 2. Specular Surfaces: 83 percent.
  - 3. Diffusing Specular Surfaces: 75 percent.
- G. Housings:
  - 1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
  - 2. Provide filter/breather for enclosed luminaires.

## **2.04 FINISHES**

- A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.
- C. Factory-Applied Finish for Aluminum Luminaires: Comply with NAAMM's "Metal Finishes Manual for Engineerural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.



2. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20 requirements; and seal aluminum surfaces with clear, hard-coat wax.
3. Class I, Clear-Anodic Finish: AA-M32C22A41 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Engineerural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class I, Color-Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: Medium satin; Chemical Finish: Etched, medium matte; Anodic Coating: Engineerural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker), complying with AAMA 611.
5. Color: Bronze.

## **2.05 GENERAL REQUIREMENTS FOR SUPPORT COMPONENTS**

- A. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.
- B. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
  1. Materials: Shall not cause galvanic action at contact points.

## **PART 3 EXECUTION**

### **3.01 GENERAL INSTALLATION REQUIREMENTS**

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Install lamps in each luminaire.
- D. Fasten luminaire to structural support.
- E. Supports:
  1. Sized and rated for luminaire weight.
  2. Able to maintain luminaire position after cleaning and relamping.
  3. Support luminaires without causing deflection of finished surface.
  4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Wall-Mounted Luminaire Support:
  1. Attached to a minimum 1/8 inch backing plate attached to wall structural members.
- G. Wiring Method: Install cables in raceways. Conceal raceways and cables.
- H. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
- I. Coordinate layout and installation of luminaires with other construction.
- J. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.
- K. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

### **3.02 CORROSION PREVENTION**

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems". In concrete foundations, wrap conduit with 0.010 inch-thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

- B. Perform the following tests and inspections:
  - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  - 2. Verify operation of photoelectric controls.
- C. Luminaire will be considered defective if it does not pass tests and inspections.
- D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

**END OF SECTION**

## SECTION 280513

### CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

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

##### 1.02 SUMMARY

- A. Section Includes:
  1. Fire alarm wire and cable.
  2. Identification products.

##### 1.03 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. IDC: Insulation displacement connector.
- C. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

##### 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate layout and installation of electronic safety and security cabling with Owner's telecommunications and LAN equipment and service suppliers.
- B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

##### 1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
  1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
  2. Cabling administration drawings and printouts.

##### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.

#### PART 2 PRODUCTS

##### 2.01 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: 25 or less.
  2. Smoke-Developed Index: 50 or less.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

##### 2.02 FIRE ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Allied Wire & Cable Inc.
  2. CommScope, Inc.
  3. Comtran Corporation.
  4. Draka Cableteq USA; a Prysmian Group company.
  5. Genesis Cable Products; Honeywell International, Inc.
  6. Rockbestos-Suprenant Cable Corp.
  7. Superior Essex Inc.
  8. West Penn Wire.

- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
  - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
  - 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
  - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.

### **2.03 IDENTIFICATION PRODUCTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Brady Corporation.
  - 2. HellermannTyton.
  - 3. Kroy LLC.
  - 4. Panduit Corp.
- B. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- C. Comply with requirements in Section 260553 "Identification for Electrical Systems."

### **2.04 SOURCE QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to evaluate cables.
- B. Cable will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION OF HANGERS AND SUPPORTS**

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for installation of supports for cables.

### **3.02 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Comply with NECA 1 and NFPA 70.
- B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.
- C. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.
- D. General Requirements for Cabling:
  - 1. Comply with TIA-568-C.1.
  - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
  - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels. Leave a minimum of 6 inches of slack at outlet terminations and coil loosely into box after termination on outlet fitting.
  - 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - 5. Maintain minimum cable bending radius during installation and termination of cables.
  - 6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  - 7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.

8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions. Do not exceed manufacturer's rated cable-pulling tension.
  9. Riser Cable: Riser cable support intervals shall be in accordance with manufacturer's recommendations.
  10. Comply with Section 260500 "Common Work Results for Electrical."
- E. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA-569-C recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
  2. Separation between communication cables in grounded metallic pathways and unshielded power lines or electrical equipment shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
    - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
  3. Separation between cables in grounded metallic pathways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
    - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
    - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
  4. Separation between Cables and Electrical Motors and Transformers, 5 kVA or hp and Larger: A minimum of 48 inches.

### **3.03 FIRE ALARM WIRING INSTALLATION**

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method: Install wiring in metal pathway according to Section 260533 "Raceway and Boxes for Electrical Systems."
  1. Install plenum cable in environmental air spaces, including plenum ceilings.
  2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated pathway system. This system shall not be used for any other wire or cable.
- C. Wiring Method:
  1. Cables and pathways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
  2. Fire-Rated Cables: Use of two-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is not permitted.
  3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or pathway as signaling line circuits.
- D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- F. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and another for supervisory circuits. Color code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

- G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- H. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

### **3.04 POWER AND CONTROL-CIRCUIT CONDUCTORS**

- A. 120-V Power Wiring: Install according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables" unless otherwise indicated.
- B. Minimum Conductor Sizes:
  - 1. Class 1 remote-control and signal circuits, No. 14 AWG.
  - 2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
  - 3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

### **3.05 CONNECTIONS**

- A. Comply with requirements in Section 283111 "Digital, Addressable Fire-Alarm System" for connecting, terminating, and identifying wires and cables.

### **3.06 FIRESTOPPING**

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-C, "Firestopping" Annex A.
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

### **3.07 GROUNDING**

- A. For communication wiring, comply with J-STD-607-A and with BICSI TDMM's "Grounding, Bonding, and Electrical Protection" chapter.
- B. For low-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

### **3.08 IDENTIFICATION**

- A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### **3.09 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections:
  - 1. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
- C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

**END OF SECTION**

**SECTION 283111**  
**DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

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

**1.02 DEFINITIONS**

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. NICET: National Institute for Certification in Engineering Technologies.
- D. PC: Personal computer.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product, including furnished options and accessories.
  - 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
  - 2. Include rated capacities, operating characteristics, and electrical characteristics.
- B. Shop Drawings: For fire-alarm system.
  - 1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
  - 2. Include plans, elevations, sections, details, and attachments to other work.
  - 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
  - 4. Detail assembly and support requirements.
  - 5. Include voltage drop calculations for notification-appliance circuits.
  - 6. Include battery-size calculations.
  - 7. Include input/output matrix.
  - 8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
  - 9. Include performance parameters and installation details for each detector.
  - 10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
  - 11. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
  - 12. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
    - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    - b. Show field wiring required for HVAC unit shutdown on alarm.
    - c. Locate detectors according to manufacturer's written recommendations.
  - 13. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
  - 14. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.
- C. General Submittal Requirements:
  - 1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Engineer.
  - 2. Shop Drawings shall be prepared by persons with the following qualifications:
    - a. Trained and certified by manufacturer in fire-alarm system design.
    - b. NICET-certified, fire-alarm technician; Level III minimum.

- c. Licensed or certified by authorities having jurisdiction.

#### **1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Field quality-control reports.

#### **1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
  - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
    - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
    - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
    - d. Riser diagram.
    - e. Device addresses.
    - f. Record copy of site-specific software.
    - g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
      - 1) Equipment tested.
      - 2) Frequency of testing of installed components.
      - 3) Frequency of inspection of installed components.
      - 4) Requirements and recommendations related to results of maintenance.
      - 5) Manufacturer's user training manuals.
    - h. Manufacturer's required maintenance related to system warranty requirements.
    - i. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.
- B. Software and Firmware Operational Documentation:
  - 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.

#### **1.06 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
  - 2. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than one unit of each type.
  - 3. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.
  - 4. Keys and Tools: One extra set for access to locked or tamperproofed components.
  - 5. Audible and Visual Notification Appliances: One of each type installed.
  - 6. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

#### **1.07 QUALITY ASSURANCE**

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.



- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

### **1.08 PROJECT CONDITIONS**

- A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.
- B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
  - 1. Notify Owner no fewer than seven days in advance of proposed interruption of fire-alarm service.
  - 2. Do not proceed with interruption of fire-alarm service without Owner's written permission.
- C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

### **1.09 SEQUENCING AND SCHEDULING**

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

### **1.10 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
  - 2. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 SYSTEM DESCRIPTION**

- A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the selected system.
- E. 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.

### **2.02 SYSTEMS OPERATIONAL DESCRIPTION**

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
  - 1. Manual stations.
  - 2. Heat detectors.
  - 3. Smoke detectors.
- B. Fire-alarm signal shall initiate the following actions:
  - 1. Continuously operate alarm notification appliances.
  - 2. Identify alarm and specific initiating device at fire-alarm control unit \_\_\_\_\_.
  - 3. Transmit an alarm signal to the remote alarm receiving station.
  - 4. Unlock electric door locks in designated egress paths.

5. Activate alarm notification system.
  6. Record events in the system memory.
  7. Record events by the system printer.
  8. Indicate device in alarm on the graphic annunciator.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. User disabling of zones or individual devices.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
  2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
  3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
  4. Loss of primary power at fire-alarm control unit.
  5. Ground or a single break in internal circuits of fire-alarm control unit.
  6. Abnormal ac voltage at fire-alarm control unit.
  7. Break in standby battery circuitry.
  8. Failure of battery charging.
  9. Abnormal position of any switch at fire-alarm control unit or annunciator.
- E. System Supervisory Signal Actions:
1. Initiate notification appliances.
  2. Identify specific device initiating the event at fire-alarm control unit \_\_\_\_\_.
  3. Record the event on system printer.
  4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
  5. Transmit system status to building management system.
  6. Display system status on graphic annunciator.

### 2.03 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

### 2.04 FIRE-ALARM CONTROL UNIT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Faraday.
  2. Fire-Lite Alarms, Inc.; a Honeywell International company.
  3. Notifier.
  4. Siemens Industry, Inc.; Fire Safety Division.
  5. Silent Knight.
- B. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
    - a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
    - b. Include a real-time clock for time annotation of events on the event recorder and printer.
    - c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
    - d. The FACP shall be listed for connection to a central-station signaling system service.
    - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a

- complete power down condition. The FACP shall provide a minimum 500-event history log.
2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
  3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
  2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class B.
  2. Pathway Survivability: Level 0.
  3. Install no more than 100 addressable devices on each signaling-line circuit.
  4. Serial Interfaces:
    - a. One dedicated RS 485 port for central-station operation using point ID DACT.
    - b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
- E. Notification-Appliance Circuit:
1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
  2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
  3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.
- F. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- G. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- H. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals shall be powered by 24-V dc source.
1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- I. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium.
- J. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

## 2.05 MANUAL FIRE-ALARM BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Faraday.
  - 2. Fire-Lite Alarms, Inc.; a Honeywell International company.
  - 3. Notifier.
  - 4. Siemens Industry, Inc.; Fire Safety Division.
  - 5. System Sensor.
  - 6. Wheelock; a brand of Eaton.
- B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
  - 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
  - 2. Station Reset: Key- or wrench-operated switch.
  - 3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

## 2.06 SYSTEM SMOKE DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Faraday.
  - 2. Fire-Lite Alarms, Inc.; a Honeywell International company.
  - 3. Notifier.
  - 4. Siemens Industry, Inc.; Fire Safety Division.
  - 5. Silent Knight.
  - 6. System Sensor.
- B. General Requirements for System Smoke Detectors:
  - 1. Comply with UL 268; operating at 24-V dc, nominal.
  - 2. Detectors shall be four-wire type.
  - 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
  - 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
  - 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
  - 6. Integral Visual-Indicating Light: LED type, indicating detector has operated.
- C. Photoelectric Smoke Detectors:
  - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
  - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
    - a. Primary status.
    - b. Device type.
    - c. Present average value.
    - d. Present sensitivity selected.
    - e. Sensor range (normal, dirty, etc.).

## 2.07 HEAT DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Faraday.
  - 2. Fire-Lite Alarms, Inc.; a Honeywell International company.
  - 3. Gamewell - FCI by Honeywell.
  - 4. Notifier.
  - 5. Siemens Industry, Inc.; Fire Safety Division.
  - 6. Silent Knight.
  - 7. System Sensor.
- B. General Requirements for Heat Detectors: Comply with UL 521.
  - 1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- C. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.
  - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- D. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.
  - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.08 NOTIFICATION APPLIANCES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Siemens Industry, Inc.; Fire Safety Division.
  - 2. System Sensor.
  - 3. Wheelock; a brand of Eaton.
- B. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
  - 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.
- C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.
- D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters on the lens.
  - 1. Rated Light Output:
    - a. 15/30/75/110 cd, selectable in the field.
  - 2. Mounting: Wall mounted unless otherwise indicated.
  - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
  - 4. Flashing shall be in a temporal pattern, synchronized with other units.
  - 5. Strobe Leads: Factory connected to screw terminals.
  - 6. Mounting Faceplate: Factory finished, red.
- E. Exit Marking Audible Notification Appliance:

1. Exit marking audible notification appliances shall meet the audibility requirements in NFPA 72.
2. Provide exit marking audible notification appliances at the entrance to all building exits.
3. Provide exit marking audible notification appliances at the entrance to areas of refuge with audible signals distinct from those used for building exit marking.

## **2.09 ADDRESSABLE INTERFACE DEVICE**

- A. General:
  1. Include address-setting means on the module.
  2. Store an internal identifying code for control panel use to identify the module type.
  3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- C. Control Module:
  1. Operate notification devices.

## **2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTER**

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
  1. Verification that both telephone lines are available.
  2. Programming device.
  3. LED display.
  4. Manual test report function and manual transmission clear indication.
  5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
  1. Address of the alarm-initiating device.
  2. Address of the supervisory signal.
  3. Address of the trouble-initiating device.
  4. Loss of ac supply.
  5. Loss of power.
  6. Low battery.
  7. Abnormal test signal.
  8. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

## **2.11 SYSTEM PRINTER**

- A. Printer shall be listed and labeled as an integral part of fire-alarm system.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 EQUIPMENT INSTALLATION**

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
  1. Devices placed in service before all other trades have completed cleanup shall be replaced.
  2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor.
- C. Manual Fire-Alarm Boxes:
  1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway.
  2. Mount manual fire-alarm box on a background of a contrasting color.
  3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- D. Smoke- or Heat-Detector Spacing:
  1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
  2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
  3. Smooth ceiling spacing shall not exceed 30 feet.
  4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A in NFPA 72.
  5. HVAC: Locate detectors not closer than 36 inches from air-supply diffuser or return-air opening.
  6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- F. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- G. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling. Install all devices at the same height unless otherwise indicated.

### **3.03 PATHWAYS**

- A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.
  1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.
- B. All exposed and concealed fire alarm cables shall be installed in EMT pathways.
- C. Exposed and concealed EMT shall be painted red enamel.
- D. Refer to Section 260533 Raceway and Boxes for Electrical Systems.

### **3.04 CONNECTIONS**

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Smoke dampers in air ducts of designated HVAC duct systems.
  - 2. Electronically locked doors and access gates.

### **3.05 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

### **3.06 GROUNDING**

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

### **3.07 FIELD QUALITY CONTROL**

- A. Field tests shall be witnessed by authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Visual Inspection: Conduct visual inspection prior to testing.
    - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
  - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  - 3. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- E. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

### **3.08 MAINTENANCE SERVICE**

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.



1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

### **3.09 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

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**SECTION 311000**  
**SITE CLEARING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

**1.02 RELATED REQUIREMENTS**

- A. Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 015100 - Construction Facilities and Temporary Utilities: Site fences, security, protective barriers, and waste removal.
- C. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 312200 - Grading: Topsoil removal.
- E. Section 312200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- F. Section 312323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

**1.03 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
  - 1. Vegetation removal limits.
  - 2. Areas for temporary construction and field offices.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SITE CLEARING**

- A. Comply with other requirements specified in Section 017000.
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

**3.02 EXISTING UTILITIES AND BUILT ELEMENTS**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

**3.03 VEGETATION**

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Do not remove or damage vegetation beyond the following limits:
  - 1. 40 feet (12 m) outside the building perimeter.
  - 2. 10 feet (3.1 m) each side of surface walkways, patios, surface parking, and utility lines less than 12 inches (305 mm) in diameter.
  - 3. 15 feet (4.6 m) each side of roadway curbs and main utility trenches.

4. 25 feet (7.5 m) outside perimeter of pervious paving areas that must not be compacted by construction traffic.
- D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
  1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
  2. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.
- F. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

#### **3.04 DEBRIS**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 312200**  
**GRADING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of topsoil.
- B. Rough grading the site for building pads.
- C. Finish grading.

**1.02 RELATED REQUIREMENTS**

- A. Section 311000 - Site Clearing.
- B. Section 312316 - Excavation.
- C. Section 312323 - Fill: Filling and compaction.

**1.03 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with State of North Dakota, Highway Department standards.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Topsoil: Topsoil excavated on-site.
- B. Other Fill Materials: See Section 312323.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.
- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- H. Protect plants and other features to remain as a portion of final landscaping.

**3.03 ROUGH GRADING**

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. See Section 312323 for filling procedures.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- H. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

### **3.04 SOIL REMOVAL**

- A. Stockpile excavated topsoil on site.
- B. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet (2.5 m); protect from erosion.

### **3.05 FINISH GRADING**

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.
- C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).
- D. Place topsoil to the following compacted thicknesses:
  - 1. Areas to be Seeded with Grass: 6 inches (150 mm).
  - 2. Areas to be Sodded: 4 inches (100 mm).
- E. Place topsoil during dry weather.
- F. Remove roots, weeds, rocks, and foreign material while spreading.
- G. Near plants spread topsoil manually to prevent damage.
- H. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- I. Lightly compact placed topsoil.
- J. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

### **3.06 TOLERANCES**

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) (30 mm) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch) (13 mm).

### **3.07 REPAIR AND RESTORATION**

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

### **3.08 FIELD QUALITY CONTROL**

- A. See Section 312323 for compaction density testing.

### **3.09 CLEANING**

- A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

**END OF SECTION**

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**SECTION 312316**  
**EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for building volume below grade, footings, slabs-on-grade, paving, and utilities within the building.
- B. Temporary excavation support and protection systems.

**1.02 RELATED REQUIREMENTS**

- A. Section 017000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring. General requirements for dewatering of excavations and water control.
- B. Section 024100 - Demolition: Shoring and underpinning existing structures.
- C. Section 210553 - Identification for Fire Suppression Piping and Equipment: Underground warning tapes at underground fire suppression lines.
- D. Section 220553 - Identification for Plumbing Piping and Equipment: Underground warning tapes at underground plumbing lines.
- E. Section 230553 - Identification for HVAC Piping and Equipment: Underground warning tapes at underground HVAC lines.
- F. Section 260553 - Identification for Electrical Systems: Underground warning tapes at underground electrical lines.
- G. Section 311000 - Site Clearing: Vegetation and existing debris removal.
- H. Section 312200 - Grading: Soil removal from surface of site.
- I. Section 312200 - Grading: Grading.
- J. Section 312316.13 - Trenching: Excavating for utility trenches.
- K. Section 312323 - Fill: Fill materials, backfilling, and compacting.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

**1.04 SUBMITTALS**

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Record drawings at project closeout according to 017000 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- C. Shoring Installer's Qualification Statement.
- D. Field Quality Control Submittals: Document visual inspection of load-bearing excavated surfaces.

**1.05 QUALITY ASSURANCE**

- A. Temporary Support and Excavation Protection Plan:
  - 1. Indicate sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property.
  - 2. Include drawings and calculations for bracing and shoring.
  - 3. Bracing and shoring design to meet requirements of OSHA92s Excavation Standard, 29 CFR 1926, Subpart P.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Bedding and Fill to Correct Over-Excavation:

1. See Section 312323 for bedding and corrective fill materials at general excavations.
  2. See Section 312316.13 for bedding and corrective fill materials at utility trenches.
- B. Underground Warning Tapes:
1. See Section 220553 for underground warning tapes at underground plumbing lines.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
  1. Resurvey benchmarks during installation of excavation support and protection systems and notify Owner if any changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
- C. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by Architect. If the proposed excavation extends more than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by Geotechnical Engineer.

#### **3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 311000 for clearing, grubbing, and removal of existing debris.
- C. See Section 312200 for topsoil removal.
- D. Locate, identify, and protect utilities that remain and protect from damage.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Protect plants, lawns, and other features to remain.
- G. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

#### **3.03 TEMPORARY EXCAVATION SUPPORT AND PROTECTION**

- A. Excavation Safety: Comply with OSHA92s Excavation Standard, 29 CFR 1926, Subpart P.
  1. Excavations in stable rock or in less than 5 feet (1.5 m) in depth in ground judged as having no cave-in potential do not require excavation support and protection systems.
  2. Depending upon excavation depth, time that excavation is open, soil classification, configuration and slope of excavation sidewalls, design and provide an excavation support and protection system that meets the requirements of 29 CFR 1926, Subpart P:
    - a. Sloping and benching systems.
    - b. Support systems, shield systems, and other protective systems.
- B. Leave excavation support and protection systems, used as formwork or within 10 feet (3.03 m) of existing foundations, permanently in place, unless otherwise noted.
  1. Cut off top 4 feet (1.22 m) below grade, abandon remainder.
- C. Excavation support and protection systems not required to remain in place may be removed subject to approval of Owner or Owner's Representative.
  1. Remove temporary shoring and bracing in a manner to avoid harmful disturbance to underlying soils and damage to buildings, structures, pavements, facilities and utilities.

#### **3.04 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.
  1. Excavate to the specified elevations.

2. Excavate to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work.
  3. Hand trim excavations. Remove loose matter.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
  - C. Do not interfere with 45 degree bearing splay of foundations.
  - D. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

### **3.05 SUBGRADE PREPARATION**

- A. See Section 312323 for subgrade preparation at general excavations.

### **3.06 FILLING AND BACKFILLING**

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.
- B. Install underground warning tape at buried utilities according to Sections 220553.
- C. See Section 312323 for fill, backfill, and compaction requirements at general excavations.
- D. See Section 312200 for rough and final grading and topsoil replacement requirements.

### **3.07 REPAIR**

- A. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 312323.

### **3.08 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

### **3.09 CLEANING**

- A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 312200.
- B. Remove excavated material that is unsuitable for re-use from site.
- C. Remove excess excavated material from site.

### **3.10 PROTECTION**

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

**END OF SECTION**

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## SECTION 312323

### FILL

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for building volume below grade, footings, slabs-on-grade, paving, and utilities within the building.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

##### 1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 312200 - Grading: Removal and handling of soil to be re-used.
- C. Section 312200 - Grading: Site grading.
- D. Section 312316 - Excavation: Removal and handling of soil to be re-used.

##### 1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 6 inches (152.4 mm) below finish grade elevations indicated on drawings.

##### 1.04 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; 2017.
- B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2017.
- C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.
- D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2012, with Editorial Revision (2015).
- E. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012, with Editorial Revision (2015).
- G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- H. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.
- I. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017.
- J. ASTM D6817/D6817M - Standard Specification for Rigid Cellular Polystyrene Geofoam; 2017.
- K. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

##### 1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data for Manufactured Fill.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- E. Compaction Density Test Reports.

## **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Perform design of structural fill under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.

## **1.08 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 FILL MATERIALS**

- A. General Fill: Subsoil excavated on-site.
  - 1. Graded.
  - 2. Free of lumps larger than 3 inches (75 mm), rocks larger than 2 inches (50 mm), and debris.
  - 3. Complying with ASTM D2487 Group Symbol CL.
- B. Structural Fill: Conforming to State of North Dakota Highway Department standard.
- C. Concrete for Fill: See Section 033000; compressive strength of 2,500 psi (17.235 MPa).
- D. Granular Fill: Coarse aggregate, conforming to State of North Dakota Highway Department standard.
- E. Sand: Conforming to State of North Dakota Highway Department standard.
- F. Topsoil: See Section 312200.

### **2.02 ACCESSORIES**

- A. Geotextile: Non-biodegradable, woven.

### **2.03 SOURCE QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for general requirements for testing and analysis of soil material.
- B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.
- D. Provide materials of each type from same source throughout the Work.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 312200 for additional requirements.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.

- E. Verify areas to be filled are not compromised with surface or ground water.

### **3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Fill up to subgrade elevations unless otherwise indicated.
- C. Employ a placement method that does not disturb or damage other work.
- D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- E. Maintain optimum moisture content of fill materials to attain required compaction density.
- F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches (150 mm) compacted depth.
- G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches (200 mm) compacted depth.
- H. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- I. Correct areas that are over-excavated.
  - 1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 100 percent of maximum dry density.
  - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- J. Compaction Density Unless Otherwise Specified or Indicated:
  - 1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
  - 2. At other locations: 95 percent of maximum dry density.
- K. Reshape and re-compact fills subjected to vehicular traffic.
- L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

### **3.04 FILL AT SPECIFIC LOCATIONS**

- A. Under Interior Slabs-On-Grade:
  - 1. Use granular fill.
  - 2. Depth: 6 inches (152 mm) deep.
  - 3. Compact to 95 percent of maximum dry density.
- B. At Foundation Walls and Footings:
  - 1. Use general fill.
  - 2. Fill up to subgrade elevation.
  - 3. Compact each lift to 95 percent of maximum dry density.
  - 4. Do not backfill against unsupported foundation walls.
  - 5. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- C. Over Buried Utility Piping, Conduits, and Duct Bank in Trenches:
  - 1. Bedding: Use general fill.
  - 2. Cover with general fill.

3. Fill up to subgrade elevation.
  4. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.
- D. At Lawn Areas:
1. Use general fill.
  2. Fill up to 6 inches (150 mm) below finish grade elevations.
  3. Compact to 95 percent of maximum dry density.
  4. See Section 312200 for topsoil placement.
- E. Under Monolithic Paving and Monolithic Paver Setting Beds:
1. Compact subsoil to 95 percent of its maximum dry density before placing fill.
  2. Use general fill.
  3. Fill up to subgrade elevation.
  4. Compact to 95 percent of maximum dry density.
  5. See Section 321123 for aggregate base course placed over fill.

### **3.05 TOLERANCES**

- A. Top Surface of General Filling: Plus or minus 1 inch (25 mm) from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.

### **3.06 FIELD QUALITY CONTROL**

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests: See Structural Drawings.
- E. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

### **3.07 CLEANING**

- A. See Section 017419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

**END OF SECTION**



APPENDIX  
TABLE OF CONTENTS

TITLE

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ND SALES AND USE TAX EXEMPTIONS LETTER

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**ND SALES AND USE TAX EXEMPTIONS LETTER**

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April 24, 2023

Dana Henry  
ND Office of State Tax Commissioner  
600 East Boulevard  
Bismarck, ND 58505-0599

Re: Standing Rock Rural Water System MR&I Office Remodel Contract 2-6 ND Sales  
and Use Tax Exemptions

This letter is sent to request exemptions from North Dakota Sales and Use Tax for construction of the MR&I Office Remodel Contract 2-6 located in North Dakota. The purpose of the project is to remodel approximately 3,000 sf of office space, replacement of the existing metal roof and construction of a vestibule addition. The project will be located entirely within the boundary of the Standing Rock Sioux Reservation and will be owned and operated by the Standing Rock Sioux Tribe. The project is being bid and constructed by the Standing Rock Rural Water System, a division of the Standing Rock Sioux Tribe.

Bids are scheduled to be opened May 25, 2023. The bid estimate for Contract 2-6 is approximately \$1,000,000 to \$1,500,000.

Thank you for your assistance on this matter.

Janet Alkire, Chairwoman  
Standing Rock Sioux Tribe

cc: SRRWS – Randez Bailey, Director  
BW – Doug Mund, P.E.

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**STANDING ROCK RURAL WATER SYSTEM**  
**ADDENDUM NO. 1**  
**TO THE CONTRACT DOCUMENTS FOR CONSTRUCTION OF**  
**MR&I OFFICE REMODEL**  
**CONTRACT 2-6**  
**DECEMBER 2024**

**NOTICE IS HEREBY GIVEN TO BIDDERS** that in reference to the CONTRACT DOCUMENTS, DRAWINGS, and SPECIFICATIONS of the above-mentioned Contract, the following will be noted:

**A. CONTRACT SPECIFICATIONS**

1. 085200 WOOD WINDOWS

- a. Reference paragraph 2.01 B. 2. **Replace** “Architect Series Reserve” with “Pella Lifestyle Series”.
- b. Reference paragraph 2.02 A. 5. Wood Species. **Replace** sub paragraph with the following: “Clear pine, preservative treated using treatment type suitable for required finish.”
- c. Reference paragraph 2.03.
  - 1) **Add** the following sub paragraphs.
    - 1. “11. Clear pine, preservative treated using treatment type suitable for required finish.”
    - 2. “12. Transparent Finish: Scarf joint permitted if wood matches in color and grain texture.
  - 2) **Remove** sub paragraphs 8. Insect Screens and 9. Operable Units.
- d. Reference paragraph 2.05 A. Type IG-2 – Exterior Glazing. **Replace** sub paragraph with the following: “Double glazed with hinged glass panel where internal blinds are provided, gray tinted, Low-E coated, manufacturer's standard fill, with glass thicknesses as recommended by manufacturer for specified wind conditions.”
- e. Reference paragraph 2.05 K. 2. **Replace** sub paragraph with the following: “Installed between panes of glass.”

2. 096500 RESILIENT FLOORING

- a. Reference paragraph 2.01 A. e. **Replace** “Make Your Mark LVT” with “Classics II LVT 3mm/20mil”.
- b. Reference paragraph 2.01 A. 4. **Replace** “6 by 36” with “9 by 48”.
- c. **Remove** paragraphs 2.01 A. 3. Square Tile Size and 8. Pattern.

### 3. 133419 METAL BUILDING SYSTEMS

- a. Reference paragraph 2.01 A. Add the following:
  - 1) 3. Metallic Buildings Systems: [www.metallic.com/#sle](http://www.metallic.com/#sle)
  - 4. Nucor Building Systems: [www.nucorbuildingsystems.com/sle](http://www.nucorbuildingsystems.com/sle)
  - 5. VP Buildings: [www.vp.com/#sle](http://www.vp.com/#sle)
  - 6. Ceco Metal Building Systems: [www.cecobuildings.com](http://www.cecobuildings.com)
- b. Reference paragraph 2.05 A. Metal Roof System. **Replace** “CMR-24” with “MR-24”
- c. Reference paragraph 2.05 E. Insulation. **Add** the following:
  - 1) 3. Match depth of existing roof insulation estimated at 12” (R-38).
  - 2) 4. Existing metal liner panel below to remain.

## **B. CONTRACT DRAWINGS**

### 1. A-111 FLOOR PLANS

- a. **Replace** reference note 011000.05 with the following: “011000.05 – OFFICE FURNISHINGS BY ALLOWANCE. INCLUDING DELIVERY, INSTALLATION, AND ALL TAXES AND FEES FOR THE FURNISHINGS.”

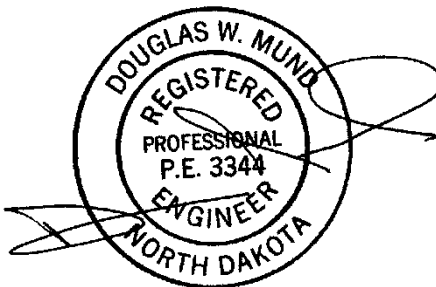
### 2. A-201 ELEVATIONS

- a. **Replace** reference note 085200.02 with note 085200.01 – FIXED ALUMINUM CLAD WOOD WINDOW.

### 3. A-601 SCHEDULES

- a. Window type AW4 shall be a fixed aluminum clad wood window.

**BARTLETT & WEST, INC.**  
3456 East Century Avenue  
Bismarck, ND 58503



---

**Douglas W. Mund, P.E.**  
Project Manager

**December 13, 2024**  
Date



# STANDING ROCK SIOUX TRIBE STANDING ROCK RURAL WATER SYSTEM



**Bartlett & West**

#	DATE	DESCRIPTION	BY

PROJECT: MR&I OFFICE REMODEL  
CONTRACT 2-6

CLIENT: RURAL WATER SYSTEM

PROJECT MANAGER:  
**DOUGLAS W. MUND**  
PE 3344

PROJECT ARCHITECT:  
**JOSEPH P. LARRIVEE**  
RA# 1268

DRAWING NO: **G-001**

SHEET NUMBER: ---- of ----

DESIGN NUMBER: 12493.700      CONST. NUMBER: ----

**Bartlett & West**

3456 E CENTURY AVENUE - BISMARCK, ND 58503  
PHONE: 785-272-2252  
WWW.BARTLETTWEST.COM

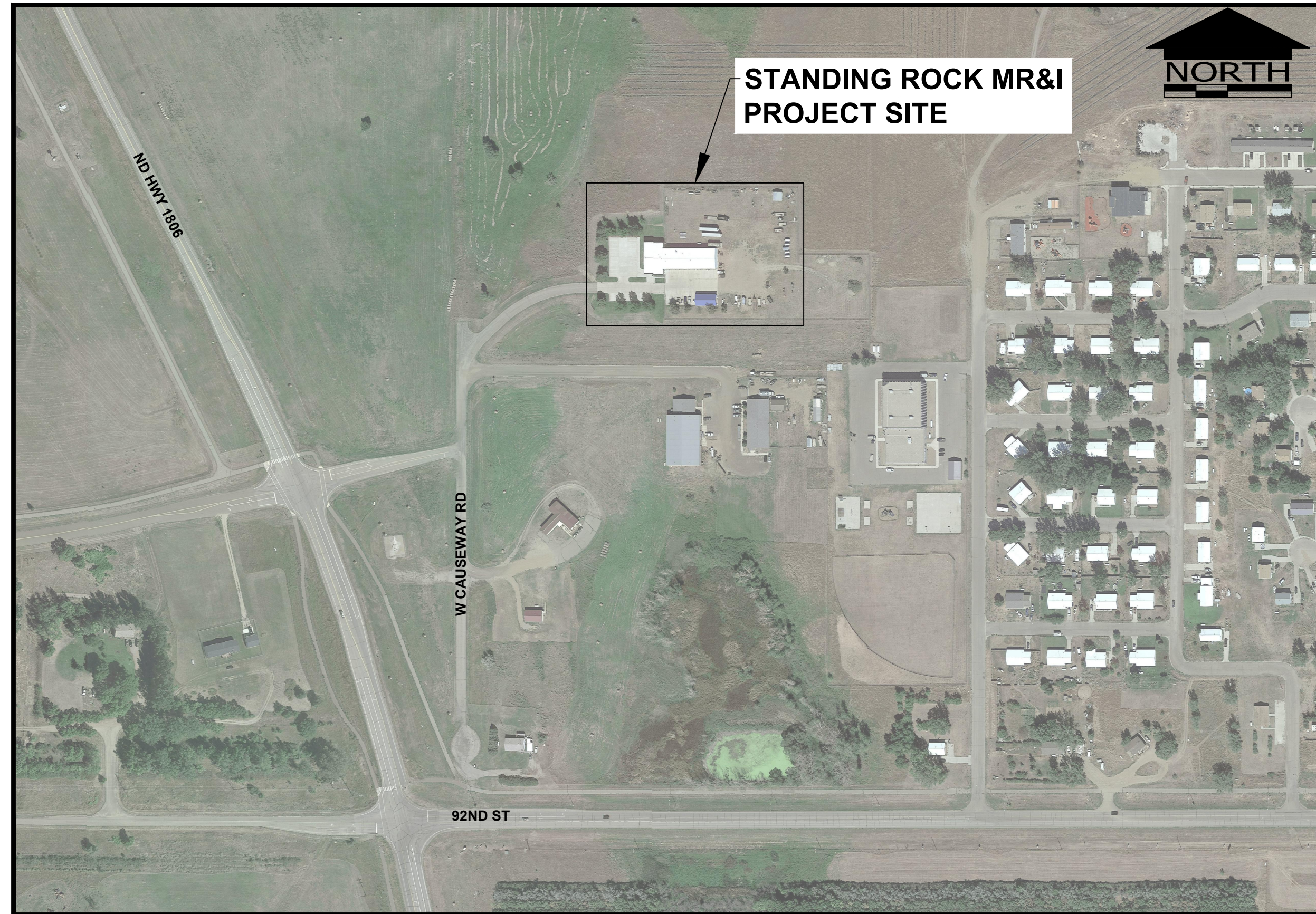
**MR&I OFFICE REMODEL  
CONTRACT 2-6  
BID SET - DECEMBER 2024**

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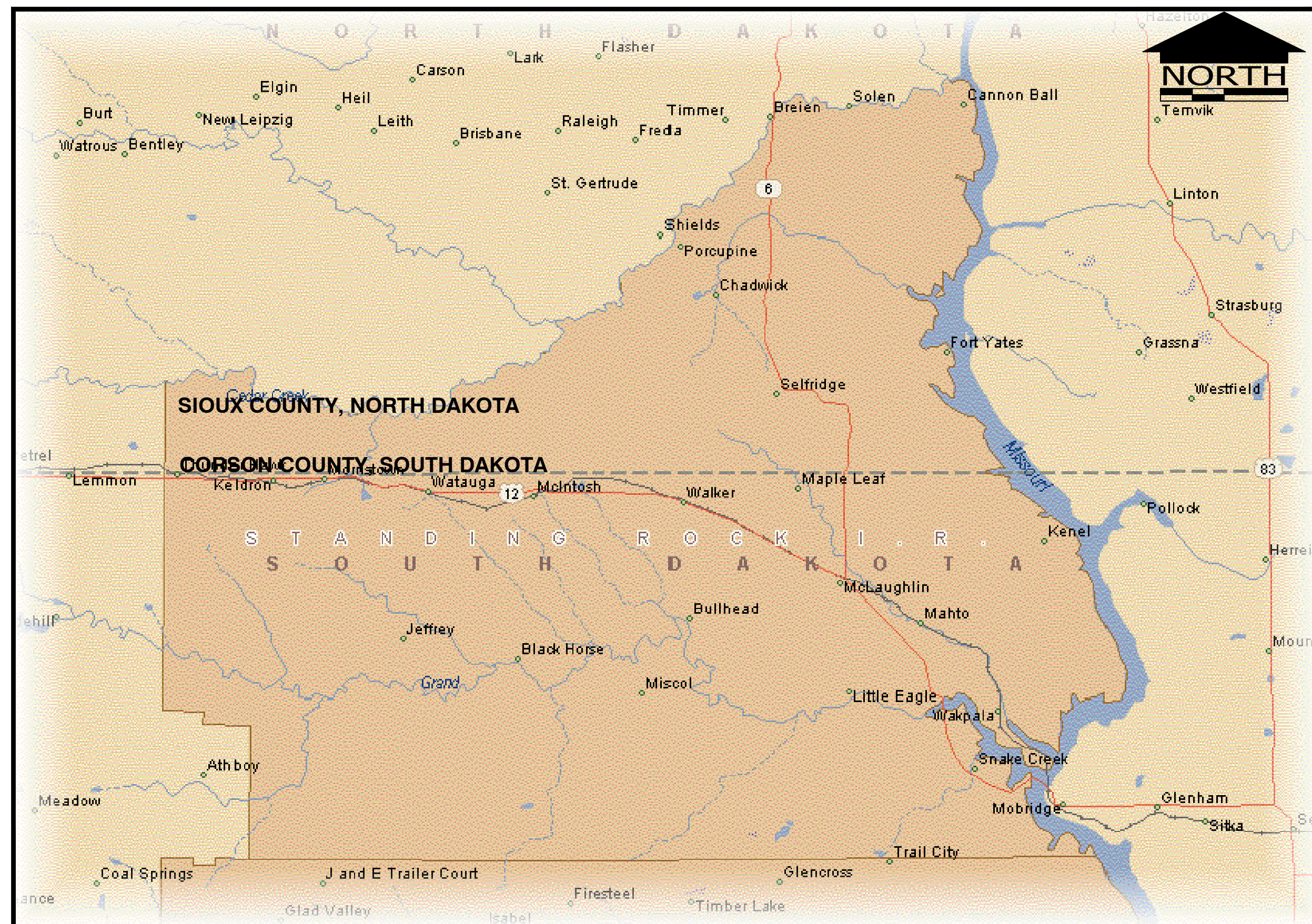
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PROJECT LOCATION



**STANDING ROCK RESERVATION**



**STANDING ROCK RESERVATION**

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DRAWING INDEX

DRAWING NUMBER	DESCRIPTION
G-001	COVER
G-002	SITE LOCATION & DRAWING INDEX
G-101	CODE PLAN
G-102	CODE STUDY
G-103	TYPICAL WALL ASSEMBLIES, DRAWING STANDARDS, AND MOUNTING
S101	FOUNDATION PLAN & SPECIAL INSPECTION TABLES
S201	ROOF FRAMING PLAN
S202	VESTIBULE ROOF FRAMING PLAN
S301	FOUNDATION DETAILS
S302	TYP. FOUNDATION DETAILS & PIER DETAILS
S401	FRAMING DETAILS
S501	GENERAL STRUCTURAL NOTES
A-011	SITE PLAN
A-101	DEMOLITION PLAN
A-111	FLOOR PLAN
A-121	REFLECTED CEILING PLAN
A-131	ROOF PLAN
A-201	ELEVATIONS
A-301	SECTIONS
A-601	SCHEDULES
A-701	ROOM ELEVATIONS
MEP000	MEP SYMBOLS & ABBREVIATIONS
P-101	PLUMBING UNDERFLOOR DEMOLITION PLAN
P-102	PLUMBING DEMOLITION PLAN
P-111	PLUMBING UNDERFLOOR IMPROVEMENT PLAN
P-112	PLUMBING IMPROVEMENT PLAN
P-501	PLUMBING DETAILS, SCHEDULES & RISERS
M-101	MECHANICAL UNDERFLOOR DEMOLITION PLAN
M-102	MECHANICAL DEMOLITION PLAN
M-111	MECHANICAL UNDERFLOOR IMPROVEMENT PLAN
M-112	MECHANICAL IMPROVEMENT PLAN
M-501	MECHANICAL DETAILS & SCHEDULES
E-101	LIGHTING DEMOLITION PLAN
E-102	POWER DEMOLITION PLAN
E-103	FIRE ALARM DEMOLITION PLAN
E-104	SPECIAL SYSTEMS DEMOLITION PLAN
E-111	LIGHTING IMPROVEMENT PLAN
E-112	POWER IMPROVEMENT PLAN
E-113	FIRE ALARM IMPROVEMENT PLAN
E-114	SPECIAL SYSTEMS IMPROVEMENT PLAN
E-501	ELECTRICAL DETAILS
E-601	ELECTRICAL SCHEDULES

SITE LOCATION & DRAWING INDEX

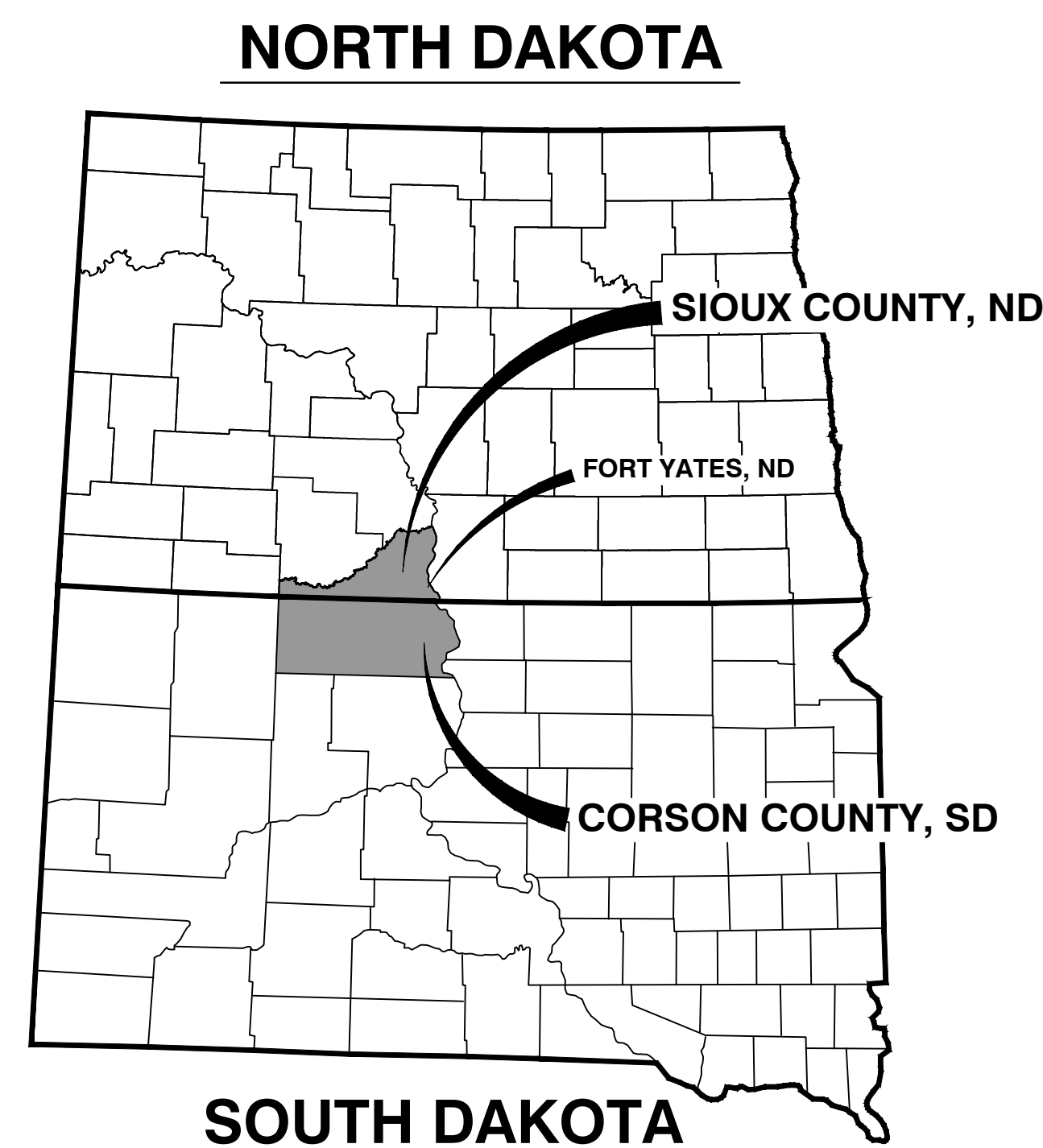
**Bartlett & West**

3458 E CENTURY AVENUE - BISMARCK, ND 58503  
www.bartlettwest.com

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

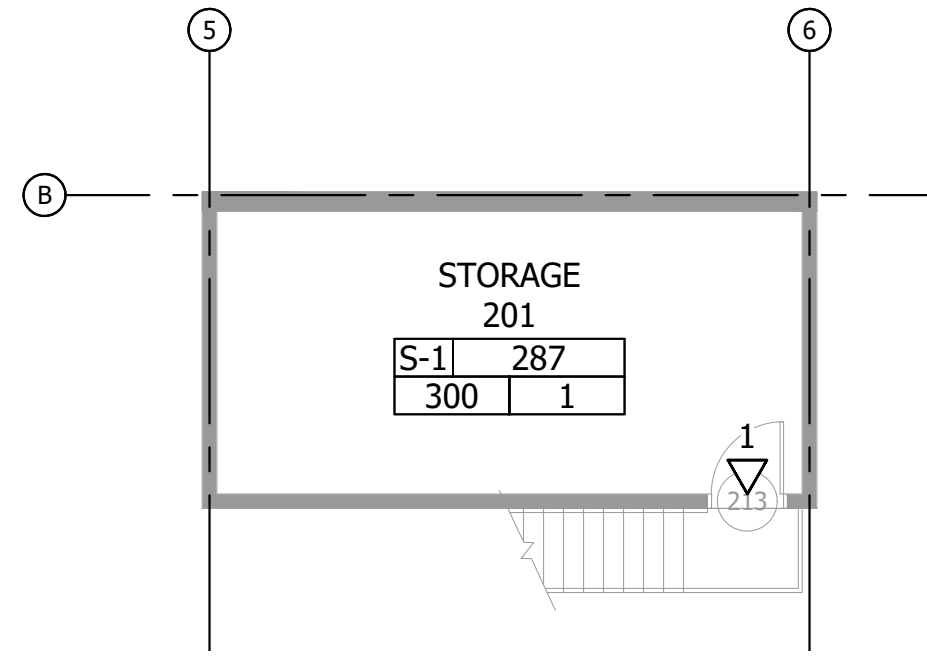


DESIGNED BY:	----
DRAWN BY:	----
APPROVED BY:	JWB
DESIGN PROJ:	12493_700
CONST PROJ:	----
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	
<b>SHEET NO:</b>	<b>G-002</b>

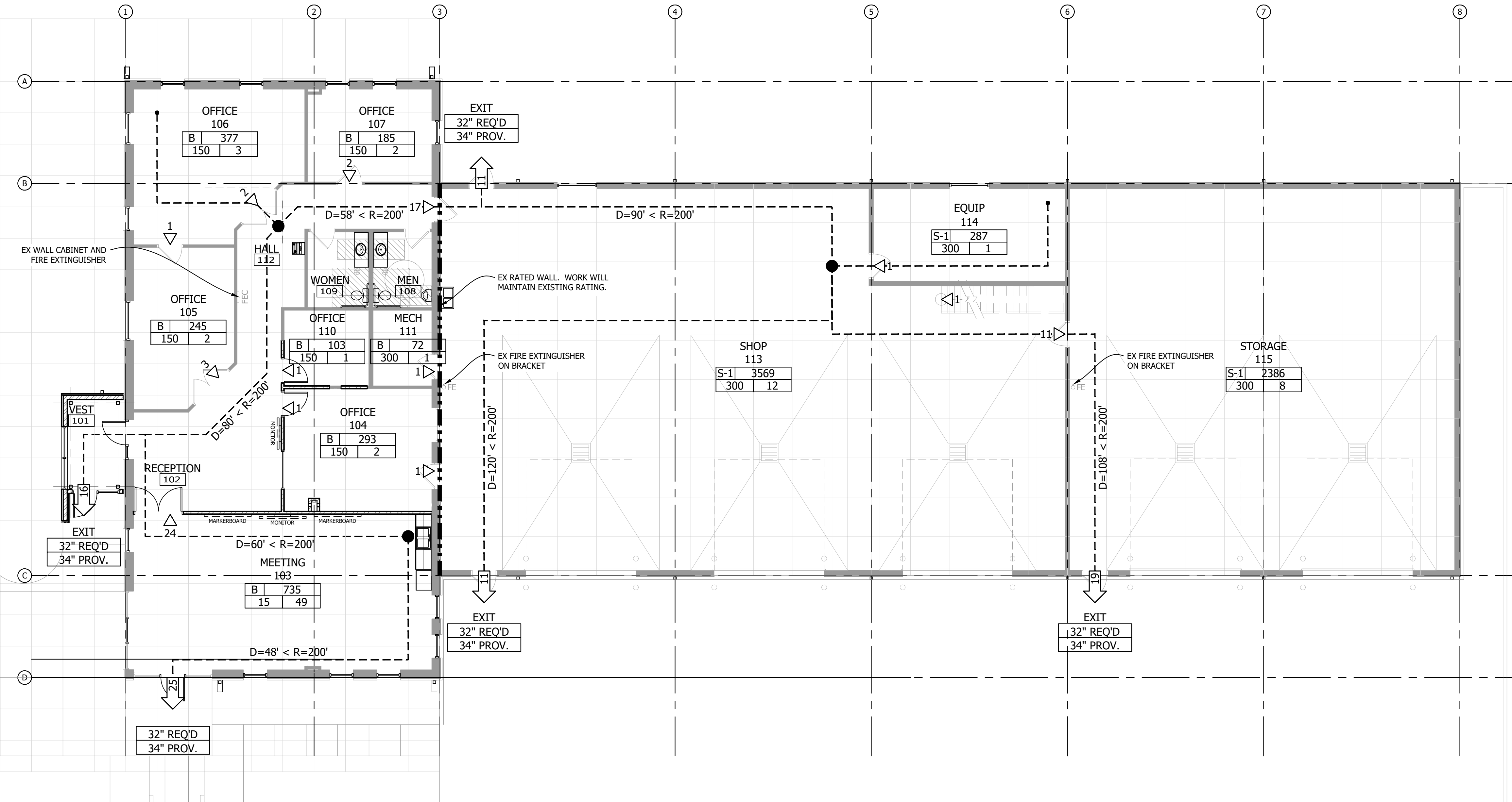


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**MEZZANINE LEVEL CODE PLAN**  
SCALE: 1/8"=1'-0"



**GROUND LEVEL CODE PLAN**  
SCALE: 1/8"=1'-0"

**REFERENCE NOTES:**

**GENERAL NOTES:**

**CODE PLAN LEGEND**

- XX = EXITING DIRECTION AND NUMBER OF OCCUPANTS
- XX = TOTAL EXITING NUMBER AT EXIT
- EXIT  
X" REQ'D  
X" PROV. = DOOR EXIT WIDTH REQUIRED (INCHES)  
DOOR EXIT WIDTH PROVIDED (INCHES)
- = FIRE EXTINGUISHER MAX TRAVEL DISTANCE 75', TYPICAL
- PROCESS  
F-2 13,539 SF  
100 135
- ROOM NAME  
Room Number  
Occupancy Area SF  
Occupant Occupants  
Load Factor
- D=100' < R=250' = EXIT TRAVEL DIST.  
D= TRAVEL DISTANCE  
R= REQUIRED DISTANCE
- = POINT OF COMMON PATH OF EGRESS.
- = 1 HOUR RATED FIRE BARRIER (60 MIN RATED DOORWAYS)
- = 2 HOUR RATED FIRE BARRIER (90 MIN RATED DOORWAYS)
- = 3 HOUR RATED FIRE WALL (180 MIN RATED DOORWAYS)

BY	DATE	DESCRIPTION

**Bartlett & West**  
3458 E CENTURY AVENUE - BISMARCK, ND 58503  
www.bartlettwest.com

**CODE PLAN**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	JPL
DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>G-101</b>
SHEET NO:	

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<b>Bartlett &amp; West</b> 3456 E Century Avenue Bismarck, North Dakota	
Date:	10/2/24
<b>CODE ANALYSIS (2021 International Building Code)(No found Adopted Building Code)</b>	
Project:	SRRWS - MR&I Office Remodel
Address:	W Cauesway Road, Fort Yates, ND 58538
Official:	
Phone:	
Owner:	Standing Rock Sioux Tribe Municipal, Rural, and Industrial (MR&I) Water System
<b>Chapter 3 - Use and Occupancy</b>	
<b>See code plans for occupancy classification and counts.</b>	
<b>Small Assembly Spaces (303.1.2)</b> The following rooms and spaces shall not be classified as Assembly occupancies. 1. A room or space used for assembly purposes with an occupant load of less than 50 persons and accessory to another occupancy shall be classified as a Group b occupancy or as part of that occupancy. 2. A room or space used for assembly purposes that is less than 750 square feet in area and accessory to another occupancy shall be classified as a group B occupancy or as part of that occupancy.	
<b>Accessory Storage Spaces (311.1.1)</b> A room or space used for storage purposes that is accessory to another occupancy shall be classified as part of that occupancy.	
<b>Occupancy Load (1004)</b>	
See plan	Other egress components
34 to 68	Egress Door (Inches) (Total Occupants * .15) Provided Egress door width. (Inches)
<b>Number of Exits and Exit Access Doorways (1006)</b>	
2	Minimum number of exits for occupant load (1006.3.3)
5	Number of exits provided
<b>Accessible Mean of Egress (1009)</b>	
1	Minimum number of accessible exits required
5	Number of accessible exits provided
<b>Exit Signs (1013.1)</b> Exits and exit access doors shall be marked by an approved exist sign readily visible from any direction of egress travel.	
<b>Travel Distance (1017)</b>	
200	Maximum exit access travel distance (feet) (w/o sprinkler system) B
200	Maximum exit access travel distance (feet) (w/o sprinkler system) S-1

<b>CODE ANALYSIS (2021 International Existing Building Code)(No found Adopted Building Code)</b>	
<b>Chapter 2 - Definitions</b>	
<b>Work Area</b> That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.	
<b>Chapter 5 - Prescriptive Compliance Method</b>	
<b>503 Alterations</b> 503.1 General. Alterations to any building or structure shall comply with the requirements of the International Building Code for new construction. Alterations shall be such that the existing building or structure is not less complying with the provisions of the International Building Code than the existing building or structure was prior to the alteration.	
<b>Chapter 6 - Classification of Work</b>	
<b>Section 602 - Alteration Level 1</b> 602.1 Scope Level 1 alterations include the removal and replacement or the covering of existing materials, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same	
603.2 Application Level 1 alterations shall comply with the provisions of Chapter 7.	
<b>Section 603 - Alteration Level 2</b> 603.1 Scope Level 2 alterations include the addition or elimination or any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment, and shall apply where the work area is equal to or less than 50 percent of the building area.	
603.2 Application Level 2 alterations shall comply with the provisions of Chapter 7 for Level 1 Alterations as well as provisions of Chapter 8.	
<b>Chapter 7 - Alterations Level 1</b>	
<b>Section 701 - General</b> 701.2 Conformance An existing building or portion thereof shall not be altered such that the building becomes less safe than its existing conditions.	
<b>Section 702 - Building Elements and Materials</b> 702.1 Interior Finishes. Newly installed interior wall and ceiling finishes shall comply with Chapter 8 of the IBC.  702.7 Materials and Methods New work shall comply with the materials and methods requirements in the IBC, IECC, IMC, IPC, as applicable, that specify standards, details of installation and connection, joints, penetrations, and continuity of any element, component, or system in the building.	
<b>Section 703 - Fire Protection</b> 703.1 General. Alterations shall be done in a manner that maintains the level of fire protection provided.	
<b>Section 704 - Means of Egress</b> 704.1 General. Alterations shall be done in a manner that maintains the level of protection provided for the means of egress.	
<b>Section 705 - Reroofing</b> 705.1 General. Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 15 of the International Building Code. Exception 2. Recovering or replacing an existing roof covering shall not be required to meet the requirement for secondary (emergency overflow) drains or scuppers in section 1502 of the IBC for roof that provide positive roof drainage.	
705.2 Roof Replacement Roof replacement shall include the removal of all existing layers of roof coverings down to the roof deck.	
<b>Section 708 - Energy Conservation</b> Level 1 alterations to existing buildings or structures do not require the entire building or structure to comply with the energy requirements of the IECC. The alterations shall conform to the energy requirements of the IECC as they relate to new construction only.	
<b>Chapter 8 - Alterations Level 2</b>	
<b>Section 801 - General</b> 801.2 Alteration Level 1 compliance. In addition to the requirements of this chapter, all work shall comply with the requirements of Chapter 7.  801.4 Compliance New construction elements, components, systems, and spaces shall comply with the requirements of the IBC Exceptions: 1. Where windows area added they are not required to comply with the light and ventilation requirements of the IBC.	
<b>Section 802 - Building Elements and Materials</b> 802.4 Interior finish The interior finish and trim of walls and ceilings in exits and corridors in any work area shall comply with the requirements of the IBC.	

<b>Section 803 - Fire Protection</b>	
803.1 Scope The requirements of this section shall be limited to the work areas in which Level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.	
803.4 Fire Alarm and detection An approved automatic fire detection system shall be installed in accordance with the provisions of this code and NFPA72. Devices, combinations of devices, appliances, and equipment shall be approved. The automatic fire detectors shall be smoke detectors, except that an approved alternative type of detector shall be installed in spaces such as boiler rooms, where products of combustion are present during normal operations in sufficient quantity to actuate a smoke detector.	
803.4.1 Occupancy Requirements Where the building is not equipped with a fire alarm system, alarm-notification appliances within the work area shall be provided and automatically activated.	
<b>Section 804 - Means of Egress</b>	
804.1 Scope The requirements of this section shall be limited to work areas in which level 2 alterations are being performed, and where specified they shall apply throughout the floor on which the work areas are located or otherwise beyond the work area.	
804.4 Number of exits. The number of exits shall be in accordance with Section 804.4.1 through 804.4.3	
804.4.1 Minimum number. Every story utilized for human occupancy on which there is a work area that includes exits shall be provided with the minimum number of exits based on the occupancy and occupant load in accordance with the IBC.	
804.5 Egress Doorways  804.5.1.1 In any work area, all rooms and spaces having an occupancy load greater than 50 or in which the travel distance to an exit exceeds 75 feet shall have not fewer than two egress doorways.	
804.5.2 Door Swing In the work area and in the egress path from any work area to the exit discharge, all egress doors serving an occupant load greater than 50 shall swing in the direction of travel.	
804.9 Exit Signs Means of egress in all work areas shall be provided with exit signs in accordance with the requirements of the IBC	
<b>Section 806 - Electrical</b> 806.1 New Installations Newly installed electrical equipment and wiring relating to work done in any work area shall comply with all applicable requirements of NFPA 70.	
<b>Section 807 - Mechanical</b> 807.1 Reconfigured or converted spaces.  Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with natural or mechanical ventilation in accordance with the IMC.	
807.2 Altered Existing Systems. In mechanically ventilated spaces, existing mechanical ventilation systems that are altered, reconfigured, or extended shall provide not less than 5 cubic feet per minute (cfm) per person of outdoor air and not less than 15 (cfm) of ventilation air per person; or not less than the amount of ventilation air determined by the Indoor Air Quality Procedure of ASHRAE 62.1.	
<b>Section 809 - Energy Conservation</b> Level 2 alterations to existing buildings or structures do not require the entire building or structure to comply with the energy requirements of the IECC. The alterations shall conform to the energy requirements of the IECC as they relate to new construction only.	
<b>Chapter 11 - Additions</b>	
<b>Section 1101 - General</b>	
1101.1 Scope An addition to a building or structural shall comply with the International Codes as adopted for new construction without requiring the existing building or structure to comply with any requirements of those codes or of these provisions, except as required by this chapter.	
1101.3 Other work Any repair or alteration work within an existing building to which an addition is being made shall comply with the applicable requirements for the work as classified in Chapter 6.	
<b>Section 1102 - Heights and Areas</b> 1102.1 Height Limitations An addition shall not increase the height of an existing building beyond that permitted under applicable provisions of Chapter 5 of the IBC for new buildings.  1102.1 Area Limitations An addition shall not increase the area of an existing building beyond that permitted under applicable provisions of Chapter 5 of the IBC for new buildings.	
<b>Section 1104 - Energy Conservation</b> 1104.1 Minimum Requirements Additions to existing buildings shall conform to the energy requirements of the IECC or IRC as they relate to new construction.	

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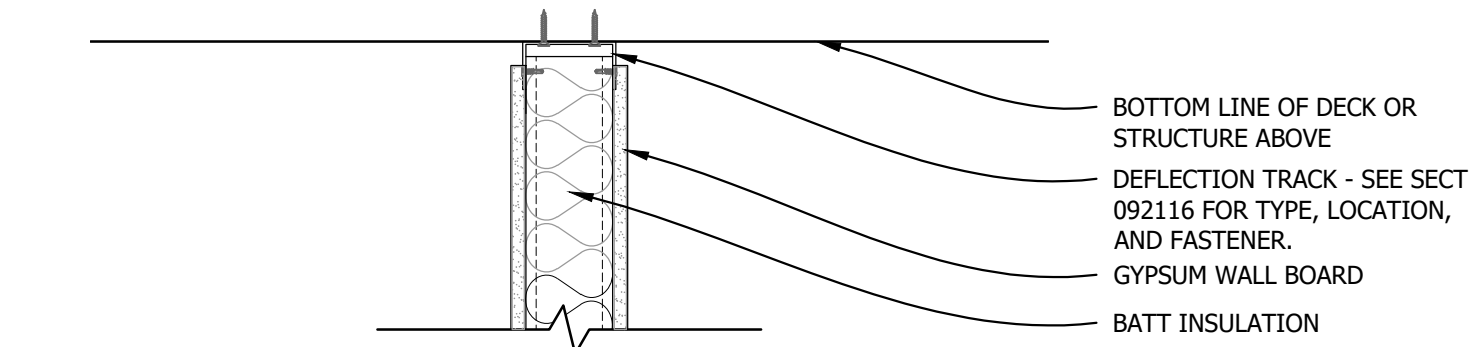
**CODE STUDY**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



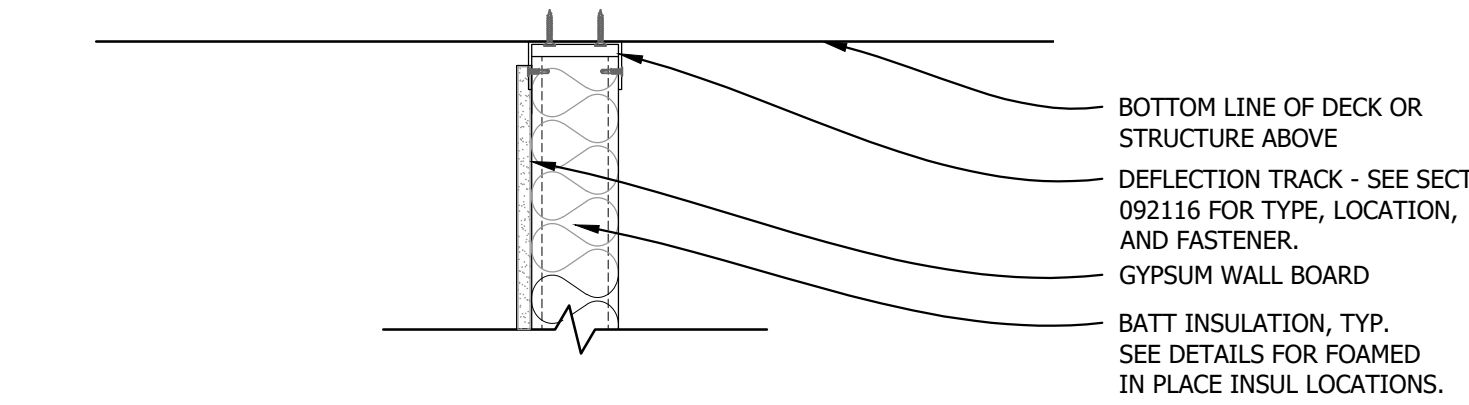
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DRAWN BY:	JBN
APPROVED BY:	JPL
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CONST PRO:	---
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DATE:	OCTOBER 2024
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SHEET NO:	

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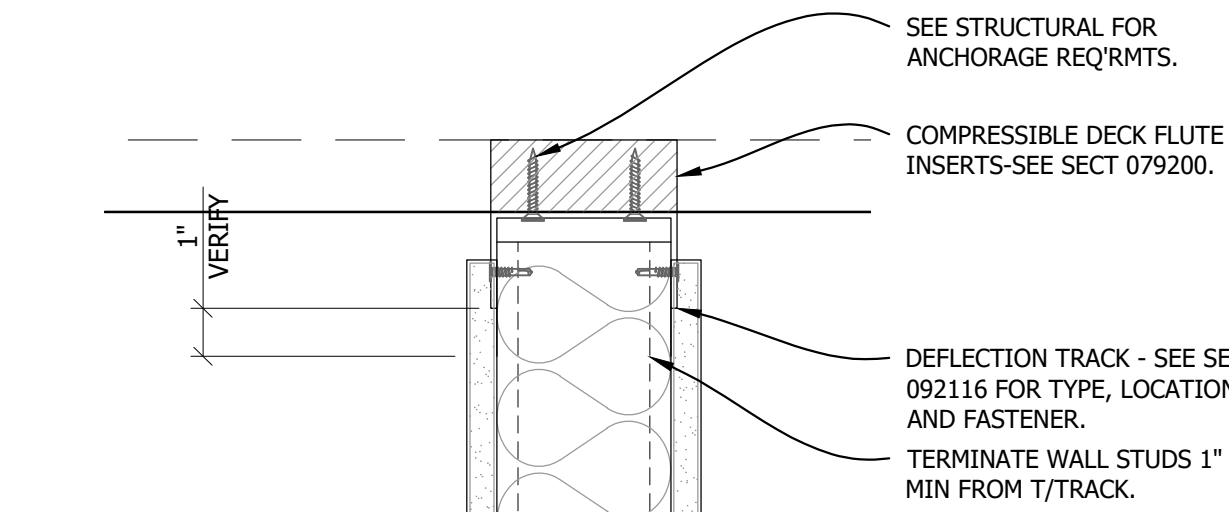




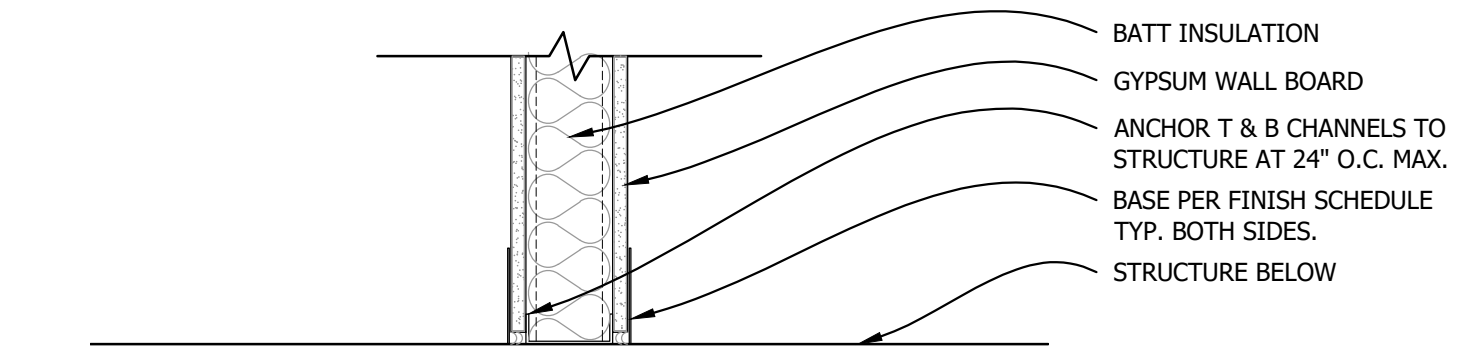
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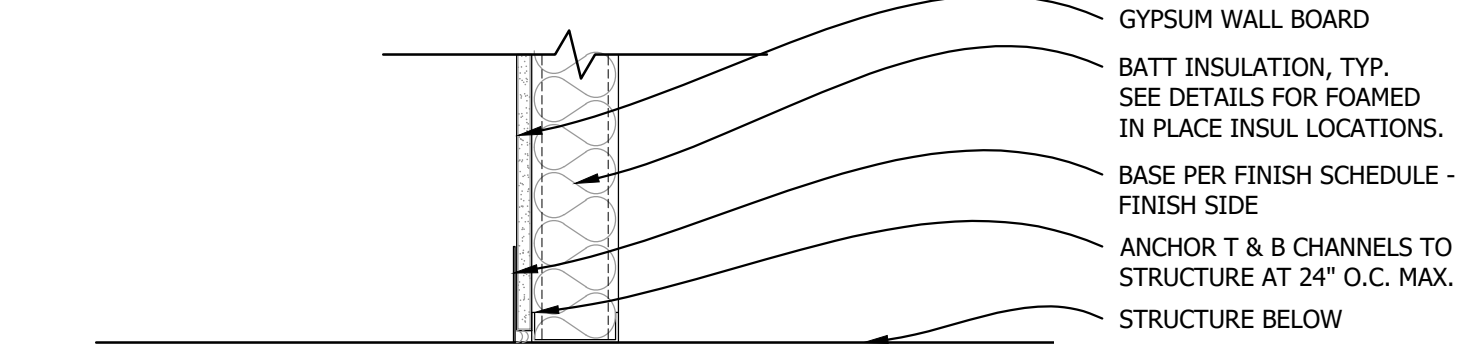
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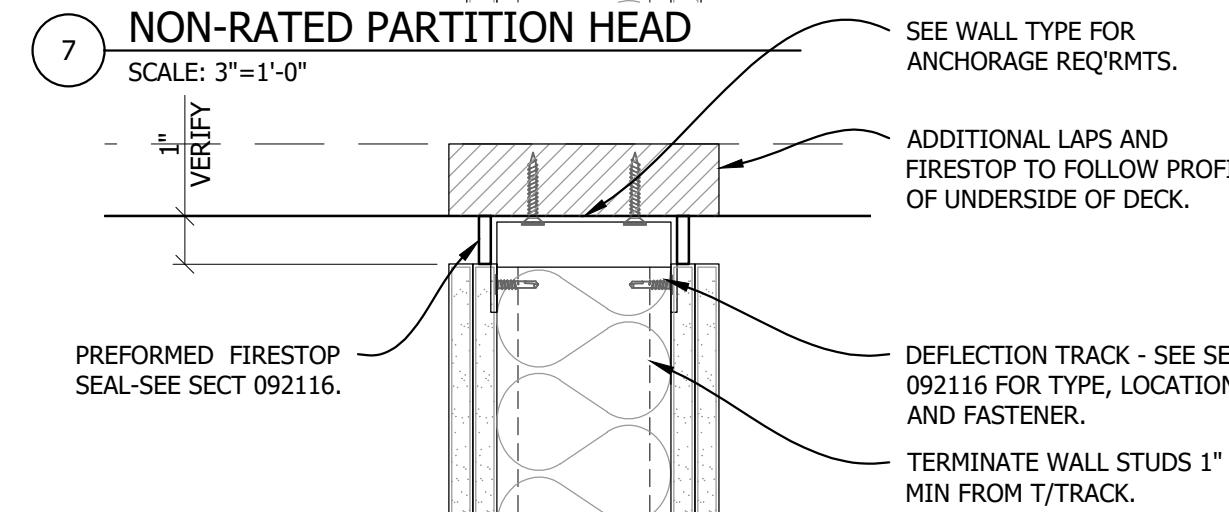
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4 PARTITION TYPE A - SILL  
SCALE: 1 1/2"=1'-0"



5 PARTITION TYPE F - SILL  
SCALE: 1 1/2"=1'-0"

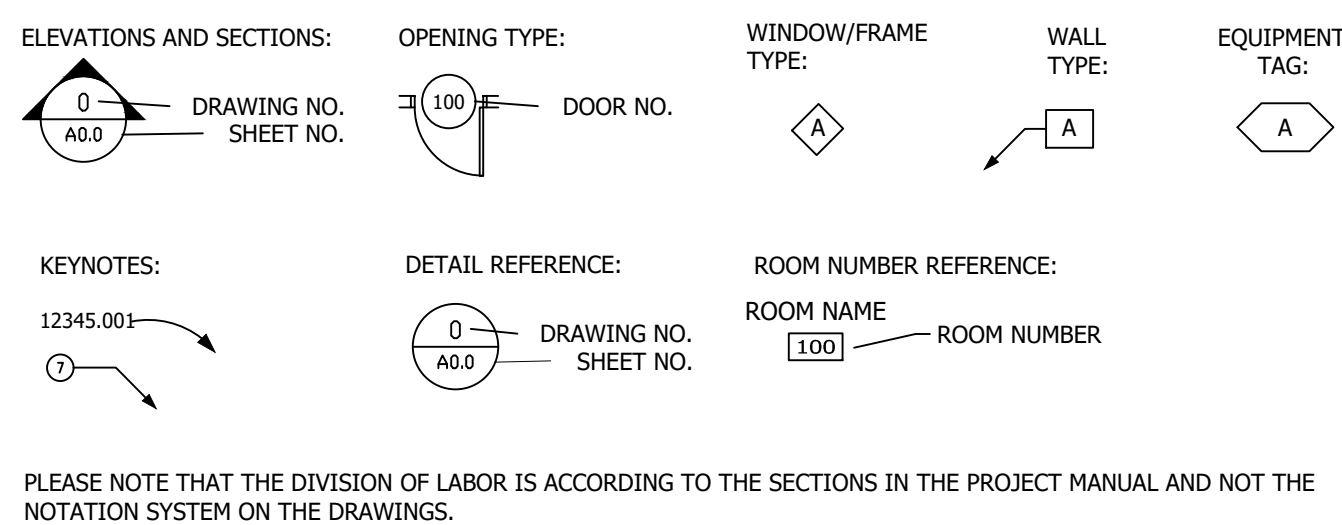


8 RATED PARTITION HEAD  
SCALE: 3"=1'-0"

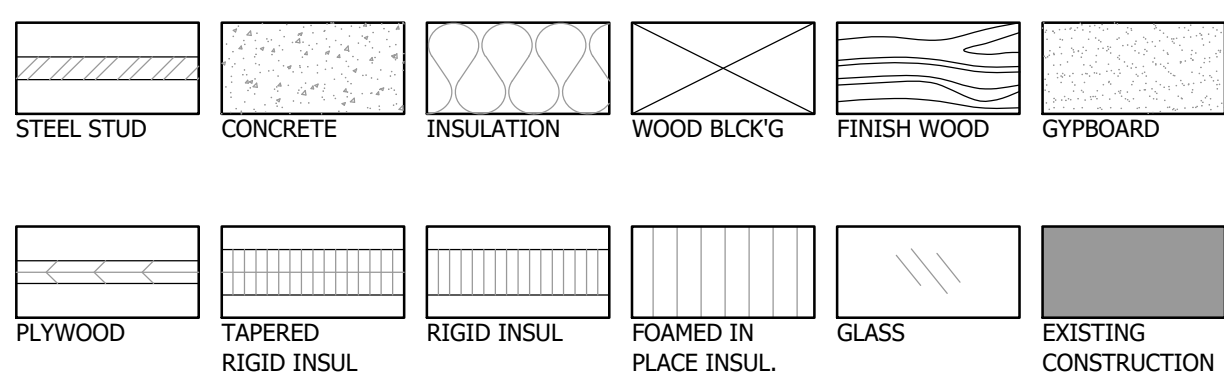
PARTITION TYPE A							
WALL TAG	STUD SIZE & SPACING	WIDTH	G.B. THK (EACH SIDE)	INSUL THICK	RATING	UL NO.	COMMENTS
A4	3 5/8" M.S. @ 16" O.C.	4 7/8"	5/8"	FILL CAVITY	1 HR	U404	SEE CODE PLAN FOR FIRE WALL LOCATIONS
A6	6" M.S. @ 16" O.C.	7 1/4"	5/8"	FILL CAVITY	1 HR	U419	SEE CODE PLAN FOR FIRE WALL LOCATIONS

PARTITION TYPE F							
WALL TAG	STUD SIZE & SPACING	WIDTH	G.B. THK (ONE SIDE)	INSUL THICK	RATING	UL NO.	COMMENTS
F2	1 5/8" M.S. @ 16" O.C.	2 1/4"	5/8"	FILL CAVITY	1 HR	U445	SEAL PENT. W/ ACOUSTICAL SEALANT
F3	2 1/2" M.S. @ 16" O.C.	3 1/8"	5/8"	FILL CAVITY	1 HR	U448	SEAL PENT. W/ ACOUSTICAL SEALANT
F4	3 5/8" M.S. @ 16" O.C.	4 1/4"	5/8"	FILL CAVITY	1 HR	U445	SEAL PENT. W/ ACOUSTICAL SEALANT
F6	6" M.S. @ 16" O.C.	6 5/8"	5/8"	FILL CAVITY	1 HR	U445	SEAL PENT. W/ ACOUSTICAL SEALANT

### DRAWING SYMBOLS

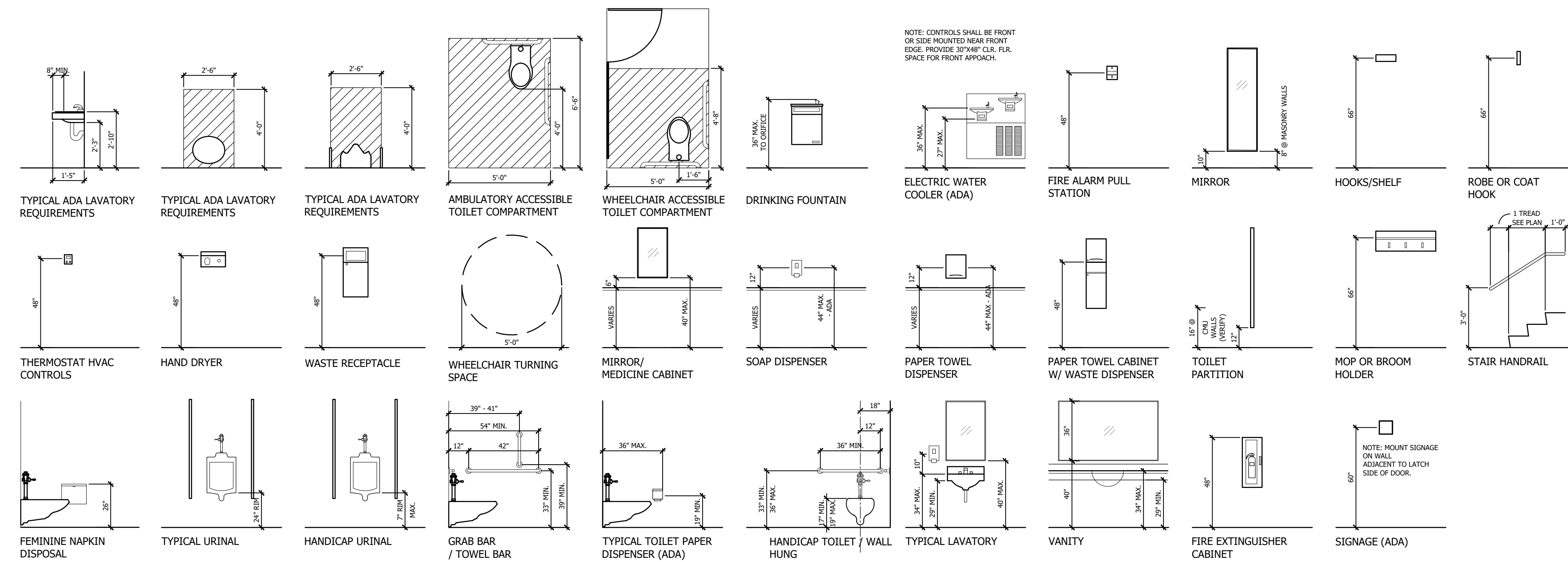


### MATERIAL INDEX



### STANDARD MOUNTING HEIGHTS / ADA MOUNTING HEIGHTS

(DIMENSIONS SHOWN ELSEWHERE FOR SPECIFIC MECH/ELECT ITEMS WILL SUPERSEDE THOSE REFERRED TO HERE)



#	DATE	DESCRIPTION

**Bartlett & West**  
3458 E CENTURY AVENUE - BISMARCK, ND 58503  
www.bartlettwest.com

**TYPICAL ASSEMBLIES, DRAWING STANDARDS, AND MOUNTING HEIGHTS**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	JPL
DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493, 700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>G-103</b>
SHEET NO:	

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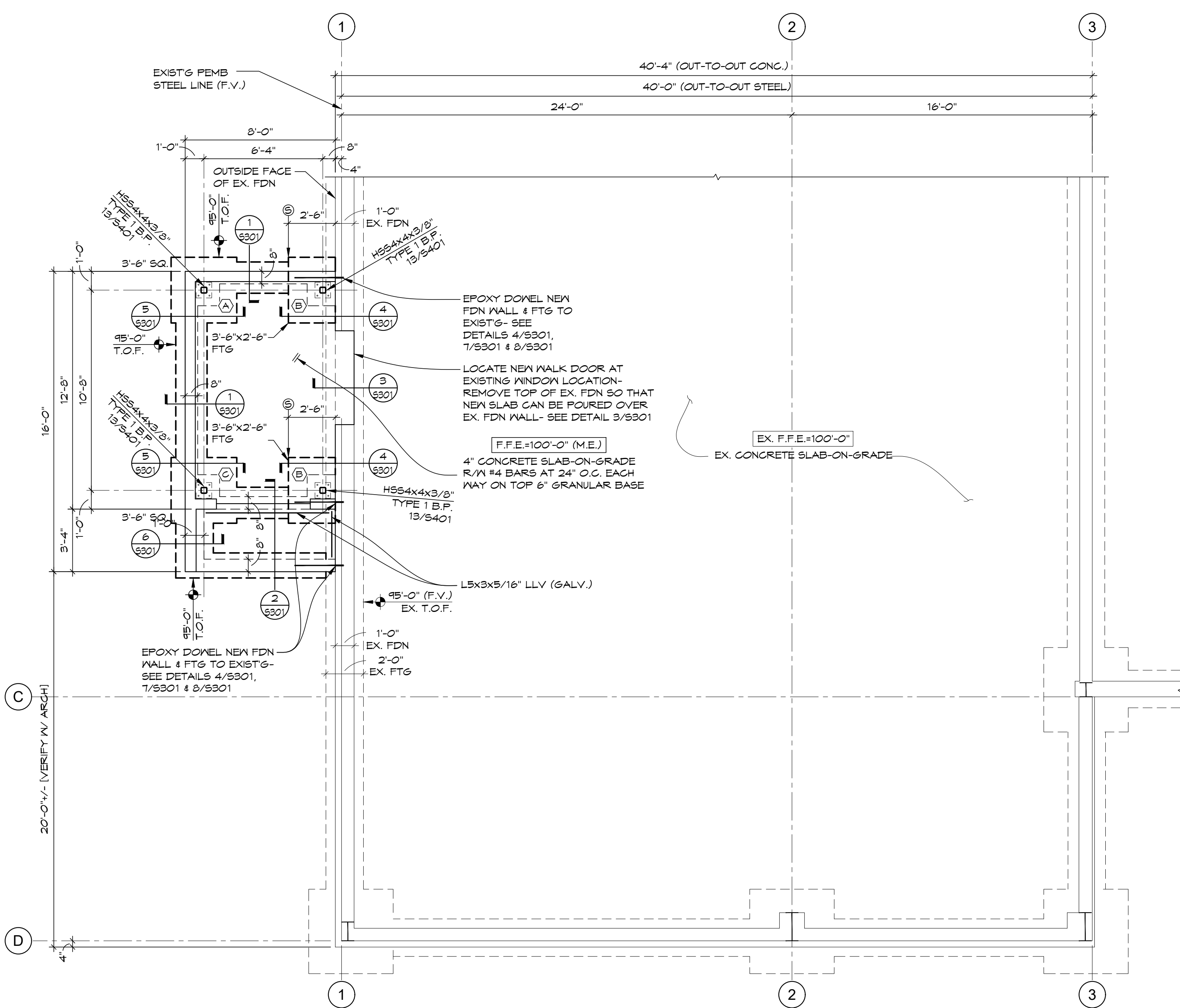
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REQUIRED SPECIAL INSPECTIONS OF CONCRETE CONSTRUCTION (IBC Table 1705.3)			
	FREQUENCY		Comments:
	Continuous	Periodic	
<b>1) Inspect Reinforcement</b>			
Inspect reinforcement, including prestressing tendons, and verify placement.		*	Verify reinforcing and placement as shown on drawings and per ACI 318 Ch. 20, 25.2, 25.3, 26.3, 26.6.1-26.6.3 & IBC 1908.4
<b>2) Reinforcing Bar Welding:</b>			
Verify weldability of reinforcing bars other than ASTM A706:		*	Verify bar welding per AWS D1.4 & ACI 318: 26.6.4
Inspect single-pass fillet welds, maximum 5/16th, and inspect all other welds.		*	
<b>3) Inspect anchors cast in concrete.</b>			
Verify anchors are cast in concrete per structural drawings and ACI 318: 17.8.2		*	
<b>4) Inspect anchors post-installed in hardened concrete members b:</b>			
Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads:		*	Verify anchors are post installed in concrete per structural drawings. ACI 318: 17.8.2.4 (adhesive anchors) & 17.8.2 (mechanical anchors)
Mechanical anchors and adhesive anchors not defined in 4.a.		*	
<b>5) Verify use of required design mix.</b>			
Verify mix designs meet strength and exposure requirements listed on approved plans; verify compliance with ACI 318: Ch. 19, 26.4.3, 26.4.4, & IBC 1904.1, 1904.2, 1908.2, 1908.3		*	
<b>6) Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.</b>			
Verify, perform, & examine tests per ASTM C172, ASTM C131, ACI 318: 26.4.6-26.12, and IBC 1908.9		*	
<b>7) Inspect concrete placement &amp; application techniques.</b>			
Inspect concrete & shotcrete placement for proper application per ACI 318: 26.5 & IBC 1908.6, 1908.7, & 1908.8		*	
<b>8) Verify curing temperature and techniques.</b>			
Verify concrete curing temperature and technique is being maintained per approved plans. ACI 318: 26.5.3-26.5.5, & IBC 1908.9		*	
<b>9) Inspect prestressed concrete for:</b>			
Application of prestressing forces; and		*	Verify prestressed concrete per ACI 318: 26.10
Grouting of bonded prestressing tendons.		*	
<b>10) Inspect erection of precast concrete.</b>			
Inspect erection per ACI 318: Ch. 26.8		*	
<b>11) Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.</b>			
Verify strength per ACI 318: 26.11.2		*	
<b>12) Inspect formwork for shape, location and dimensions of the concrete member being formed.</b>			
Inspect formwork for shape, location, and dimensions of concrete member being formed per approved drawings and ACI 318: 26.11.1, 20)		*	

For SI: 1 inch = 25.4 mm.  
(\*) Where applicable, see also Section 1705.12, Special Inspections for seismic resistance.  
 (S) Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.

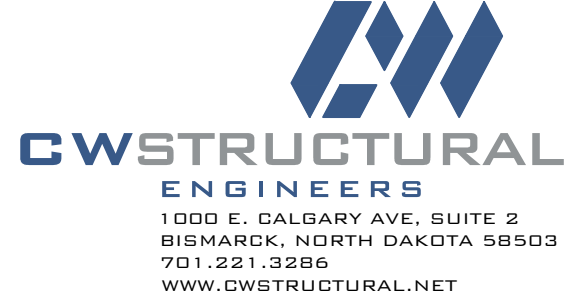
REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS (IBC 2015 Section 1705.6 & Table 1705.6)			
	FREQUENCY		Comments:
	Continuous	Periodic	
<b>1) Minimum Testing:</b>			
Verify Materials below shallow foundations are adequate to achieve the design bearing capacity.		*	
<b>2) Prior to Construction:</b>			
Verify excavations are extended to proper depth and have reached proper material.		*	
<b>3) As Construction Begins:</b>			
Perform classification and testing of compacted fill material.		*	
<b>4) During Construction:</b>			
Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.		*	
Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.		*	

REQUIRED SPECIAL INSPECTIONS OF STRUCTURAL STEEL			
	FREQUENCY		Comments:
	Continuous	Periodic	
<b>OTHER THAN STRUCTURAL STEEL (IBC 1705.11.3)</b>			
<b>Steel Roof &amp; Floor Deck: (SDI -QA/QC)</b>			
Material verification of steel deck		*	Identification markings per applicable ASTM standard.
Roof and floor deck welds		*	Verify that welds conform to AWS D1.3.
Installation of mechanical fasteners		*	Verify that fasteners conform to SDI C, SDI NC, SDI RD & manufacturer's instruction as well as construction documents
<b>STRUCTURAL STEEL CONSTRUCTION (IBC 1705.2, 1705.11, 1705.12)</b>			
<b>Prior to Welding (Table N5.4-1, AISC 360-16):</b>			
Verify welding procedures		*	
Material identification		*	Verify type and grade of material.
Welder identification		*	Verify there is a system in place to identify the welder who has welded a joint or member.
Fit-up groove welds		*	Verify joint preparation, dimensions, cleanliness, tacking and backing.
Access holes		*	Verify configuration and finish.
Fit-up fillet welds		*	Verify alignment, gaps at root, cleanliness of steel surfaces, tack weld quality and location.
<b>During Welding (Table N5.4-02, AISC 360-16):</b>			
Use of qualified inspectors		*	Verify that welders are appropriately qualified.
Control and handling of welding consumables		*	Verify packaging and exposure control.
Cracked tack welds		*	Verify welding is not over a cracked tack weld.
Environmental conditions		*	Verify wind speed is within limits as well as precipitation and temperature.
WPS followed		*	Verify items such as welding equipment settings, travel speed, welding materials, shielding gas type/flow rate, preheat applied, interpass temperature maintained, and proper position.
Welding techniques		*	Verify interpass and final cleaning, each pass is within profile limitations, and quality of each pass.
Steel headed studs anchors atop beams		*	Verify placement and installation of steel headed stud anchors. See general structural notes for additional commentary of the testing of headed stud anchors
<b>After Welding (Table N5.4-3, AISC 360-16):</b>			
Welds cleaned		*	Verify that welds have been properly cleaned.
Size, length and location of welds		*	
Welds meet visual acceptance criteria		*	
Arc strikes		*	
k-area		*	
Backing & welding tabs removed		*	
Repair activities		*	
Document acceptance/rejection of weld		*	
No prohibited welds have been added without the approval of the EDR		*	
<b>Nondestructive Testing (N5.5, AISC 360-16):</b>			
CIP welds (Risk Cat. II)		*	Ultrasonic testing shall be performed on 10% of CIP groove welds in butt, T-and corner joints subject to transversely applied tension loading in materials 5/16-inch thick or greater. Testing rate must be increased if > 5% of welds have unacceptable defects.
CIP welds (Risk Cat. III or IV)		*	Ultrasonic testing shall be performed on 100% of CIP groove welds subject to transversely applied tension loading in butt, T-and corner joints, in materials 5/16-inch thick or greater. Testing rate must be increased if > 5% of welds have unacceptable defects.
Access holes (flange > 2")		*	
Welded joints subject to fatigue		*	
<b>Other Steel Inspections (Table N5.7, AISC 360-16; Tables J8-1 and J10-1, AISC 341-10):</b>			
Structural steel details		*	All fabricated steel and their connections shall be inspected to verify compliance with the details shown in the approved plans.
Anchor rods/embeds supporting structural steel		*	Shall be on the premises during the placement of anchor rods/embedments. Verify diameter, grade, type, and length of element and the extent or depth of embedment prior to placement of concrete.
Reduced beam sections (RBS)		*	Verify contour and finish as well as dimensional tolerances (see Table J8-1 of AISC 341).
Protected Zones		*	Verify that no holes or unapproved attachments are made within the protected zone (see Table J8-1 of AISC 341).
<b>OPEN-WEB STEEL JOIST AND JOIST GIRDERS (2015 IBC Section 1705.2.3 &amp; TABLE 1705.2.3)</b>			
<b>Installation of Open-Web Steel Joists and Joist Girders</b>			
End connections - welding or bolted.		*	SI specifications listed in Section 2207.1.
Bridging - horizontal diagonal.		*	
Standard bridging.		*	SI specifications listed in Section 2207.1.1
Bridging that differs from the SI specifications listed in Section 2207.1.1.		*	



**FOUNDATION PLAN**  
SCALE: 1/4"=1'-0"

- PLAN NOTES:**
- (1) ALL PAD FOOTINGS ARE CENTERED BELOW THE COLUMN THEY SUPPORT - SEE FOUNDATION PLAN & PAD FOOTING SCHEDULE FOR SIZE & REINFORCING.
  - (2) ALL CONTINUOUS WALL FOOTINGS ARE 12" THICK UNREINFORCED, AND PROJECT 6" BEYOND EACH FACE OF FOUNDATION THEY SUPPORT, EXCEPT AS NOTED OTHERWISE.
  - (3)  $\ominus$  INDICATES STEP IN CONTINUOUS WALL FOOTING, SPACE STEPS AT 4'-0" FROM BUILDING CORNERS AND OTHER FOOTINGS STEPS EXCEPT AS SHOWN OTHERWISE.
  - (4) X'-X" T.O.F.  $\bullet$  INDICATES TOP OF FOOTING ELEVATION.
  - (X)  $\otimes$  INDICATES PIER DETAIL - REFER TO PIER DETAILS LOCATED ON SHEET S302 FOR PIER SIZE & REINFORCING.
  - (5) "EX." & "EXISTG" INDICATES EXISTING CONSTRUCTION. EXISTG MEMBER SIZES & DIMENSIONS ARE ASSUMED- FIELD VERIFY AS REQ'D.
  - (6) "F.V." INDICATES THAT DIMENSION IS TO BE FIELD VERIFIED PRIOR TO MATERIAL FABRICATION, CONCRETE CONSTRUCTION, OR STEEL FABRICATION ETC...
  - (7) GENERAL CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR BUILDING GROUNDING WIRE ATTACHMENT TO FOUNDATION WALL REINFORCING PRIOR TO POURING FOUNDATION WALL.



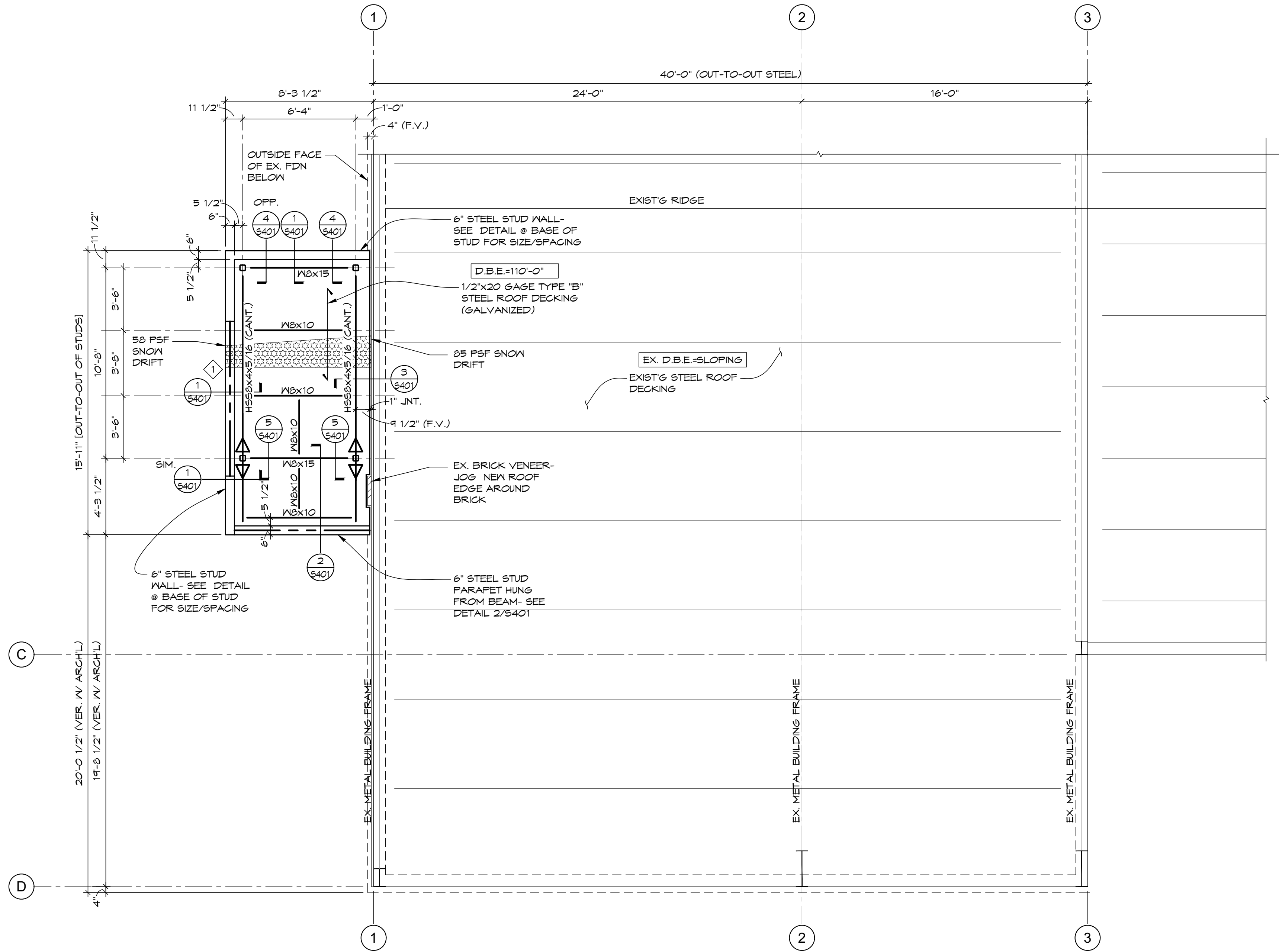
#	DATE	DESCRIPTION							
<b>FOUNDATION PLAN &amp; SPECIAL INSPECTION TABLES</b>									
MR&I OFFICE REMODEL W CAUSEWAY RD, FORT YATES, ND 58538									
DESIGNED BY: DJK									
DRAWN BY: RWB / DJK									
APPROVED BY: DJK									
DESIGN PROJ: 12493.700									
CWS PROJ: C2379A									
SCALE: AS NOTED									
DATE: OCT. 2024									
DRAWING NO: S101									
SHEET NO: of									

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COLD-FORMED HEADER SCHEDULE						
MARK	HEADER		JAMB		SILL	
	SIZE	CONN.	SIZE	CONN.	SIZE	CONN.
	600QFH300-54	10/S401	600QFJ300-54	9/S401 12/S601	600T200-54	11/S401

STEEL STUD HEADER NOTES:  
 (1) ALL HEADERS AND JAMB STUDS ARE TO BE MARINOVWARE QUICKFRAME MEMBERS (OR APPROVED EQUAL).

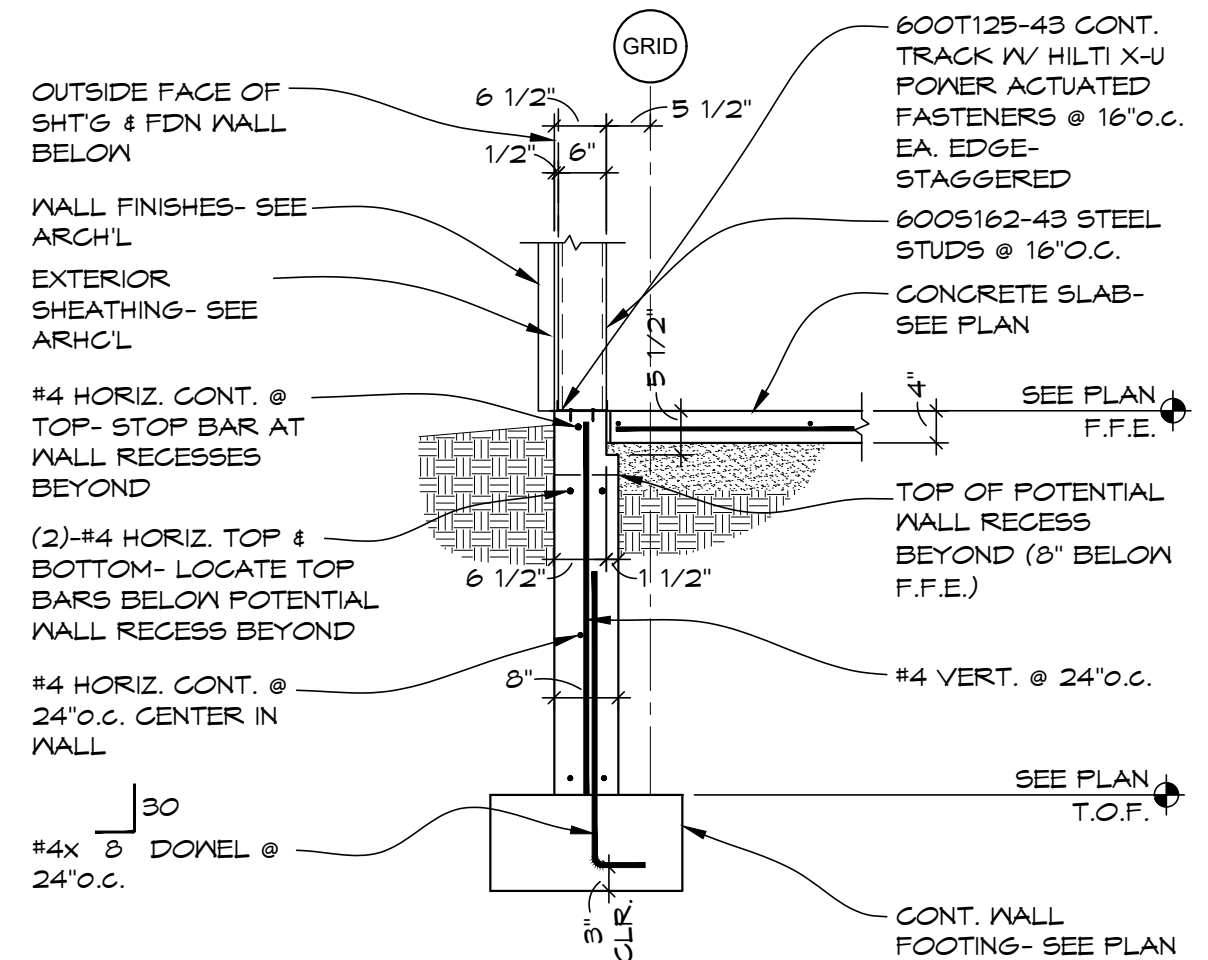
**VESTIBULE ROOF FRAMING PLAN**  
 SCALE: 1/4"=1'-0"

PLAN NOTES:  
 (1) D.B.E. INDICATES STEEL DECK BEARING ELEVATION. ALL NEW ENTRY STEEL BEAMS SHOWN ARE AT T.O.S. = D.B.E. UNLESS OTHERWISE NOTED.  
 (2)  $\diamond$  INDICATES COLD FORMED HEADER- SEE PLAN & COLD FORMED HEADER SCHEDULE FOR HEADER SIZE & JAMB STUDS REQUIRED AT WALL OPENING.

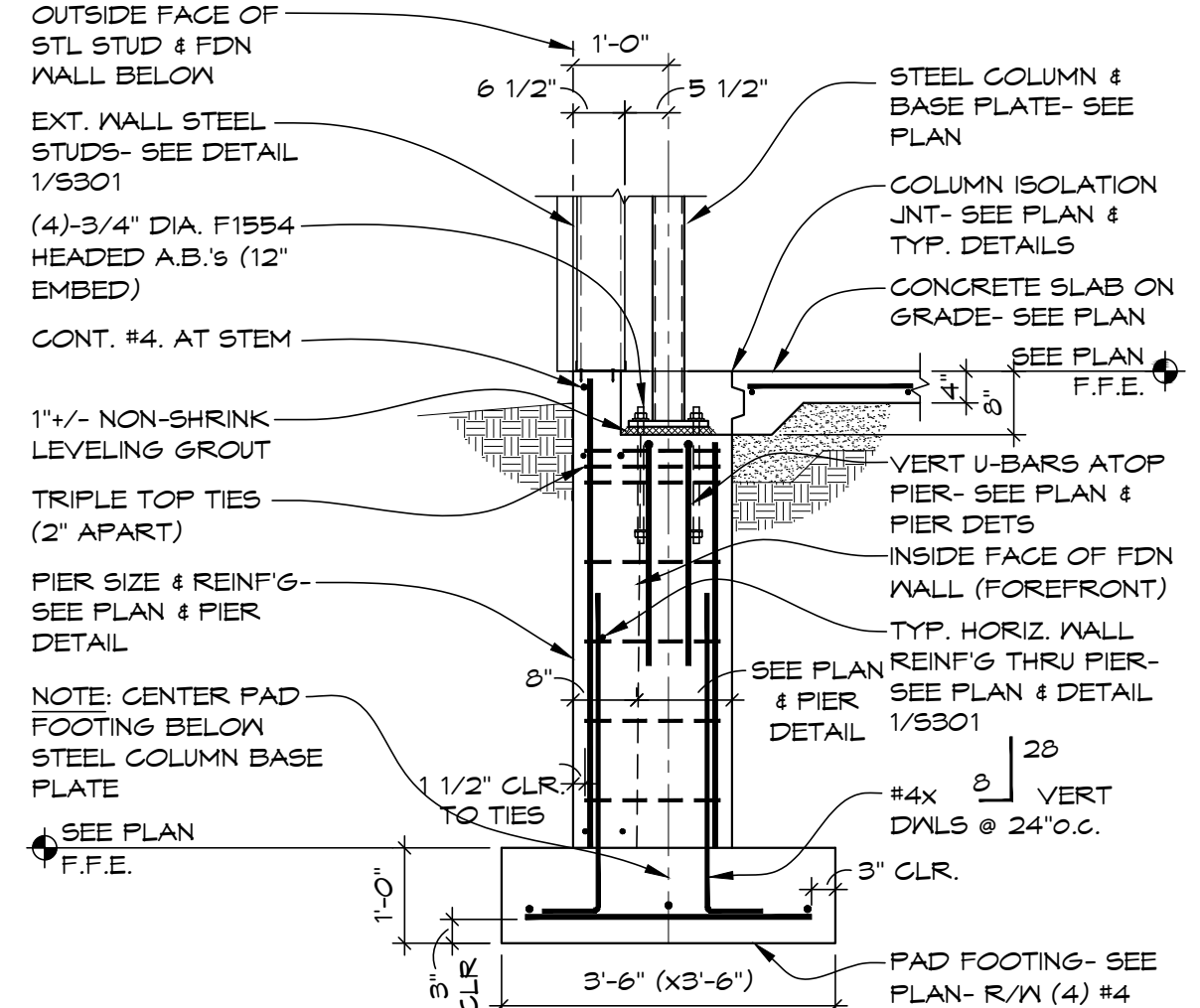


<h1 style="margin: 0;">Bartlett &amp; West</h1> <p style="font-size: 8px; margin: 0;">3466 E CENTURY AVENUE - BISMARCK, ND 58503              PHONE: 785-272-2252              www.bartlettwest.com</p>	<p style="font-weight: bold; font-size: 12px;">VESTIBULE ROOF FRAMING PLAN</p> <p style="font-size: 8px; margin-top: 10px;">MR&amp;I OFFICE REMODEL              W CAUSEWAY RD, FORT YATES, ND 58538</p>																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DESIGNED BY:</td> <td>DJK</td> </tr> <tr> <td>DRAWN BY:</td> <td>RWB / DJK</td> </tr> <tr> <td>APPROVED BY:</td> <td>DJK</td> </tr> <tr> <td>DESIGN PROJ.:</td> <td>12493.700</td> </tr> <tr> <td>CWS PROJ.:</td> <td>C2379A</td> </tr> <tr> <td>SCALE:</td> <td>AS NOTED</td> </tr> <tr> <td>DATE:</td> <td>OCT. 2024</td> </tr> <tr> <td>DRAWING NO.:</td> <td>S202</td> </tr> <tr> <td>SHEET NO.:</td> <td>of</td> </tr> </table>	DESIGNED BY:	DJK	DRAWN BY:	RWB / DJK	APPROVED BY:	DJK	DESIGN PROJ.:	12493.700	CWS PROJ.:	C2379A	SCALE:	AS NOTED	DATE:	OCT. 2024	DRAWING NO.:	S202	SHEET NO.:	of
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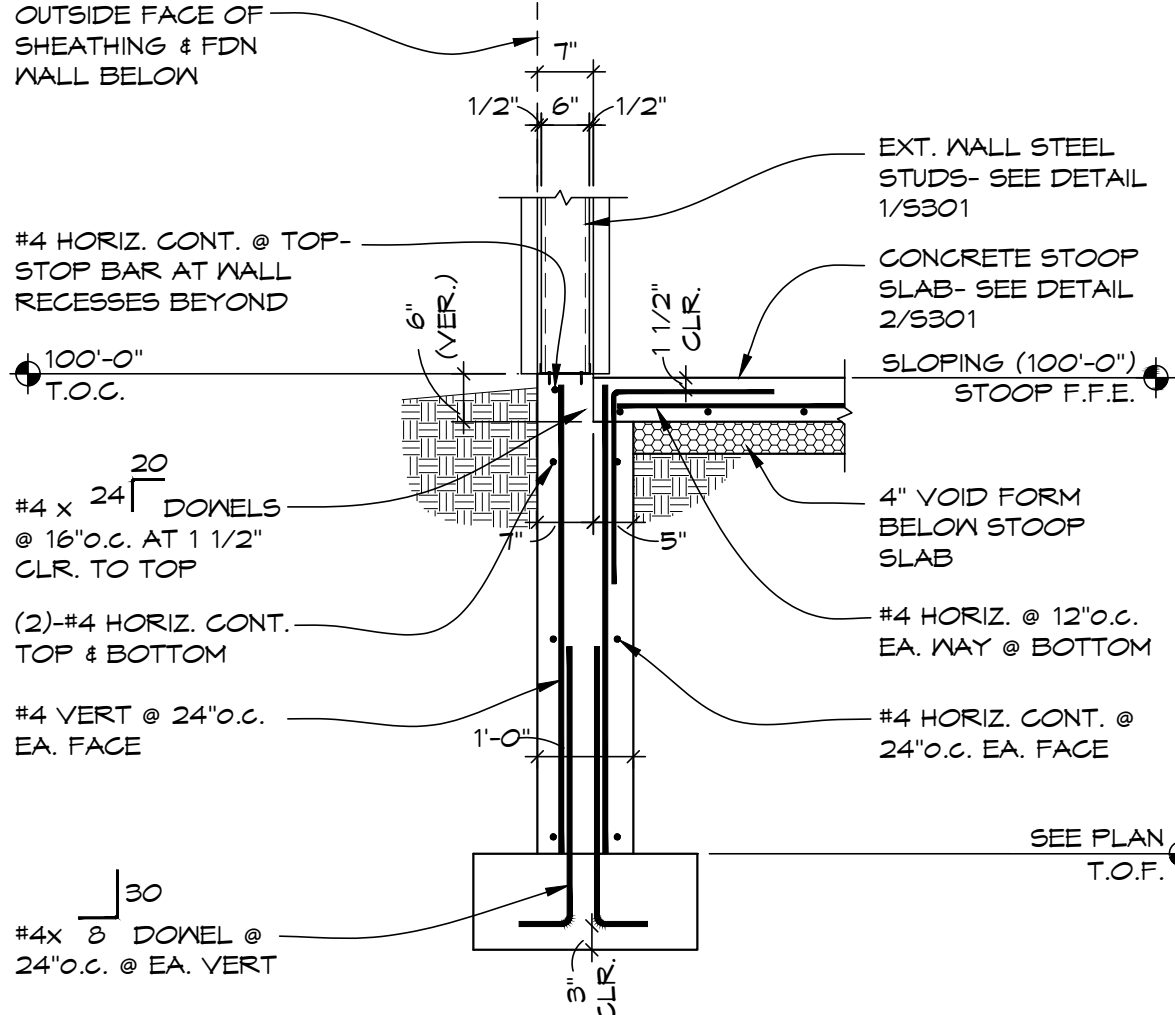


**1 EXT. COLD FORMED STUDS ON FDN WALL**  
 (S301) SCALE: 1/2"=1'-0"

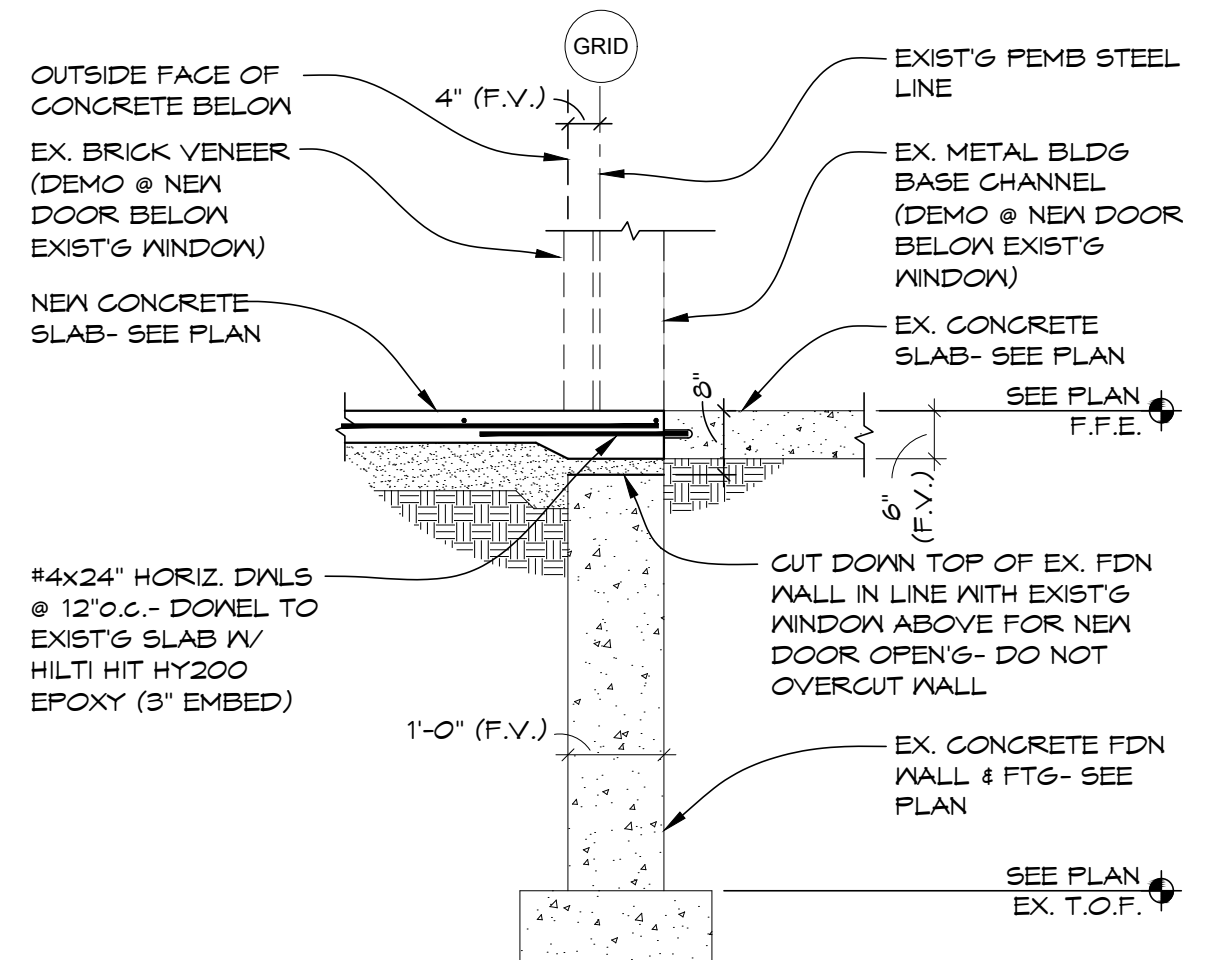


**2 TYP. ENTRY STOOP FOUNDATION REINF'G**  
 (S301) SCALE: 1/2"=1'-0"

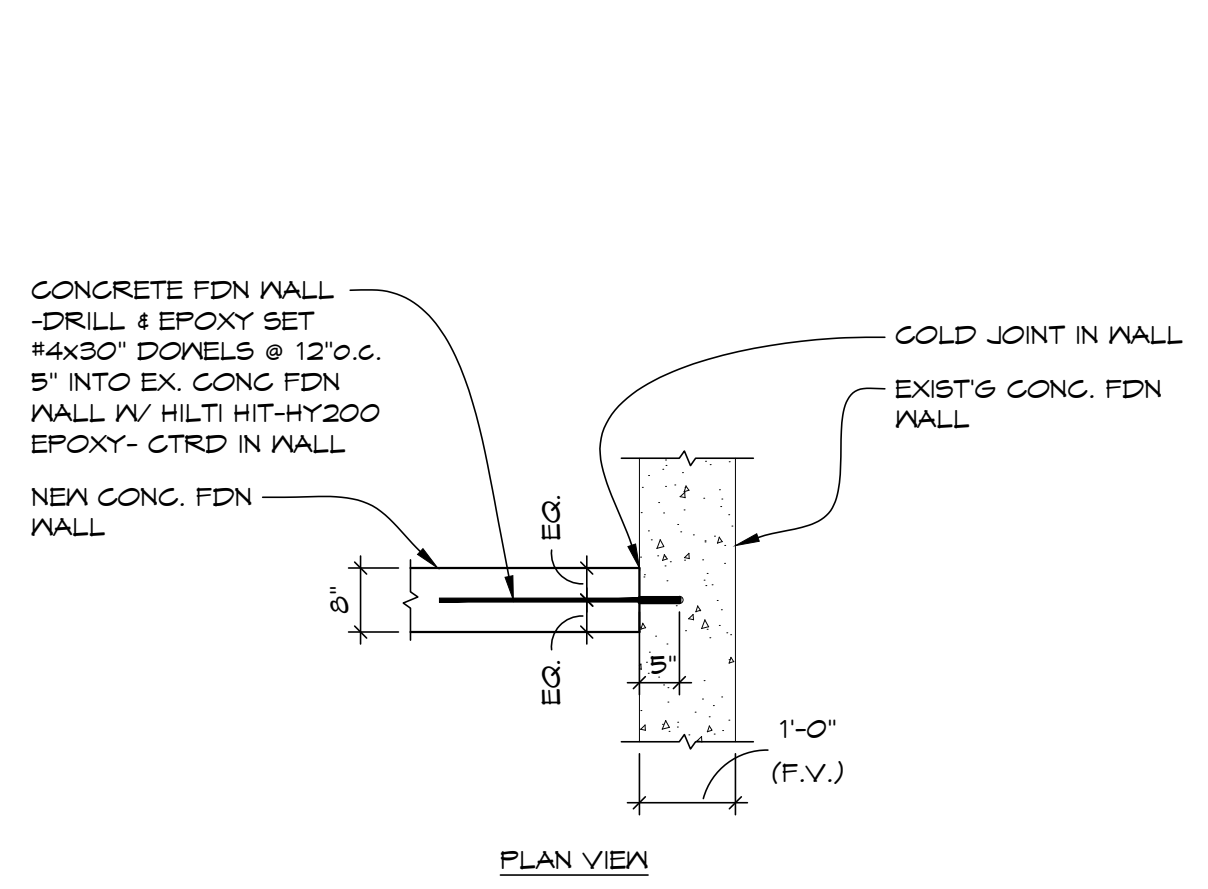
**3 FOUNDATION WALL SECTION**  
 (S301) SCALE: 1/2"=1'-0"



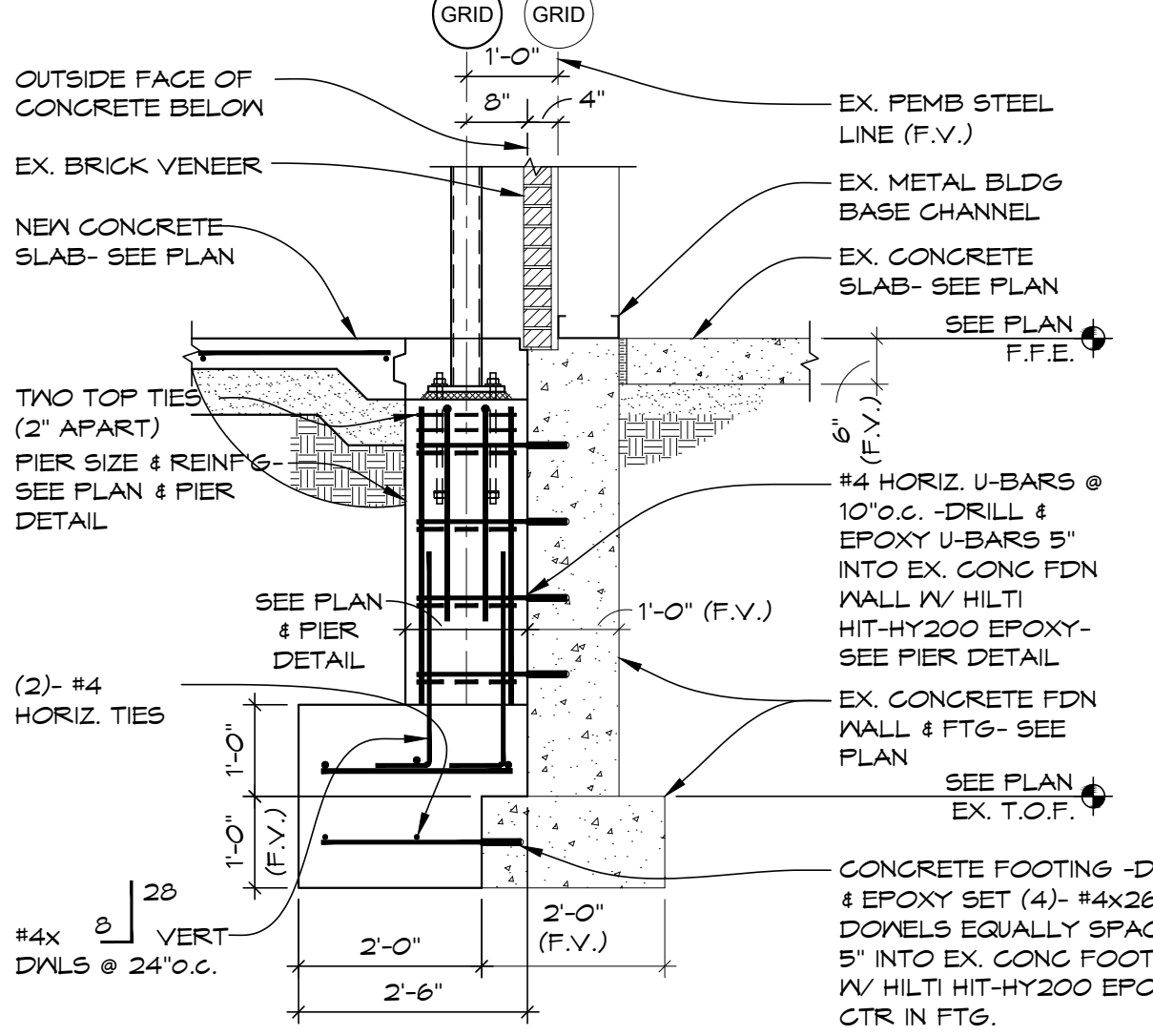
**4 ENTRY STOOP FOUNDATION WALL SECTION**  
 (S301) SCALE: 1/2"=1'-0"



**5 NEW SLAB AT AND NEW DOOR OPEN'G**  
 (S301) SCALE: 1/2"=1'-0"



**6 CONG. FOUNDATION WALL DOWEL DETAIL**  
 (S301) SCALE: 1/2"=1'-0"



**7 CONG. FOOTING DOWEL DETAIL**  
 (S301) SCALE: 1/2"=1'-0"

**FOUNDATION DETAILS**

BY	DESCRIPTION

DATE	DESCRIPTION

**Bartlett & West**  
 3456 E CENTURY AVENUE - BISMARCK, ND 58503  
 PHONE: 785-72-2252  
 www.bartlettwest.com

**MR&I OFFICE REMODEL**  
**W CAUSEWAY RD, FORT YATES, ND 58538**

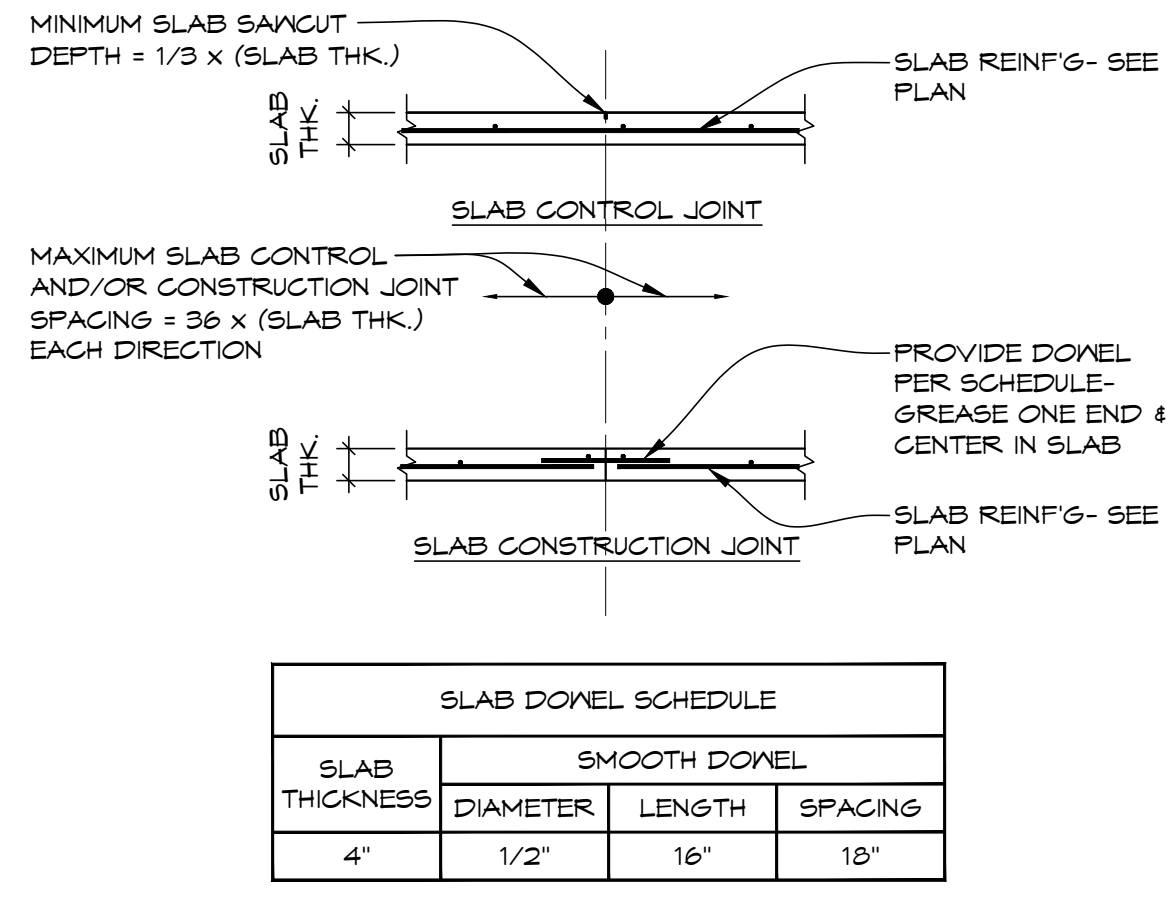
**REGISTERED PROFESSIONAL ENGINEER**  
**DEREK J. KOST**  
**PE 5638**  
 DATE: 10/1/24  
 NORTH DAKOTA

DESIGNED BY:	DJK
DRAWN BY:	RWB / DJK
APPROVED BY:	DJK
DESIGN PROJ.:	12493.700
CWS PROJ.:	C2379A
SCALE:	AS NOTED
DATE:	OCT. 2024
DRAWING NO.:	S301
SHEET NO.:	of

**CWSTRUCTURAL**  
 ENGINEERS  
 1000 E. CALSARY AVE, SUITE 2  
 BISMARCK, NORTH DAKOTA 58503  
 701.221.3286  
 www.cwstructural.net

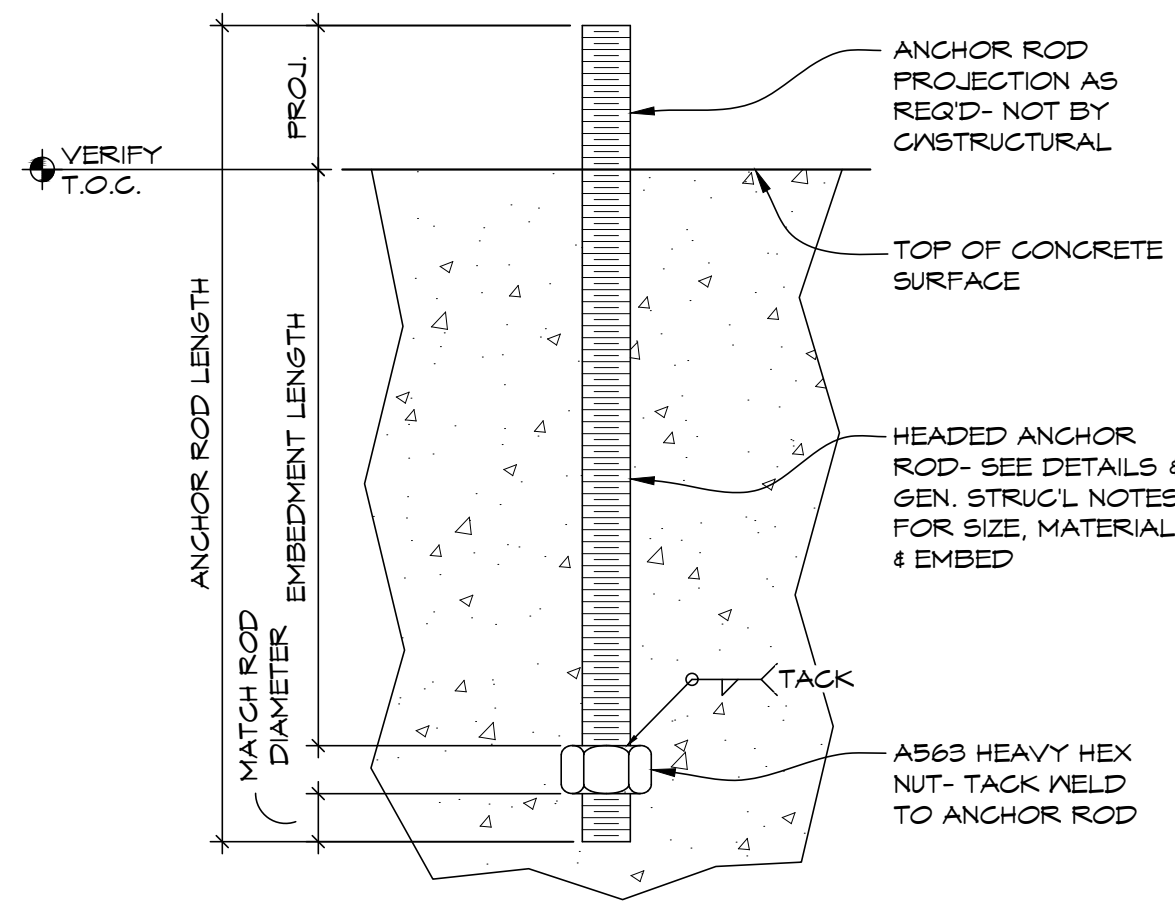


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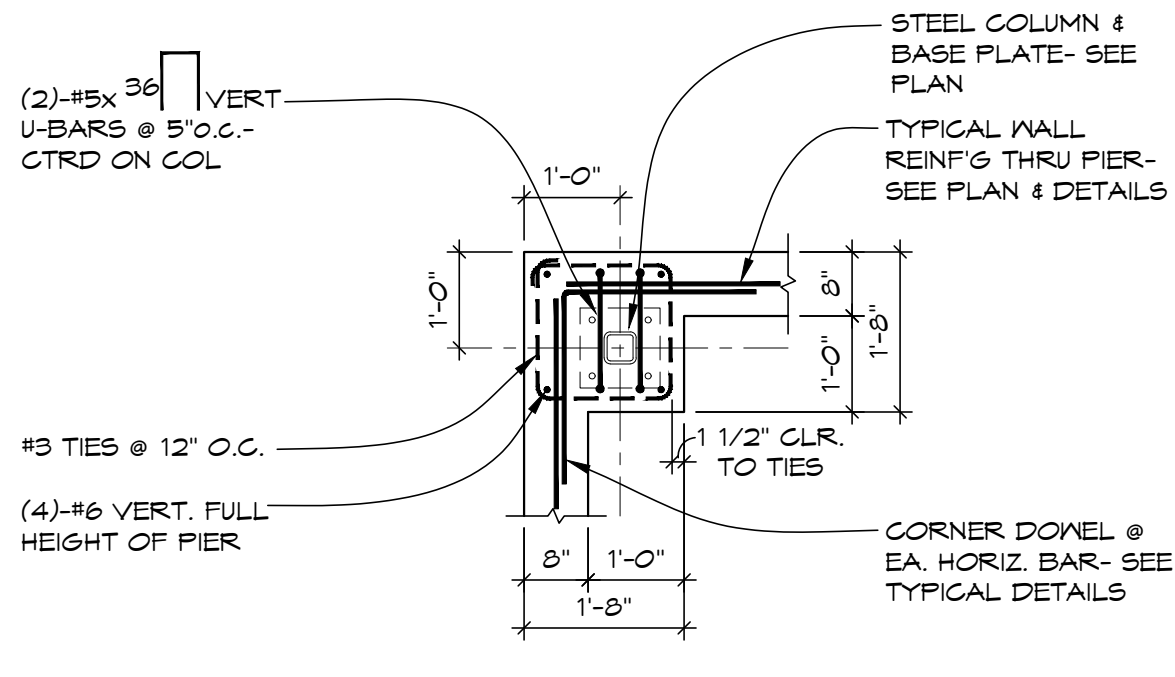


SLAB DOWEL SCHEDULE			
SLAB THICKNESS	SMOOTH DOWEL		
	DIAMETER	LENGTH	SPACING
4"	1/2"	16"	18"

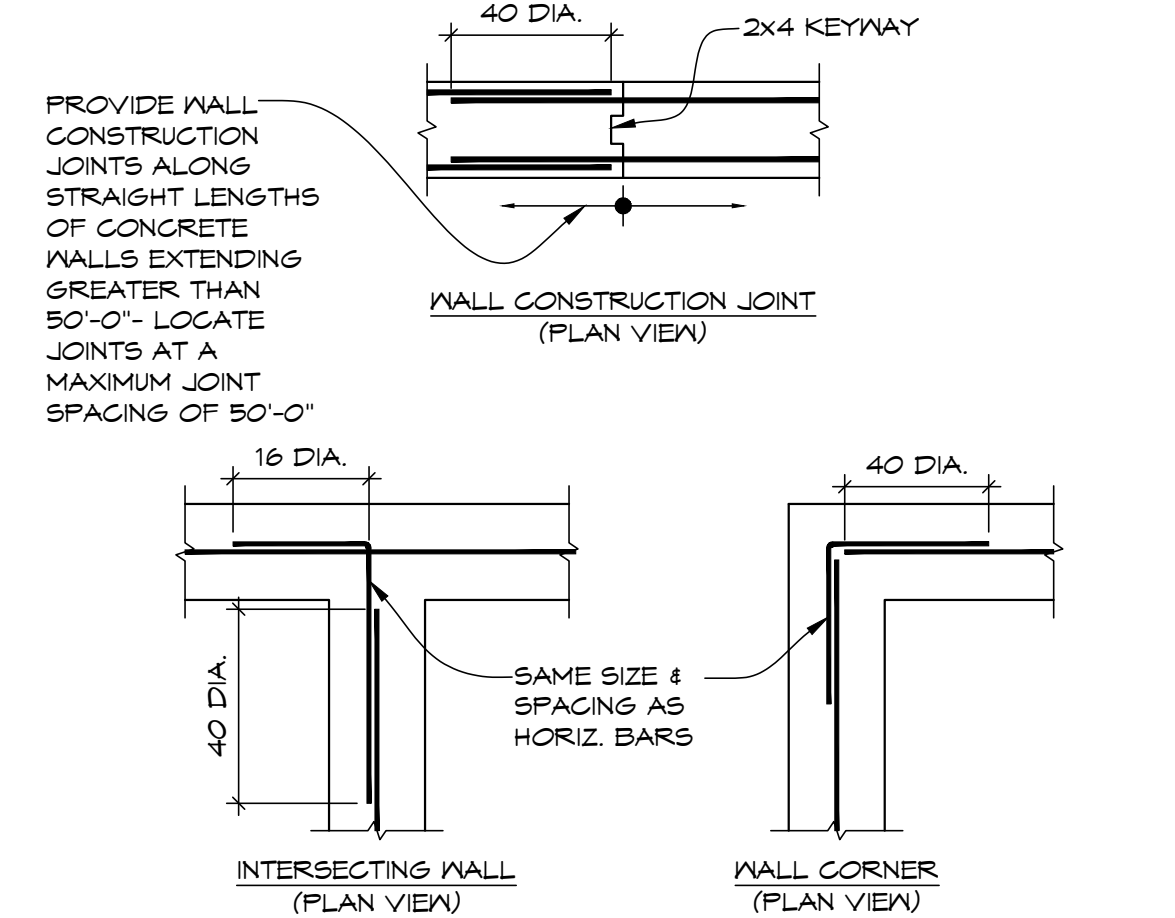
**1 TYPICAL SLAB-ON-GRADE JOINTING DETAIL**  
 6302 SCALE: NO SCALE



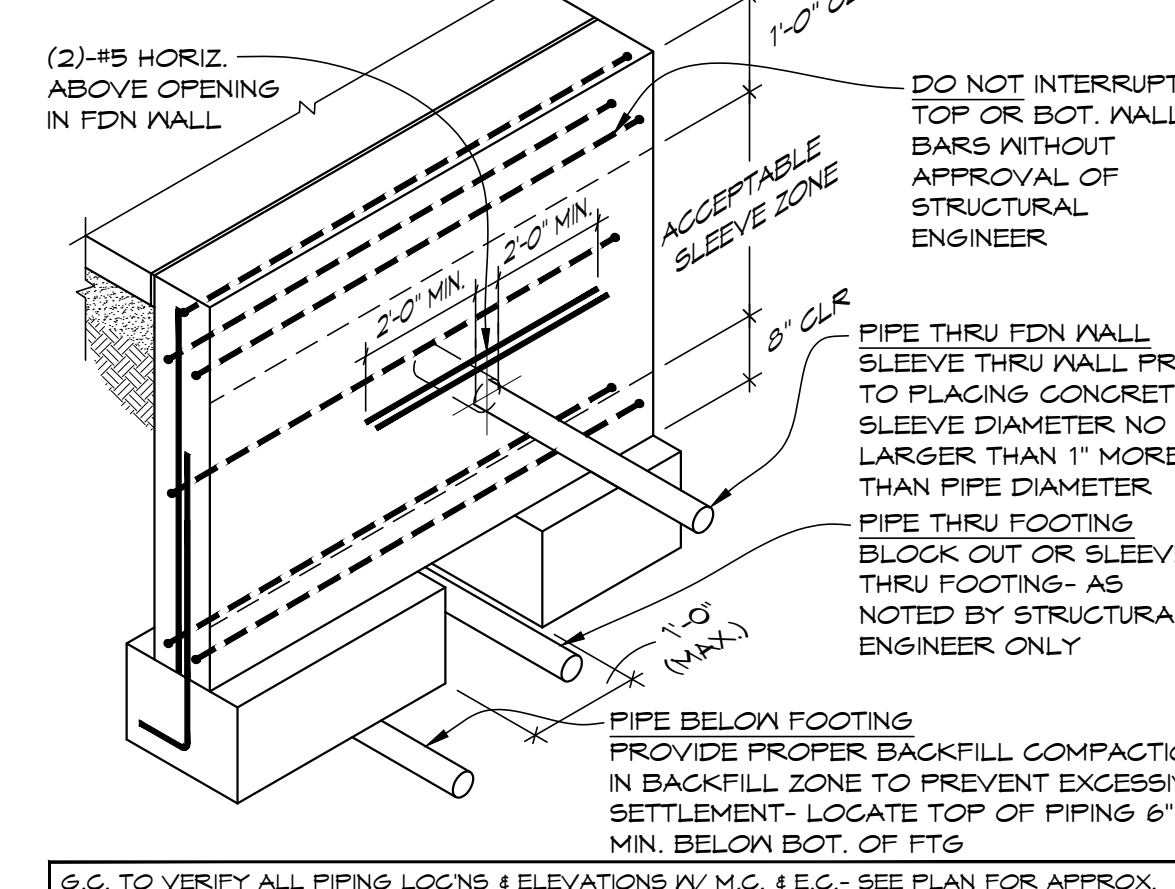
**5 TYPICAL HEADED ANCHOR ROD DETAIL**  
 6302 SCALE: NONE



**A PIER REINFORCING DETAIL**  
 SCALE: 1/2"=1'-0"

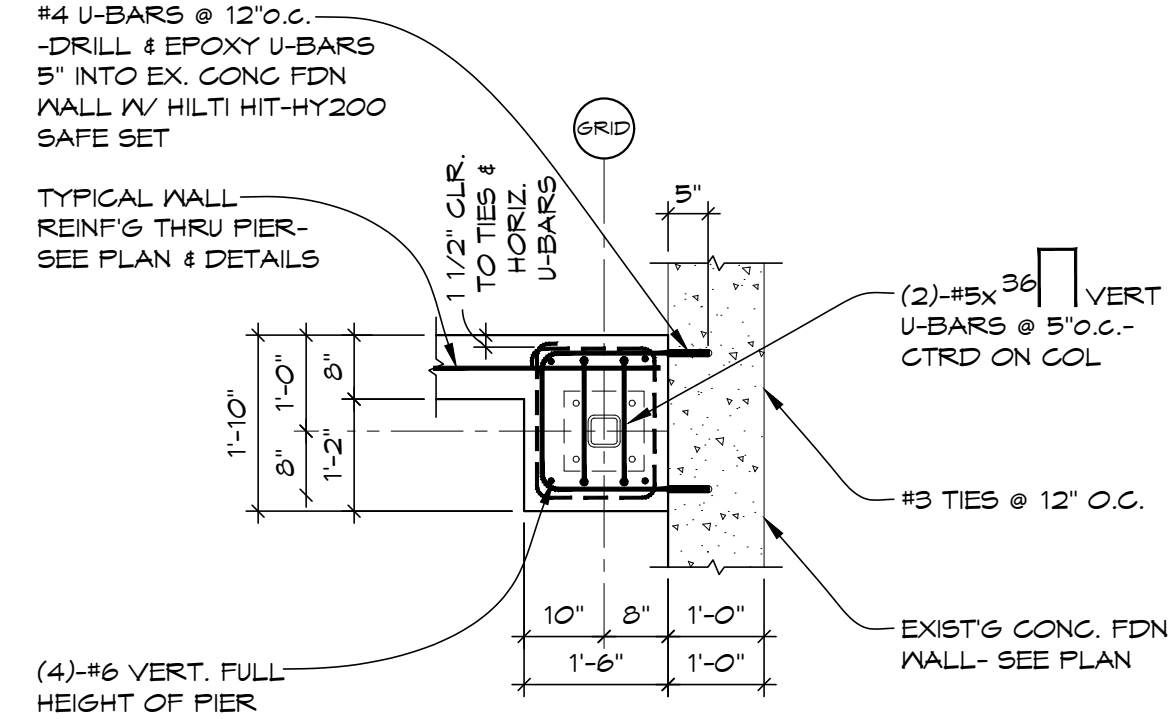


**2 TYP. CONCRETE WALL REINFORCING DETS**  
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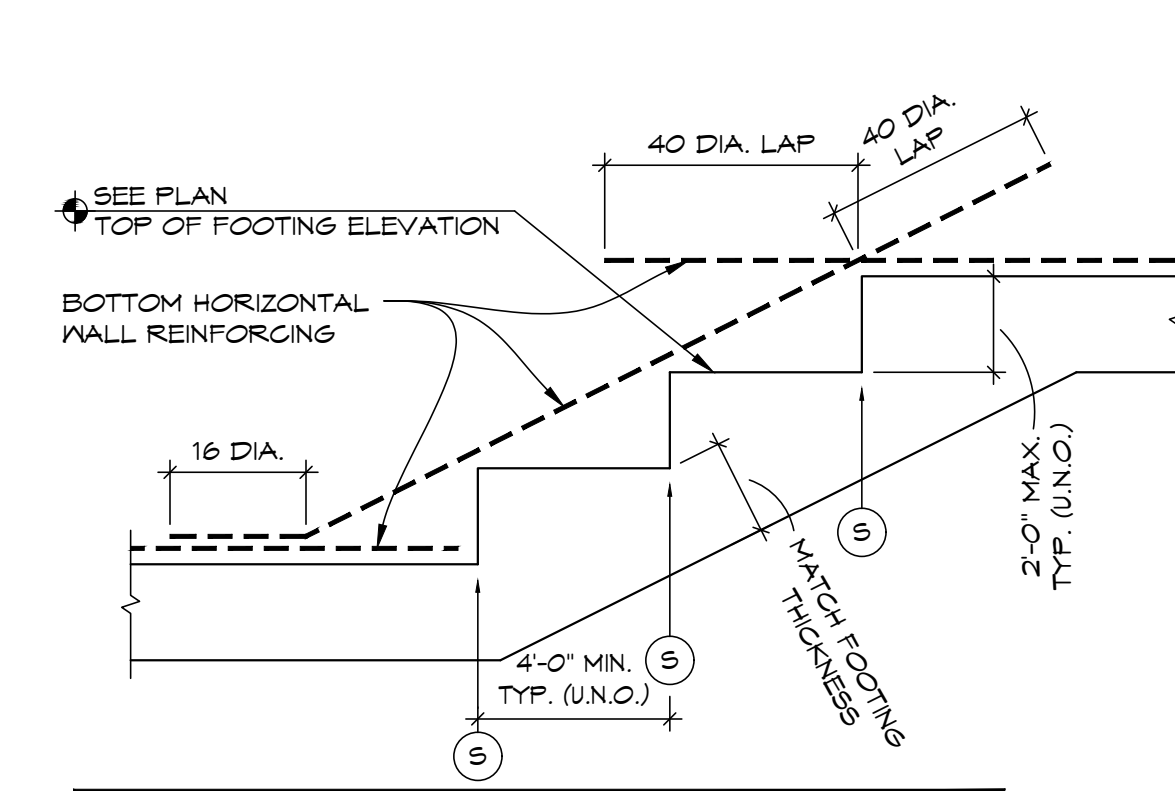


G.C. TO VERIFY ALL PIPING LOCNS & ELEVATIONS W/ M.C. & E.C.- SEE PLAN FOR APPROX. LOCNS- COORDINATE ALL OTHER LOCNS NOT SHOWN ON PLANS W/ STRUCTURAL ENGINEER

**6 TYP. PIPING REQUIREMENTS CROSSING FDNs**  
 6302 SCALE: 1/2"=1'-0"

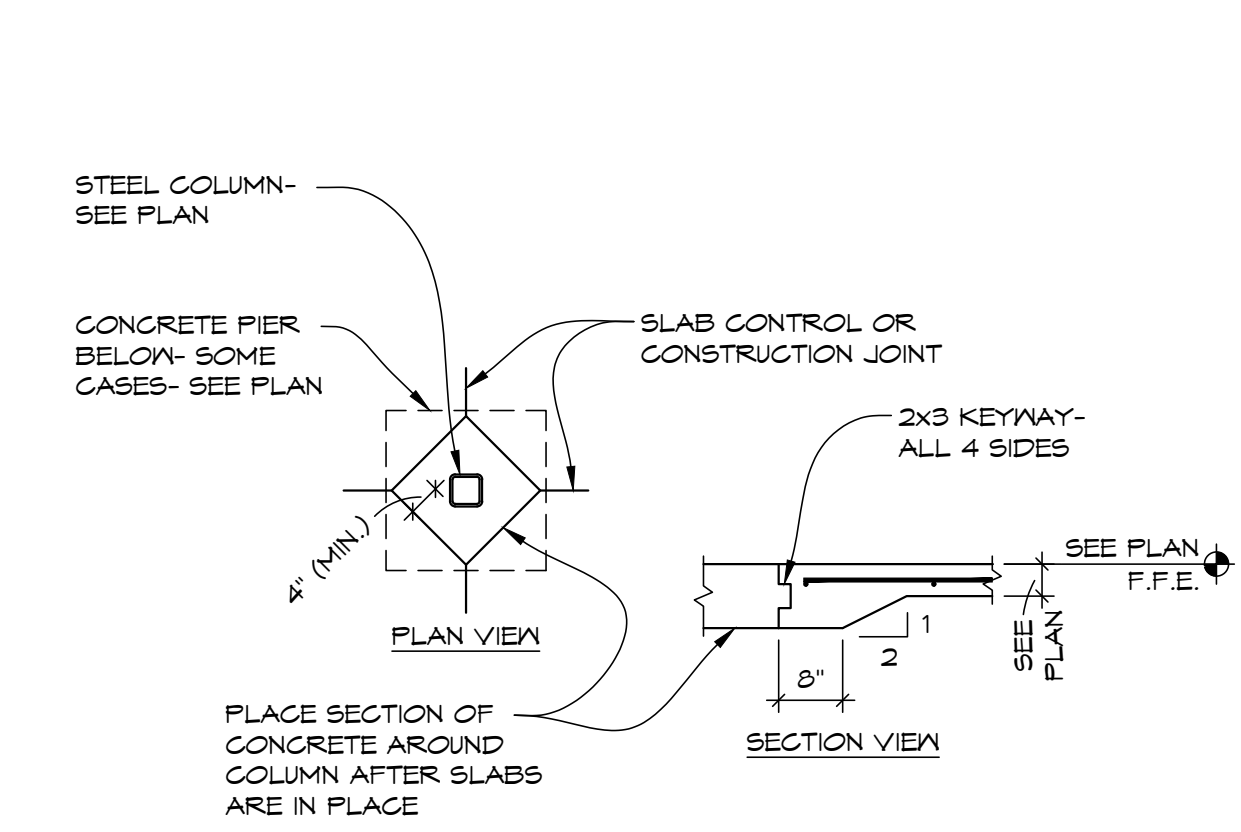


**B PIER REINFORCING DETAIL**  
 SCALE: 1/2"=1'-0"

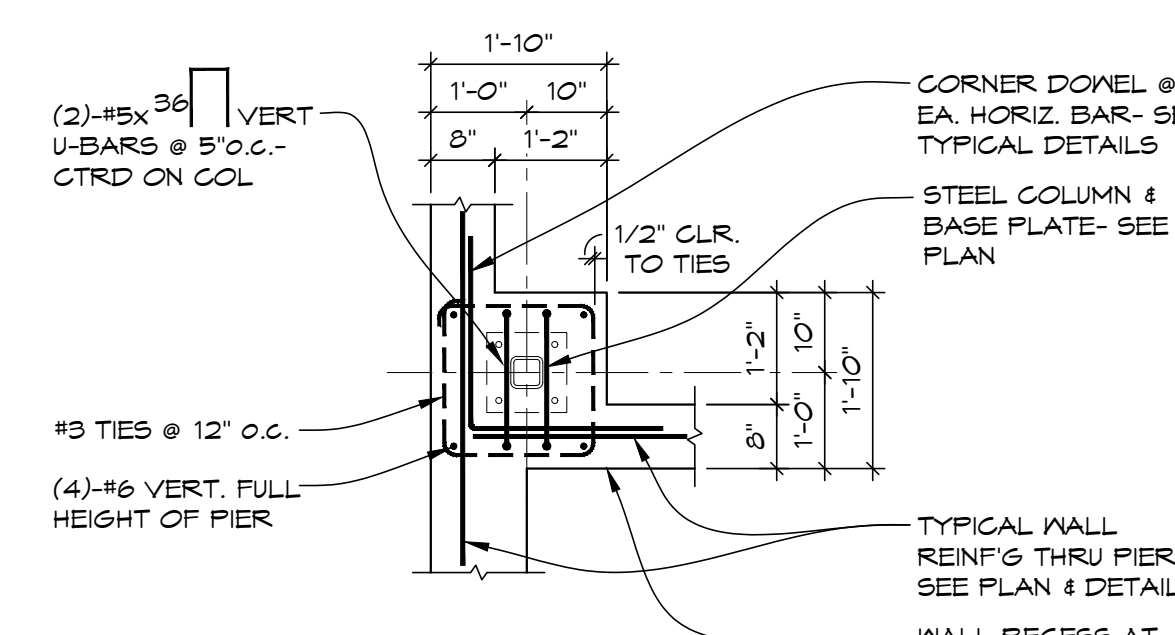


CONTRACTOR NOTE:  
 "S" INDICATES A STEP IN THE TOP OF CONCRETE FOOTING ELEVATION- REFER TO THE FOUNDATION PLAN & NOTES FOR FOOTING STEP LOCATIONS & SPACINGS

**3 TYPICAL FOOTING STEP DETAIL**  
 6302 SCALE: NO SCALE



**4 TYPICAL COLUMN ISOLATION JOINT DETAIL**  
 6302 SCALE: NO SCALE



**C PIER REINFORCING DETAIL**  
 SCALE: 1/2"=1'-0"

#	DATE	DESCRIPTION

**Bartlett & West**

3466 E CENTURY AVENUE - BISMARCK, ND 58503  
 PHONE: 785-272-2252  
 www.bartlettwest.com

**TYP. FOUNDATION DETAILS & PIER DETAILS**

MR&I OFFICE REMODEL  
 W CAUSEWAY RD, FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
 DEREK J. KOST  
 PE 5638  
 DATE 10/1/24  
 NORTH DAKOTA

DESIGNED BY:	DJK
DRAWN BY:	RWB / DJK
APPROVED BY:	DJK
DESIGN PROJ.:	12493.700
CWS PROJ.:	C279A
SCALE:	AS NOTED
DATE:	OCT. 2024
DRAWING NO.:	S302
SHEET NO.:	of

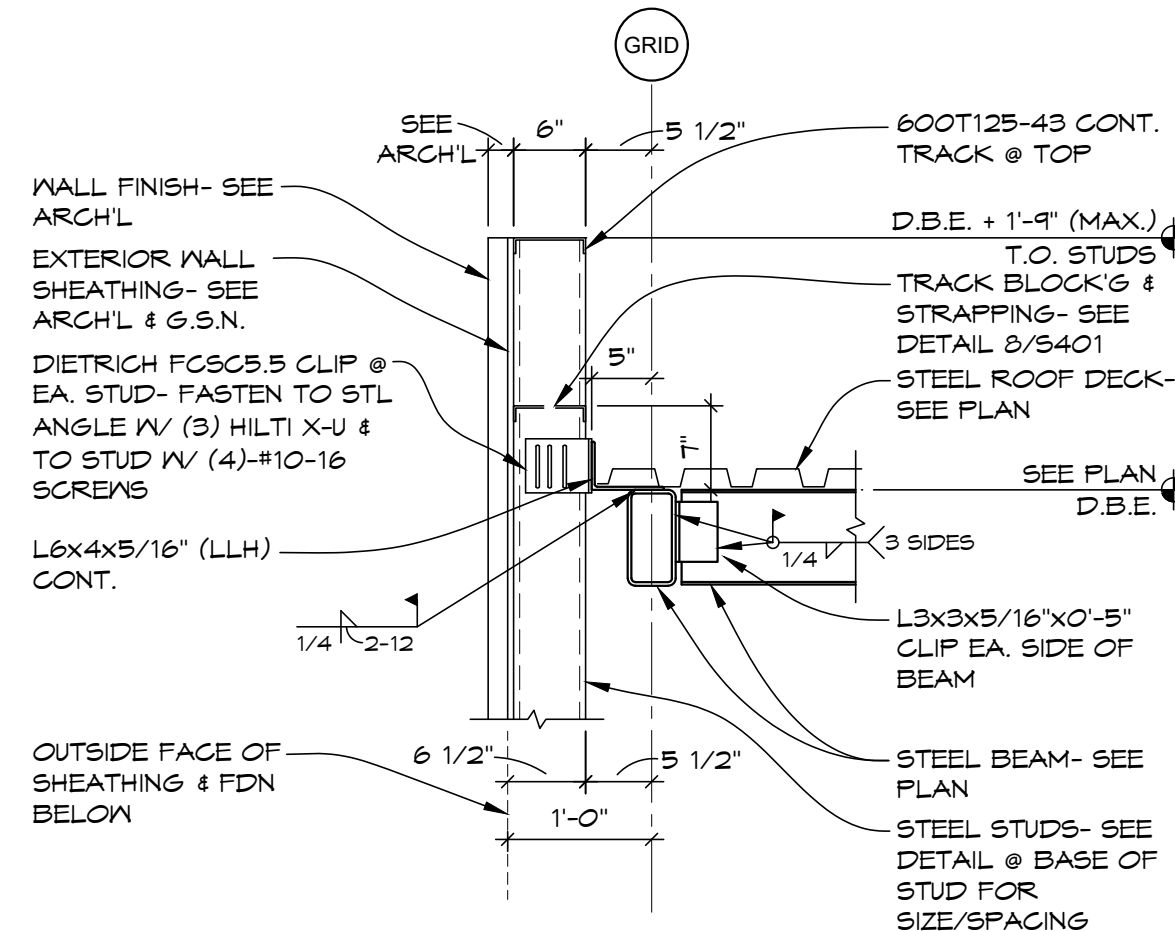
**CWSTRUCTURAL ENGINEERS**

1000 E. CALGARY AVE. SUITE 2  
 BISMARCK, NORTH DAKOTA 58503  
 701.221.3286  
 www.cwstructural.net

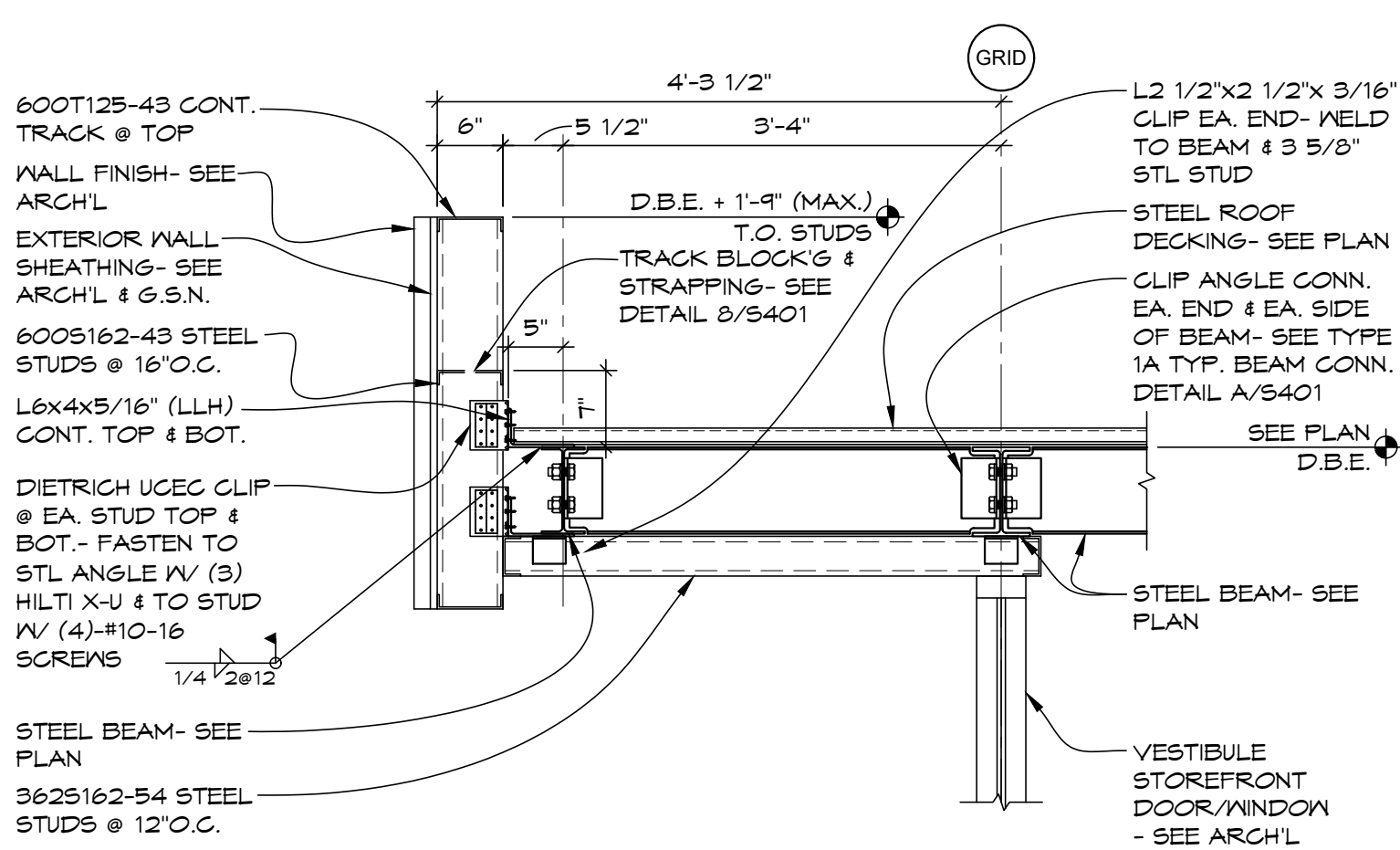
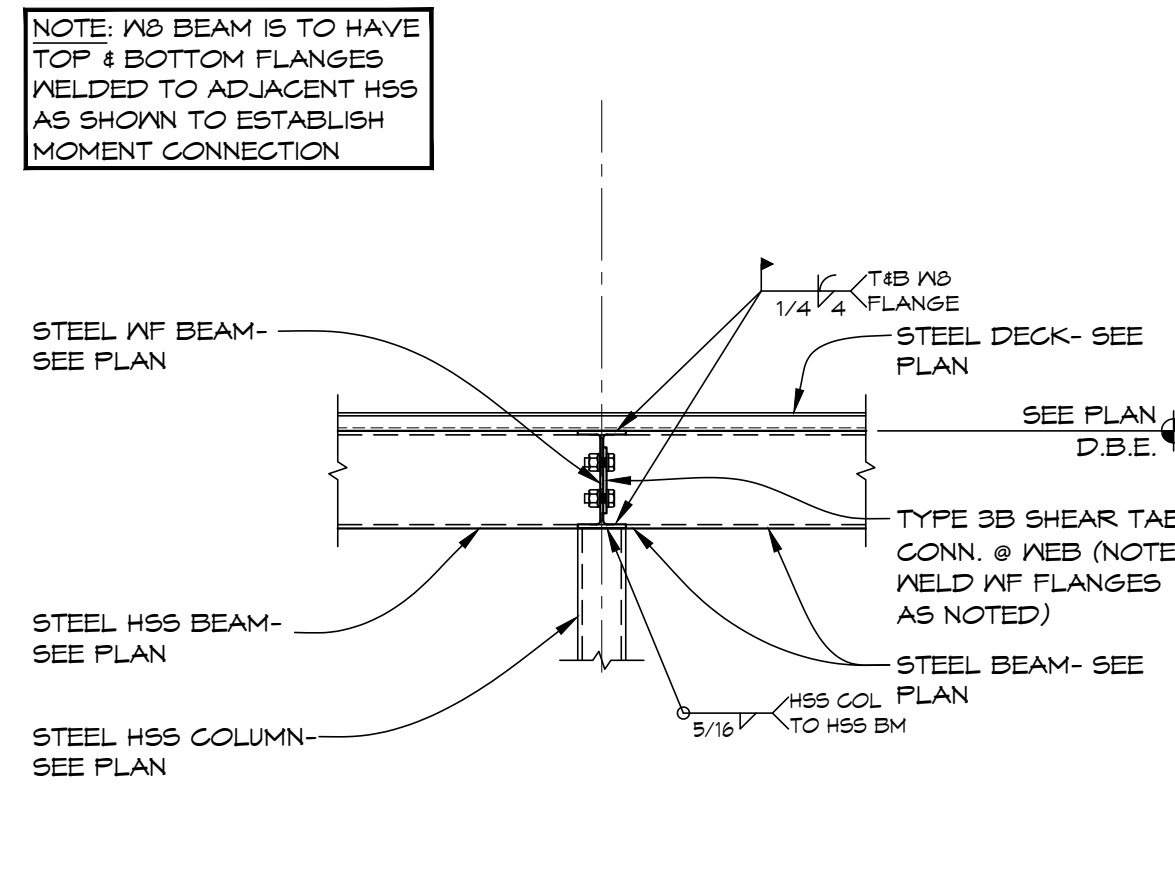
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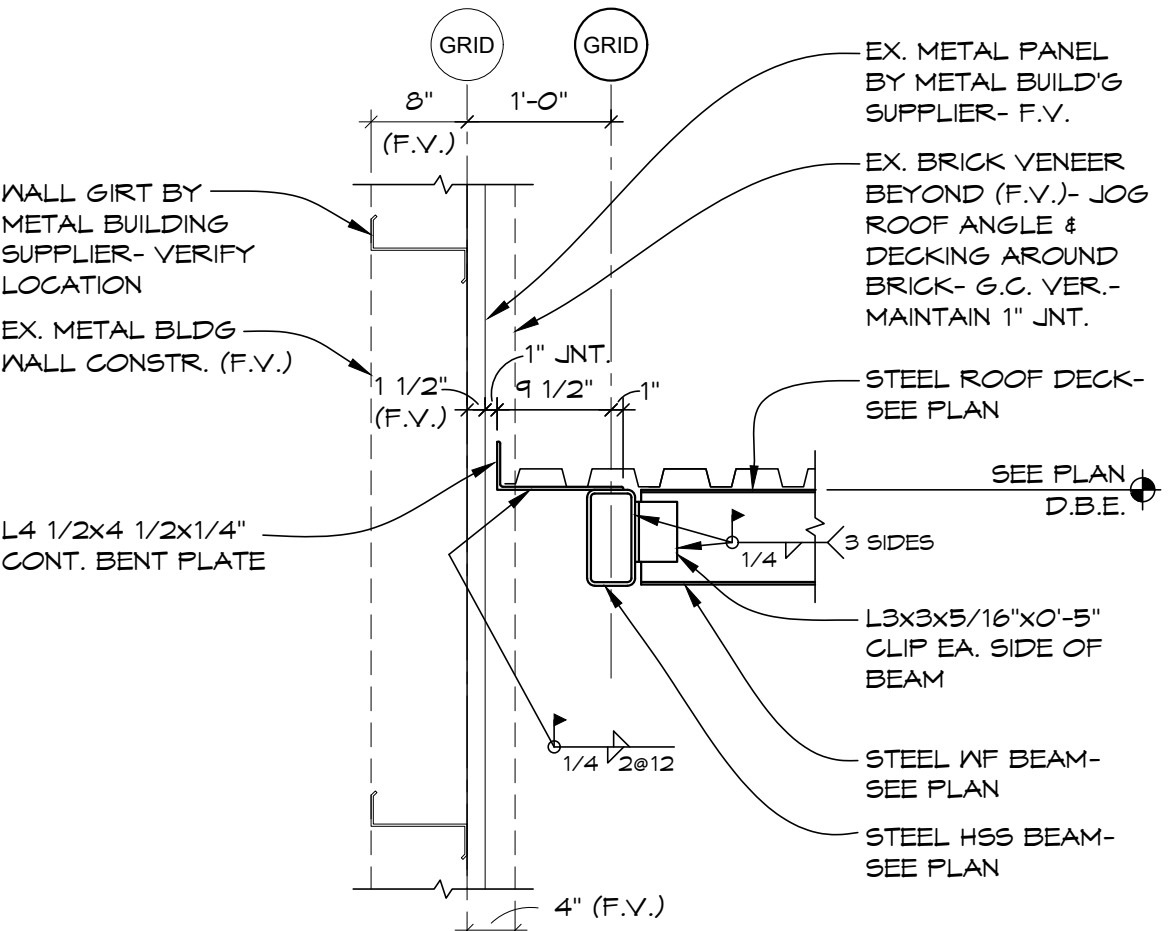
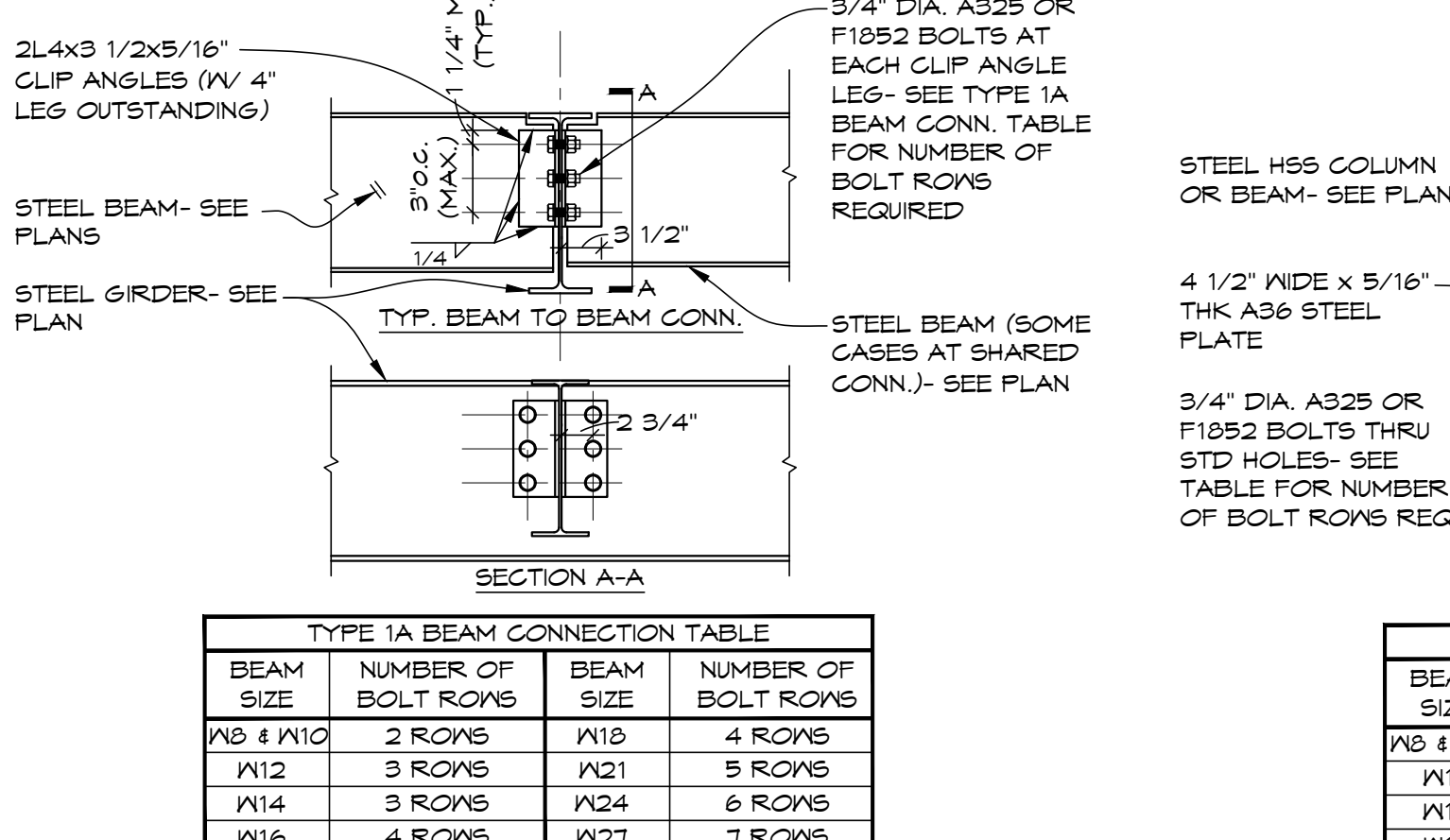
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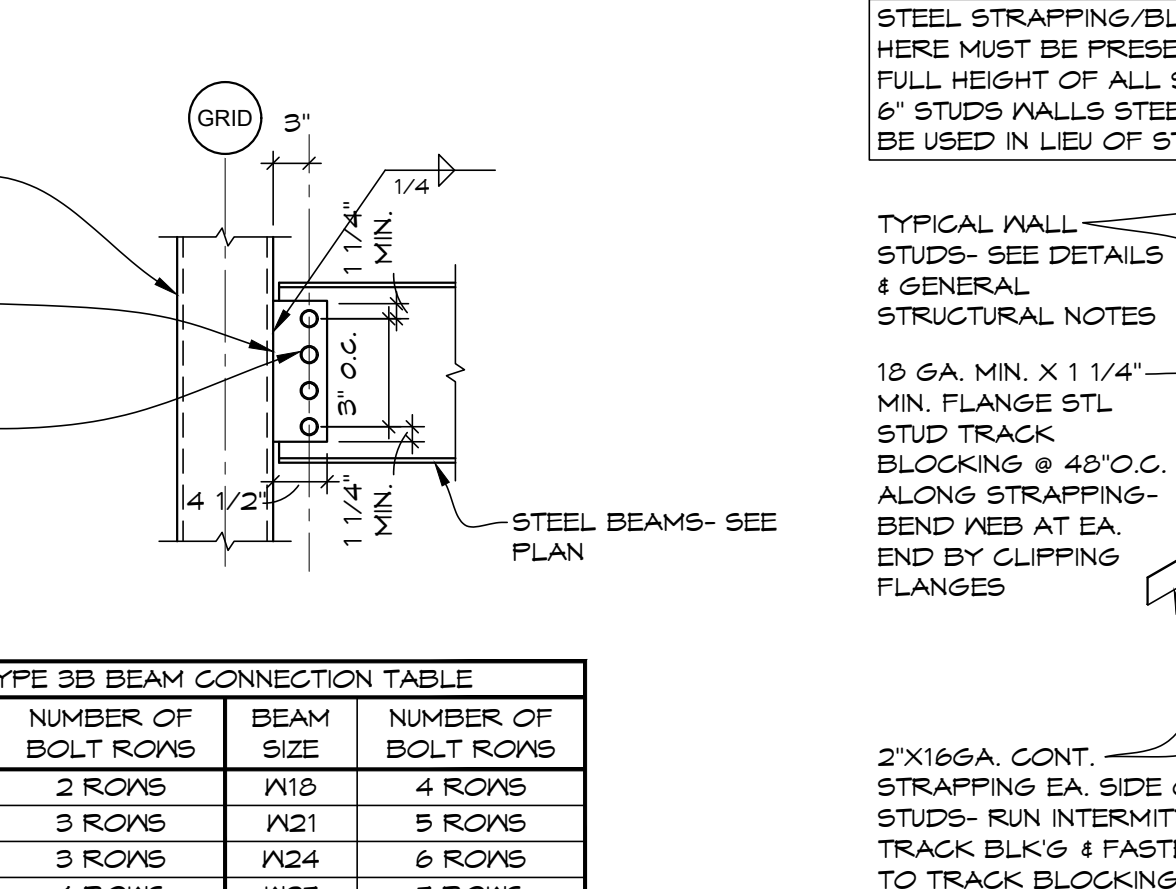
**1 ROOF DECK STEEL STUD WALL**  
S401 SCALE: 3/4"=1'-0"



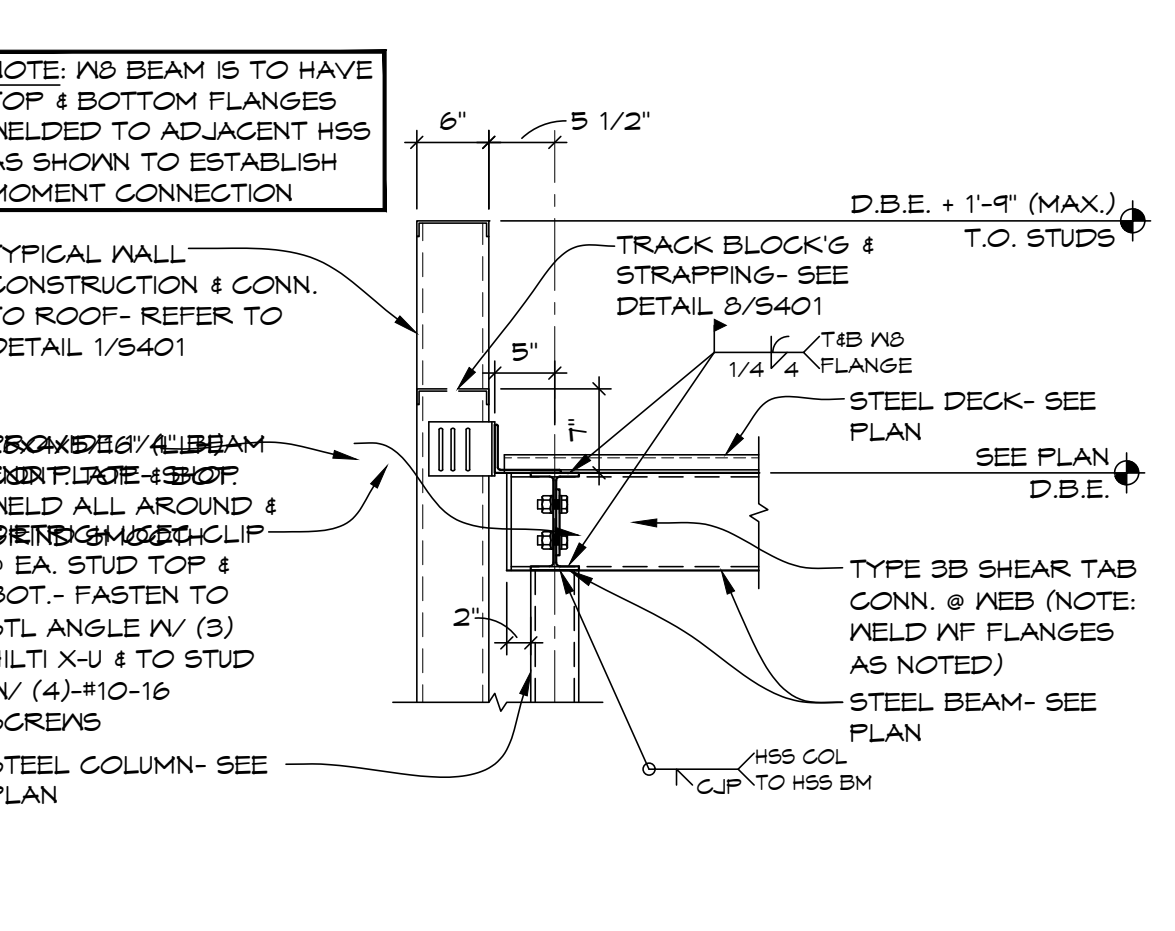
**2 ROOF DECK AT CANTILEVER**  
S401 SCALE: 3/4"=1'-0"



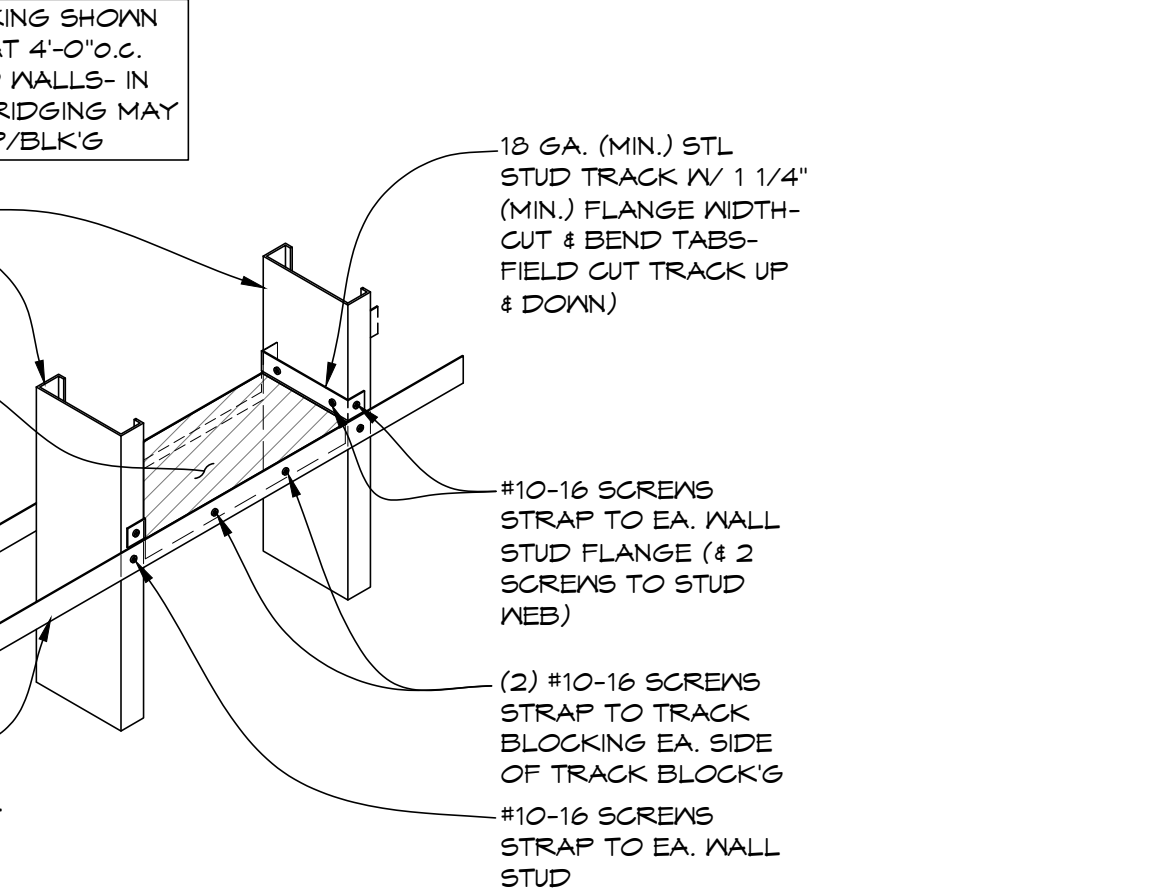
**3 ROOF DECK AT EXIST'G METAL BUILDING**  
S401 SCALE: 3/4"=1'-0"



**7 TYP. TYPE 3B STD SINGLE-PLATE BEAM CONN.**  
S401 SCALE: 3/4"=1'-0"

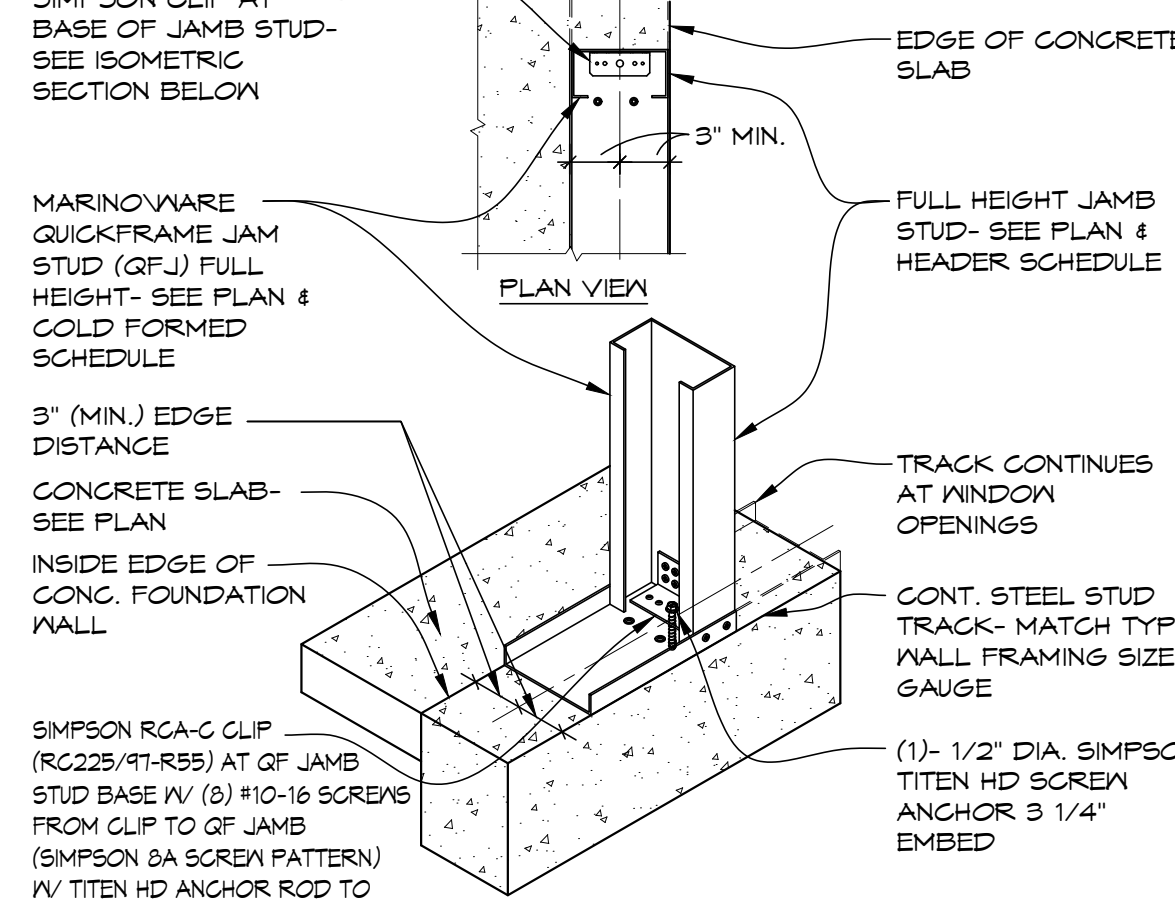


**4 HSS FRAME BEAM END BRG ATOP HSS COLUMN**  
S401 SCALE: 3/4"=1'-0"

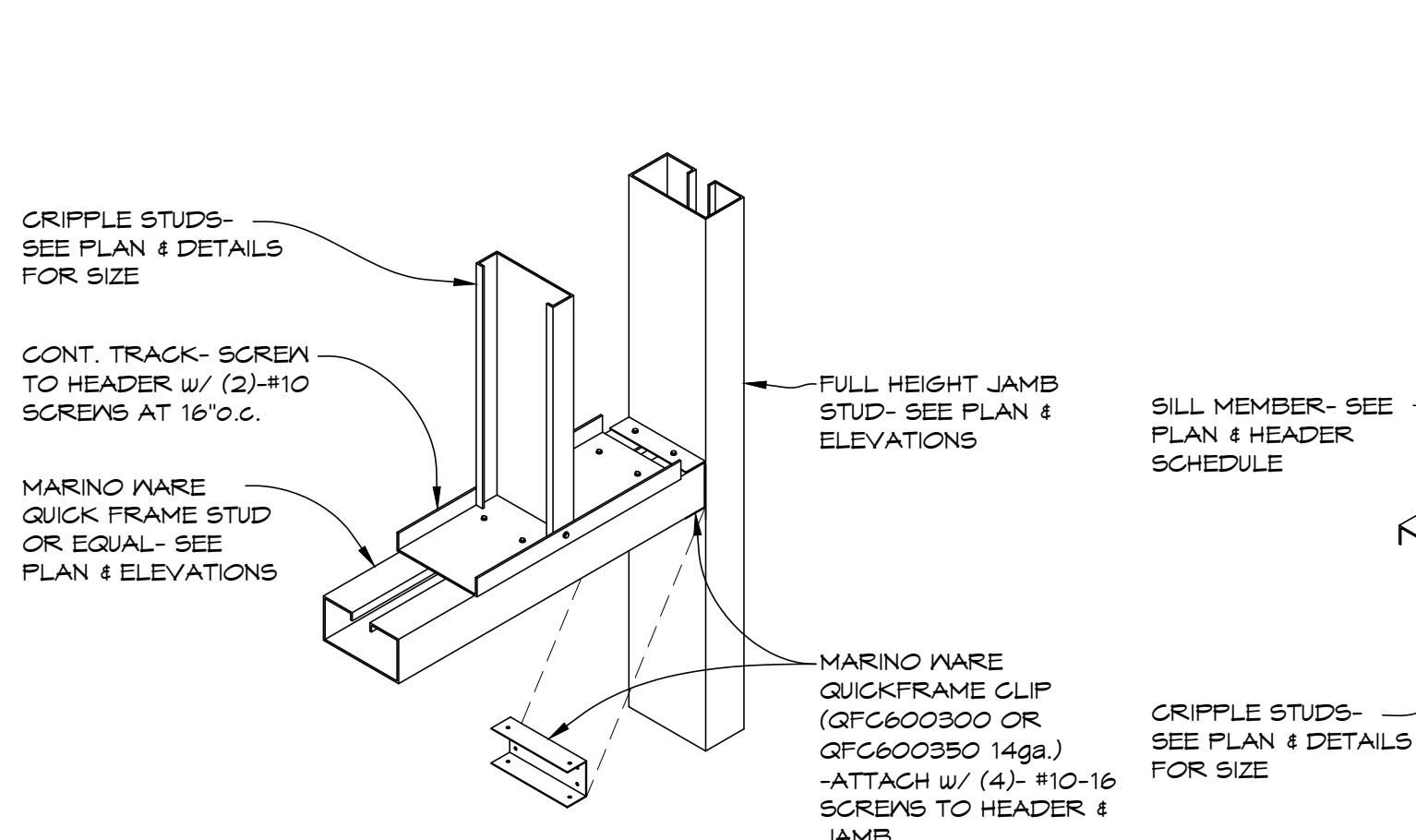


**8 TYP. STEEL STUD STRAPPING DETAIL**  
S401 SCALE: 3/4"=1'-0"

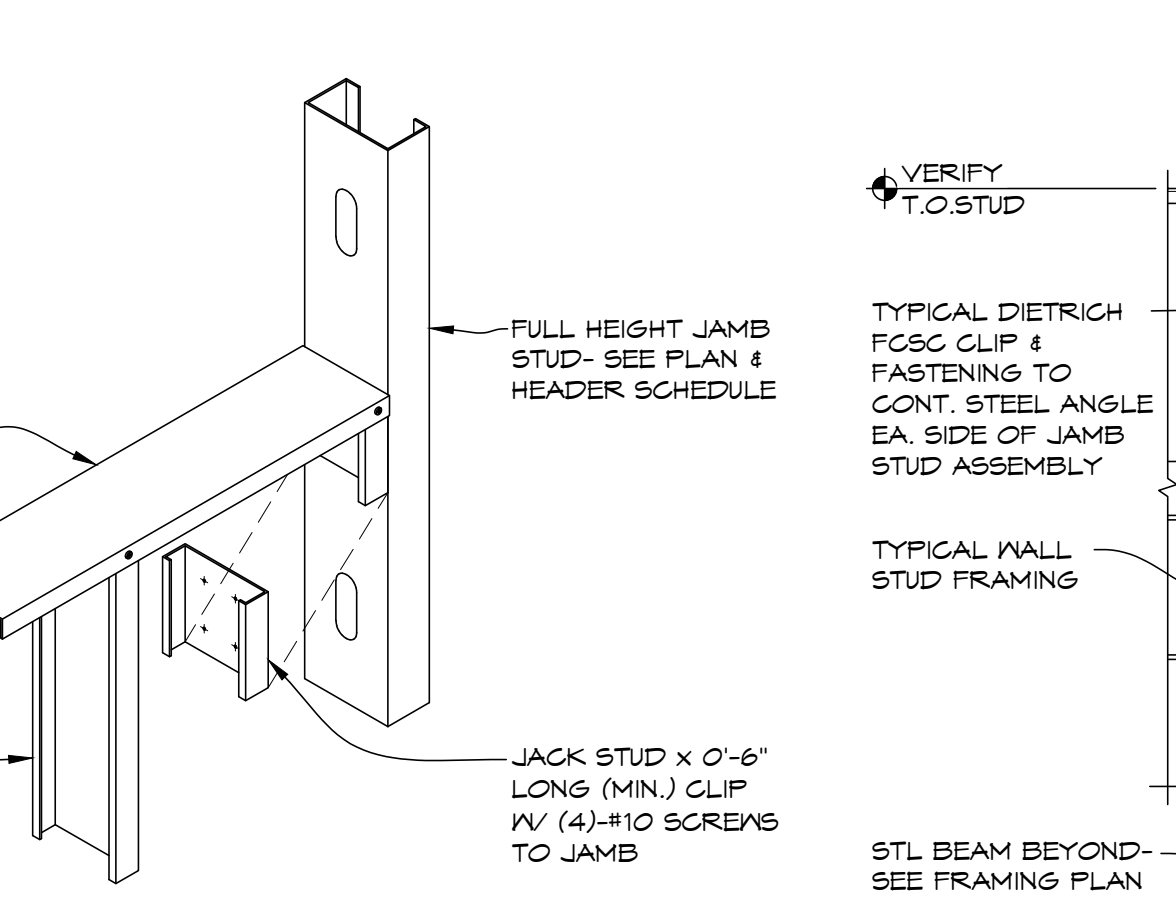
**5 HSS FRAME BEAM BRG ATOP HSS COLUMN**  
S401 SCALE: 3/4"=1'-0"



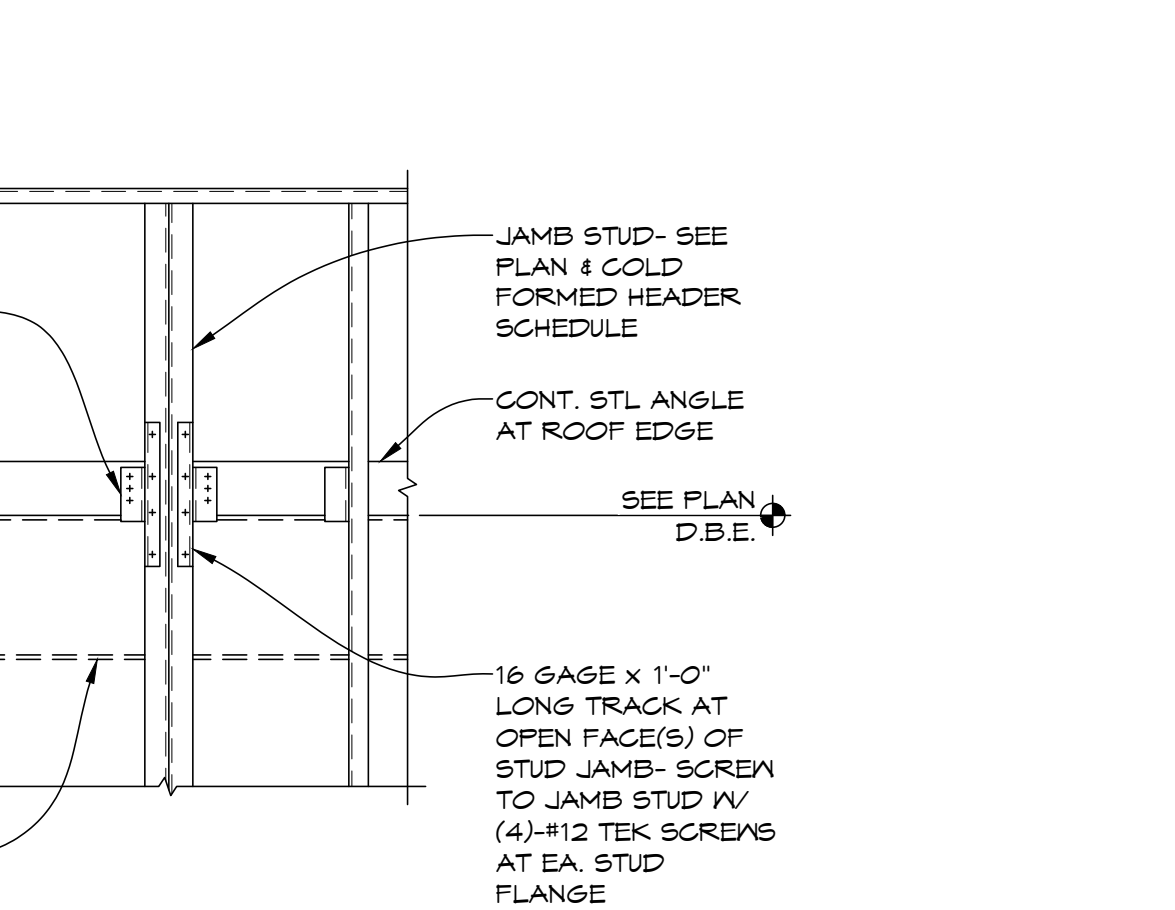
**6 TYPICAL TYPE 1A BEAM CONNECTION**  
S401 SCALE: 3/4"=1'-0"



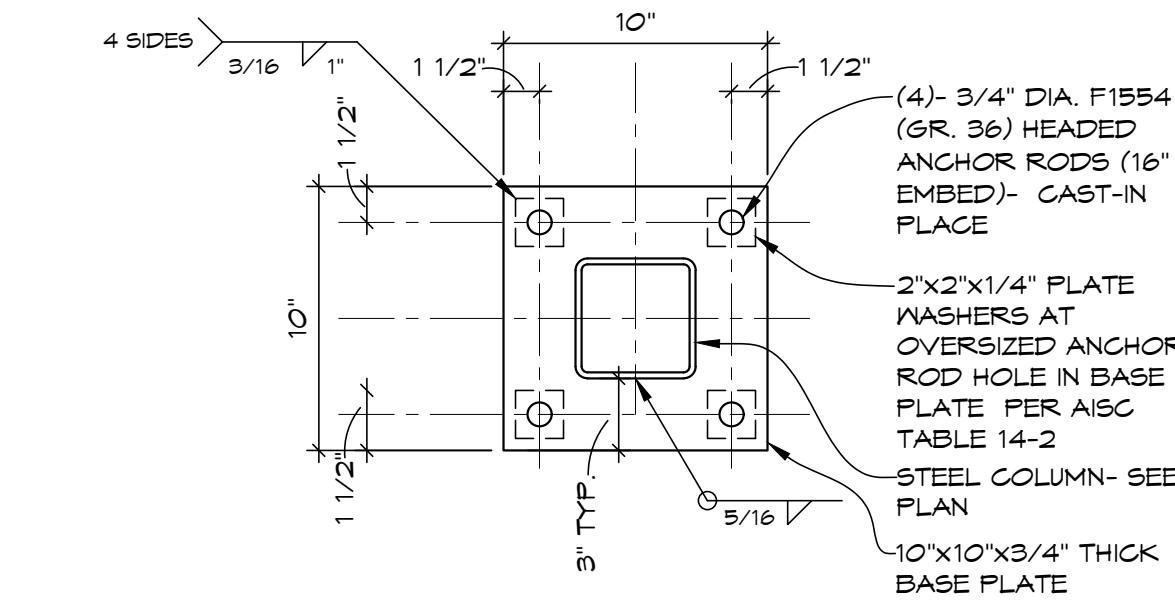
**9 COLD FORMED TRACK SILL TO JAMB CONN.**  
S401 SCALE: NO SCALE



**10 NON-LOAD BRG HDS HEADER TO JAMB CONN.**  
S401 SCALE: NO SCALE



**9 COLD FORMED TRACK SILL TO JAMB CONN.**  
S401 SCALE: NO SCALE



**13 TYPICAL "TYPE 1" COLUMN BASE PLATE**  
S401 SCALE: 3/4"=1'-0"

**10 NON-LOAD BRG HDS HEADER TO JAMB CONN.**  
S401 SCALE: NO SCALE



**11 COLD FORMED TRACK SILL TO JAMB CONN.**  
S401 SCALE: NO SCALE



**12 STEEL STUD JAMB BYPASS CONNECTIONS**  
S401 SCALE: NO SCALE



#	DATE	DESCRIPTION

**Bartlett & West**  
3466 E CENTURY AVENUE - BISMARCK, ND 58503  
PHONE: 785-272-2252  
www.bartlettwest.com

**FRAMING DETAILS**  
MR&I OFFICE REMODEL  
W CAUSEWAY RD, FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
DEREK J. KOST  
PE 6638  
DATE 10/1/24  
NORTH DAKOTA

DESIGNED BY: DJK  
DRAWN BY: RWB / DJK  
APPROVED BY: DJK  
DESIGN PROJ: 12493.700  
CWS PROJ: C2379A  
SCALE: AS NOTED  
DATE: OCT. 2024  
DRAWING NO: S401  
SHEET NO: of

**CWSTRUCTURAL ENGINEERS**  
1000 E. GALBARY AVE, SUITE 2  
BISMARCK, NORTH DAKOTA 58503  
701.221.3286  
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Last edit on: 10/7/2024 2:07 PM by: ##### Drawing Name: Z:\C\Structural\CV\Projects-23\CP29 - Bartlett & West\C2379A-MR&I Office Remodel\Structural Drawings\Working Drawings\C2379A-Standing Rock\Water On-Bldg\Rev\Est\dwg Layout Name: S501 Plotted By: ##### Plotted on: 10/7/2024 2:14:16 PM

GENERAL STRUCTURAL NOTES

GENERAL DESIGN AND CONSTRUCTION:

- (1) All work shall comply with the 2021 International Building Code (IBC 2021).
(2) Design Loads:

Project Location: Fort Yates, ND

Wind loads: Per ASCE 7, Exposure Category "C", lw = 1.0
Basic wind speed (Mapped 3-second gust) = 112 mph (Risk Category II)

Snow Load: Per ASCE 7 [Also see plan for potential additional snow drifting]
Calculated Roof Snow, Pf = 35 psf
Ground Snow (Mapped), Pg = 50 psf, Is = 1.0, Ce = 1.0, Ct = 1.0

Seismic loads per ASCE 7 (Fort Yates, ND)
Site class = D (Assumed), Ss = 0.06, S1 = 0.024, Ie=1.0
Site coefficient, Fa = 1.6, Site coefficient, Fv = 2.4
Seismic Design Category A

Roof Dead Load:
Roof Structure (Framing & Decking) Self Weight = 10 psf
Roof Collateral Dead Load = 10 psf

- (3) Specific notes and details shall take precedence over General Structural Notes.
(4) The contract structural drawings and specifications represent the finished structure. Unless otherwise indicated, they do not indicate the means or method of construction.
(5) Means-and-methods including temporary bracing and shoring against wind and erection is the responsibility of the contractor.
(6) No area of the structure shall be loaded with construction material or equipment that exceeds final design loading indicated.
(7) Verify location of box-outs and openings with mechanical and electrical contractors.
(8) Holes, pipes, sleeves, etc. through structural framing and foundations that are not shown on the drawings are not acceptable.
(9) Structural engineer's seal on the plan does not provide for construction inspection.
(10) The cost for additional structural engineering services necessitated by contractor requests for an option or due to errors or omissions in construction shall be the contractor's responsibility.
(11) Shop drawings prepared by suppliers, subcontractors, etc. shall be dimensioned, reviewed, coordinated, and signed/stamped by the general contractor prior to submitting to the structural engineer.
(12) Verify all dimensions and conditions of existing construction to be as shown on the drawings.
(13) Protect existing construction from damage due to construction of new additions.
(14) All necessary egress exit/entry doors must be constructed and maintained to operate freely at all times providing egress from the building as well as satisfying and maintaining any and all ADA requirements.
(15) CWSTRUCTURAL may provide periodic observations to assure conformance with design intent of the construction documents.

STATEMENT OF SPECIAL INSPECTIONS:

- (1) Special inspections and structural testing shall be provided by an independent agency employed by the Owner, unless specified differently in project specifications, for the items identified in this section and in other areas of the approved construction plans and specifications, unless waived by the Building Official (see IBC Chapter 17).

Or

- (2) The names and credentials of the Special Inspectors to be used shall be submitted to the Building Official for approval.
(3) Duties of the Special Inspector:
a. The Special Inspector shall review all work listed below for conformance with the approved construction plans and specifications and the IBC.
b. The Special Inspector shall furnish special inspection reports to the EOR, Contractor, Owner and Building Official on a weekly basis, or more frequently as required by the Building Official.
c. Once corrections have been made by the Contractor, the Special Inspector shall submit a final signed report to the Building Official stating that the work requiring special inspection was, to the best of the Special Inspector's knowledge, in conformance with the approved construction plans and specifications as well as the applicable workmanship provisions of the IBC.
(4) Duties and responsibilities of the Contractor:
a. The Contractor shall submit a written statement of responsibility to the Owner and the Building Official prior to the commencement of work.
b. The Contractor shall notify the responsible Special Inspector that work is ready for inspection at least one work day (24 hours minimum) before such inspection is required.
c. All work requiring special inspection shall remain accessible and exposed until it has been observed by the Special Inspector.

(1) REQUIRED SPECIAL INSPECTIONS (Per IBC 2021):

CONCRETE (IBC Section 1705.3): Special inspections to be performed per "Required Special Inspection of Concrete Construction" table located within these construction documents and also called out in the IBC table 1705.3. (Exception: Special inspections are not required for concrete in the following cases:

- 1) Isolated spread concrete footings of buildings three stories or less above grade plane that are fully supported on earth or rock.
2) Continuous concrete footings supporting walls of buildings three stories or less above grade plane that are fully supported on earth of rock where:
1.1) The footings supporting walls of light-framed construction
1.2) The footings are designed in accordance with Table 1809.7 of the IBC.
1.3) The structural design of the footing is based on a specified compressive strength, fc, not more than 2,500psi, regardless of the compressive strength specified in the approved construction documents or used in the footing construction.
3) Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi.
4) Concrete foundation walls constructed in accordance with Table 1807.1.6.2.
5) Concrete patios, driveways and sidewalks, on grade.)

WIND-RESISTING COMPONENTS (IBC Section 1705.11.3): Periodic special inspection is required for fastening of the following systems and components:

- 1.) Roof coverings, roof deck, and roof framing connections.
2.) Exterior wall covering, and wall connections to roof and floor diaphragms and framing (i.e. Wood Studs, Steel Studs, CMU walls, etc.)

SOIL (IBC Section 1705.6): Special inspections to be performed per Table 1705.6 located both in the IBC and within these

construction documents.

STRUCTURAL STEEL & STEEL JOISTS (IBC Section 1705.2, 1705.11, & 1705.12, and AISC 360): Special inspections to be performed per "Required Special Inspection of Structural Steel" table located within these construction documents and also called out in the IBC & AISC.

- (6) Please see the "Special Inspection Schedules/Tables" for the types, extents and frequency of specific items requiring special inspections and structural tests as part of this project. Inspections and testing indicated in the special inspection tables are guidelines to the required inspection and testing required by the building code for the particular building.
FOUNDATIONS:
(1) Assumed Geotechnical Design Values - All concrete foundation designs are based on assumed geotechnical design values to be confirmed by a geotechnical engineer.

FOUNDATIONS:

- (1) Assumed Geotechnical Design Values - All concrete foundation designs are based on assumed geotechnical design values to be confirmed by a geotechnical engineer.
A. Minimum Soil Bearing Capacity = 1500 psf
B. Backfill Soil Unit Weight (γ) = 110 pcf (dry)
(1) All footings shall bear on natural, undisturbed soil.
(2) All seepage shall be continuously pumped from excavations until the Geotechnical Engineer of Record determines such seepage no longer impacts the bearing soils or Engineered Fill or construction of footings and floor slabs.
(3) Positive drainage shall be obtained away from the structures and care required for backfilling and drainage of utility trenches during construction shall be provided per the Geotechnical Report and the Civil drawings.
(4) Excavations shall be performed in accordance with all governing safety regulations including OSHA.
(5) A 6" thick aggregate base course acting as a capillary break and a vapor barrier shall be placed below all interior slabs-on-grade per the Geotechnical Report and the project specifications.
(6) Clean footing excavations of snow, water, mud, loose soil and debris prior to placing footing concrete.
(7) Footings may not be earth formed.
(8) All footings are centered under the steel columns or walls they support, except as noted otherwise.
(9) Excavations and backfill shall be executed and tested in accordance with the project specifications and soils report.
(10) Footing excavations shall be to proper line and level to insure minimum concrete cover of footing reinforcement for footing depth.
(11) Backfill shall be compacted by mechanical means.
(12) Place all backfill according to the project specifications.
(13) Protect all foundations from the action of water and freezing.
(14) See mechanical, electrical and architectural drawings for all openings and inserts not shown on the structural drawings.

CONCRETE:

- (1) Concrete mix design(s) shall be by an independent testing laboratory and shall be submitted to the Architect and Structural Engineer for approval.
(2) Concrete Mix Designs:
Footings are to have a concrete mix design consisting of Portland Type I/II cement (5 sack min.) and a 28-day compressive strength of 4500 psi, 25% max fly ash allowed, 3/4" max aggregate size, 4" max slump, 0.50 max water-to-cement ratio, no air entrainment, water reducing admixture ok.
Foundation Walls are to have a concrete mix design consisting of Portland Type I/II cement (6 sack min.) and a 28-day compressive strength of 4500 psi, 25% max fly ash allowed, 3/4" max aggregate size, 4" max slump, 0.48 max water-to-cement ratio, 5% to 7% air entrainment, water reducing admixture ok, mid range plasticizer ok, super plasticizer requires prior approval.
Interior Slabs-on-Grade are to have a concrete mix design consisting of Portland Type I/II cement (5 sack min.) and a 28-day compressive strength of 4500 psi, 25% max fly ash allowed, 3/4" max aggregate size, 4" max slump, 0.48 max water-to-cement ratio, no air entrainment, water reducing admixture ok, mid range and super plasticizer requires prior approval.
Exterior exposed elevated slabs (Stoop slabs) are to have a concrete mix design consisting of Portland Type I/II cement (6 sack min.) and a 28-day compressive strength of 4,500 psi, 30% max fly ash (Note: fly ash will retard initial set time), 3/4" max aggregate size, 3" max slump, 0.41 max water-to-cement ratio, 5% to 7% air entrainment, water reducing admixture ok, mid range ok, super plasticizer requires prior approval.
Grout for steel base plates and bearing plates is to be of the non-shrink non-metallic type meeting ASTM C1107 with a maximum slump of 3" and a minimum 28-day compressive strength of 5000 psi.
(3) Concrete aggregate shall meet ASTM C33 with a maximum shale or deleterious material content of 1%.
(4) Portland cement shall meet ASTM C150 and shall be low Alkali.
(5) Fly Ash of "Type C meeting Class F" may be substituted by weight for cement up to maximum limits indicated in each concrete mix design.
(6) Mid-Range Plasticizer meeting ASTM C494 Type D is acceptable if noted in mix design.
(7) Air Entraining agents shall meet ASTM C260.
(8) Concrete construction shall conform to the ACI building code requirements for reinforced concrete, ACI 318.
(9) Hot Weather Concreting per ACI 305R and Cold Weather Placement per ACI 306R shall be followed where weather conditions warrant.
(10) Slabs shall be cured with a curing compound as indicated in the specifications and per the recommendations of the ACI code relative to exposure to sunlight, wind, temperature, etc.
(11) Forms shall be left on all walls for a minimum of 2 days or longer as required at the discretion of the contractor.
(12) A continuous bond break, such as 3/8" asphaltic fiber board expansion joint material, shall be placed between the concrete slab and the perimeter foundation walls.
(13) All concrete pours shall be tested for strength (per ASTM C31 and C39), slump and air content.
(14) All concrete reinforcing shall meet ASTM specification A615, Grade 60.
(15) Reinforcing steel shall be bent and placed in accordance with the ACI code.

(16) Provide adequate support bars and accessories to hold all rebar firmly in place.

- (17) All slabs are to be reinforced with bars located as called out on structural drawings.
(18) Concrete cover for reinforcing shall be per ACI 318.
(19) Slabs-on-grade are to be reinforced as shown on plans and details.
(20) Openings in concrete shall be reinforced with (2)- #5 bars each side, extending 30" past the face of the opening unless otherwise noted.
(21) Interior concrete slabs-on-grade must not be allowed to freeze after pouring.
(22) All reinforcing specified for interior slabs-on-grade and elevated slabs shall be supported adequately and firmly on chairs to maintain the clear distances specified.
(23) All vertical wall and pier bars must be extended to within 2" of the top of foundation walls unless shown otherwise on the drawings.
(24) All epoxy-set rebar doweling to concrete shall be HILTI HIT-HY 200 Safe Set System with HILTI Hollow Drill Bit System, except as noted otherwise.

STRUCTURAL STEEL:

- (1) Structural steel work is to be per AISC specifications.
(2) Beams and columns shall be erected true and plumb.
(3) Bearing plates for steel beams and columns shall be dry packed with dry grout as specified.
(4) All bolts in structural steel connections shall be ASTM F3125, Group A, standard heavy hex head or twist-off tension control (TC) High-Strength bolts, except as noted otherwise.
(5) All anchor rods for structural steel columns shall be ASTM F1554, Grade 36 (Fy=36ksi) threaded rod with a nut on the embedded end as indicated on the drawings.
(6) All screw anchors shall be carbon steel HILTI KWIK HUS-EZ, except as noted otherwise.
(7) All epoxy-set threaded rod anchorage to concrete shall be HILTI HIT-HY 200 Safe Set System with carbon-steel anchors (Anchors are to consist of HAS-B-105' (Fy=105 ksi) threaded rod material meeting ASTM 193, Grade B7 placed in holes cleaned with the Hilti Hollow Drill Bit System, except as noted otherwise).
(8) No field welds are to be made until the members are properly aligned.
(9) Shop welds for 50% of the beam moment splices shown on the details shall be shop inspected and tested by Magnetic Particle Inspection (MT).

STEEL DECKING:

- (1) Metal deck is to be manufactured and erected in accordance with the Steel Deck Institute (SDI) specification.
(2) 1 1/2" steel roof decking is to have a minimum design yield strength of Fy=33 ksi and shall be fastened with support fasteners of #12 Tek screws in an SDI 36/7 fastener pattern at end members & interior supports.
(3) Steel deck panel ends (other than butted VLI composite decking) must overlap a minimum of 2".
(4) Powder-actuated deck fasteners may be substituted for indicated Tek screws at supports with approval of structural engineer of record.
(5) 5/8" diameter puddle welds may be substituted for indicated Tek screws at supports decking supports (welding washers are required for decking less than 0.028" thick).

COLD-FORMED METAL FRAMING (GENERAL):

- (1) Cold-formed framing members are to be provided as indicated on the structural drawings per standard nomenclature established by the American Iron and Steel Institute (AISI) identifying size, type and thickness of each member (studs, tracks, etc.)
(2) Prior to ordering, fabrication, and installation of cold-formed framing, the contractor shall submit manufacturer's product data of the cold-formed members and clips to the Architect and Structural Engineer for approval.
(3) Structural framing members shall be properly spaced, plumbed, leveled, squared, fit properly against abutting members and held securely in place until permanently fastened.
(4) Factory punch-outs are to be located along the centerline of the member web with a minimum center-to-center spacing of 24" o.c.
(5) Fastening of framing components shall be by screws, powder actuated fasteners, welding or a combination of methods.
(6) All welded connections shall be made with the latest recommendations of AISI (American Iron and Steel Institute) and the AWS (American Welding Society).
(7) Structural framing members having protective coating removed by welding or other fastening method shall have the coating repaired by painting with a zinc-rich primer.
(8) Structural framing tracks shall have web in contact with a uniform and level bearing surface and be securely anchored as specified in the contract documents or approved connection details.
(9) Temporary bracing of wall framing shall be provided by the contractor and removed only after permanent bracing is installed.
(10) WOOD PANEL SHEATHING - All exterior wood panel sheathing shall be Exposure 1 rated plywood or OSB sheathing conforming to DOC PS 1 or PS 2 with a 24/16 APA Span Rating. All panels shall be identified with a grade mark of certificate of inspection issued by an APA approved agency.

METAL BUILDINGS:

- (1) The existing metal building roof panel to be replaced across the entire building is to have its steel thickness (gage) and configuration (profile) verified, along with the existing fastener configuration. All replacement metal building roof panel is to meet or exceed the existing roof panel thickness and configuration for strength and fasteners are to be replaced at the same spacing as ensure existing supporting framing is braced as intended by the original metal building design to support the roof snow loads indicated. Contractor is to coordinate with metal building supplier providing the metal building roof panel.

Table with columns: #, DATE, DESCRIPTION

Bartlett & West logo and contact information: 3466 E CENTURY AVENUE - BISMARCK, ND 58503

GENERAL STRUCTURAL NOTES title block and MR&I OFFICE REMODEL W CAUSEWAY RD, FORT YATES, ND 58538

Professional Engineer Seal for DEREK J. KOST, PE 5638, dated 10/1/24

Design and drawing information: DESIGNED BY: DJK, DRAWN BY: RWB / DJK, APPROVED BY: DJK, DESIGN PROJ: 12493.700, CWS PROJ: C2379A, SCALE: AS NOTED, DATE: OCT. 2024, DRAWING NO: S501, SHEET NO: of



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REFERENCE NOTES:

GENERAL NOTES:

1. CONTRACTOR/S TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND/OR CONSTRUCTION.
2. THE DIVISION OF LABOR SHALL BE AS PER THE PROJECT SPECIFICATION MANUAL AND NOT THE NOTATION SYSTEM ON THE DRAWINGS.
3. EXTERIOR DIMENSIONS ARE TO THE FACE OF WALL AND TO GRID LINE UNLESS OTHERWISE NOTED.
4. TOPSOIL SHALL BE STRIPPED TO A MINIMUM DEPTH OF 6" AT ALL CONCRETE PAVEMENT AREAS.
5. REINFORCING STEEL SHALL BE GRADE 60 DEFORMED BARS WIRE MESH IS NOT ALLOWED.
6. CONCRETE SHALL BE MINIMUM 4000 PSI COMPRESSIVE STRENGTH AT 28 DAYS.

SITE PLAN

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

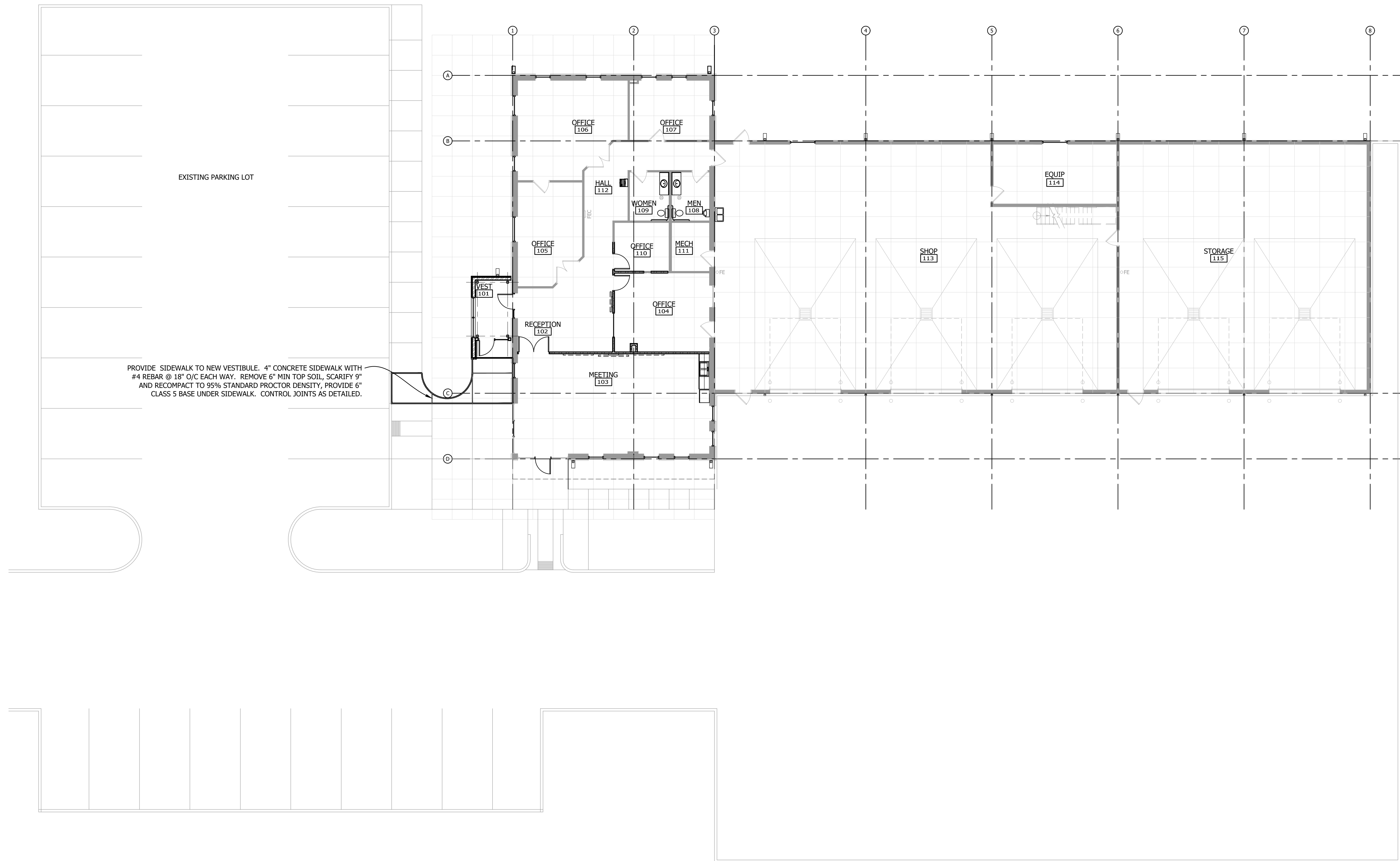


DESIGNED BY:	JPL
DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>A-011</b>
SHEET NO:	

**Bartlett & West**

3456 E CENTURY AVENUE - BISMARCK, ND 58503  
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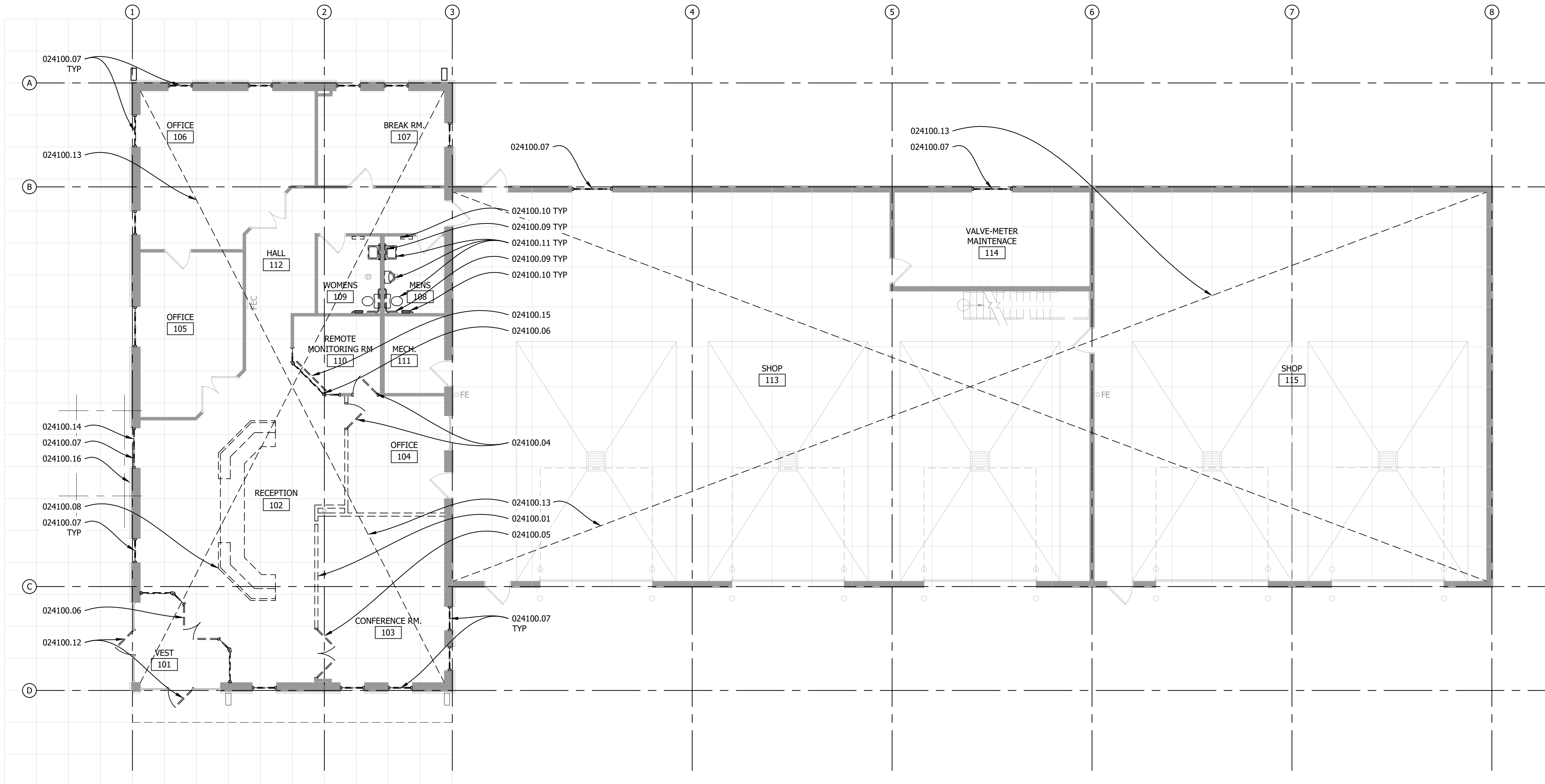
#	DATE	DESCRIPTION



PROVIDE SIDEWALK TO NEW VESTIBULE. 4" CONCRETE SIDEWALK WITH #4 REBAR @ 18" O/C EACH WAY. REMOVE 6" MIN TOP SOIL, SCARIFY 9" AND RECOMPACT TO 95% STANDARD PROCTOR DENSITY, PROVIDE 6" CLASS 5 BASE UNDER SIDEWALK. CONTROL JOINTS AS DETAILED.

**SITE PLAN**  
SCALE: 3/32"=1'-0"  
10 12

REMOVAL SCHEDULE					
ROOM NO	AREA (SF)	DEMO FLOOR		DEMO CEILING	
		MATL	BASE	MATL	HEIGHT
101	109	VCT	RCB	ACT	9'-0"
102	678	CPT	RCB	ACT	9'-0"
103	328	CPT	RCB	ACT	9'-0"
104	176	CPT	RCB	ACT	9'-0"
105	245	CPT	RCB	ACT	9'-0"
106	377	CPT	RCB	ACT	9'-0"
107	185	VCT	RCB	ACT	9'-0"
108	72	--	RCB	GWB CLG	9'-0"
109	75	--	RCB	GWB CLG	9'-0"
110	103	CPT	RCB	ACT	9'-0"
111	72	--	--	--	--
112	302	CPT	RCB	ACT	9'-0"
113	3569	--	--	--	--
114	287	--	--	--	--
115	2386	--	--	--	--
201	287	--	--	--	--



REFERENCE NOTES:	
#	DESCRIPTION
024100.01	REMOVE AND DISPOSE OF WALL/S AS INDICATED. PREP AND CLEAN FLOOR FOR NEW FINISHES.
024100.04	REMOVE AND DISPOSE OF DOOR AND FRAME ASSEMBLIES AS INDICATED. SALVAGE AND STORE DOOR WINDOW BLINDS.
024100.05	REMOVE AND SALVAGE DOOR, FRAME, HARDWARE AND BLINDS AS INDICATED.
024100.06	REMOVE AND DISPOSE STOREFRONT/GLAZING ASSEMBLIES AND RELATED FINISHES. PREP AND CLEAN SURFACES FOR NEW FINISHES.
024100.07	REMOVE AND DISPOSE OF WINDOW SYSTEM AND BLINDS AS INDICATED. PREP OPENING FOR NEW WINDOW.
024100.08	REMOVE AND DISPOSE OF CASEWORK / WORKSURFACE / FURNISHING AS INDICATED.
024100.09	REMOVE AND DISPOSE OF TOILET ACCESSORIES, MIRRORS, AND RELATED ITEMS. PREP AND CLEAN SURFACES FOR NEW FINISHES.
024100.10	REMOVE AND DISPOSE OF RECESSED TOILET PAPER HOLDER AND PAPER TOWEL DISPENSOR. PATCH GYPSUM WALL BOARD AND PREPARE FOR NEW WALL FINISHES.
024100.11	REMOVE AND DISPOSE OF PLUMBING FIXTURE/EQUIPMENT. SEE PLUMBING.
024100.12	REMOVE AND DISPOSE OF THE STOREFRONT DOOR AND PREPARE FOR NEW DOOR/GLAZING AS INDICATED ON THE PLAN.
024100.13	REMOVE AND DISPOSE OF METAL ROOFING, INSULATION, AND RELATED FLASHINGS, GUTTERS, DOWNSPOUTS, AND METAL SOFFIT. PREPARE FOR NEW ROOFING AND SOFFIT INSTALLATION. REPORT ANY WATER DAMAGE TO ARCHITECT/ENGINEER BEFORE COVERING.
024100.14	REMOVE AND DISPOSE OF WALL BELOW EXISTING WINDOW FOR NEW DOOR OPENING. REMOVE BRICK WAINSCOT AND TOOTH IN AT NEW OPENING. PREP AND CLEAN FOR NEW FINISHES.
024100.15	REMOVE AND TURN OVER TO OWNER SCADA MONITOR, STAND, AND COMPUTER. SEE ELECTRICAL.
024100.16	REMOVE AND DISPOSE OF METAL WALL PANELING AS NEEDED TO FACILITATE VESTIBULE INSTALLATION.

- GENERAL NOTES:**
- OWNER WILL OCCUPY PORTIONS OF THE BUILDING IMMEDIATELY ADJACENT TO AREAS OF WORK. CONDUCT WORK IN A MANNER THAT WILL MINIMIZE NEED FOR DISRUPTION OF OWNERS OPERATIONS.
  - PROVIDE TEMPORARY BARRIERS TO PROTECT OWNERS PERSONNEL AND GENERAL PUBLIC FROM INJURY DUE TO CONSTRUCTION WORK. TEMPORARY BARRIERS SHOULD KEEP OUT DUST AND CONSTRUCTION DEBRIS FROM OWNER OCCUPIED SPACES.
  - PROTECT FROM DAMAGE EXISTING FINISHES THAT ARE TO REMAIN IN PLACE.
  - CONTRACTOR SHALL VERIFY ALL EXISTING BUILDING DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE START OF WORK.
  - CONTRACTORS TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND/OR CONSTRUCTION.
  - SEE DEMO SCHEDULE FOR FLOOR AND CEILING DEMOLITION. PREP AND CLEAN ALL SURFACES TO RECEIVE NEW FINISHES.
  - INSPECT ROOFING INSULATION FOR MOLD AND WATER DAMAGE DURING DEMOLITION AND REPORT ANY FOUND DAMAGE TO ARCHITECT BEFORE COVERING.

**DEMO SCHEDULE ABBREVIATIONS**

ACT - REMOVE AND DISPOSE OF EXISTING ACOUSTICAL CEILING TILE AND GRID  
 GWB CLG - GYPSUM WALL BOARD CEILING  
 CPT - CARPET  
 PT - PORCELAIN TILE  
 RCB - RUBBER COVE BASE  
 VCT - VINYL COMPOSITE TILE

DESIGNED BY:	JPL
DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	A-101
SHEET NO:	

**GROUND LEVEL DEMOLITION PLAN**  
 SCALE: 1/8"=1'-0"  
 1 0 8



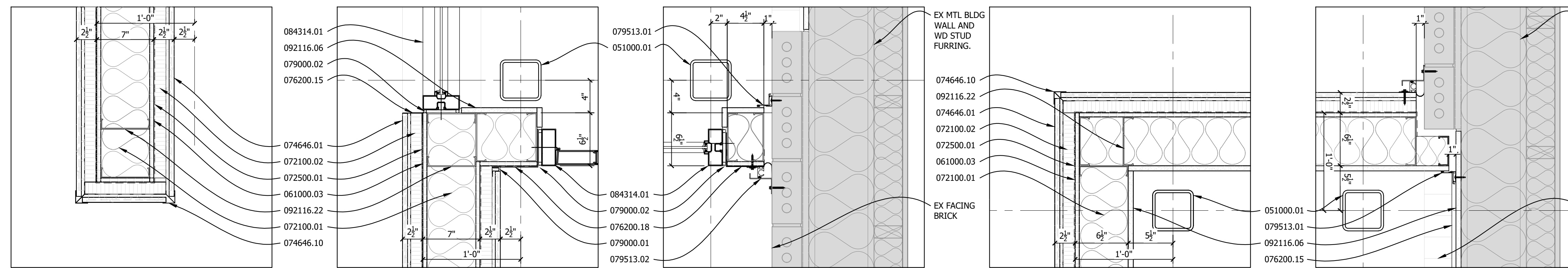
**DEMOLITION PLAN**  
**MR&I OFFICE REMODEL**  
**9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538**



Last edit on: 10/22/2024 5:11 PM by: JBN01642  
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**1 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"

**2 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"

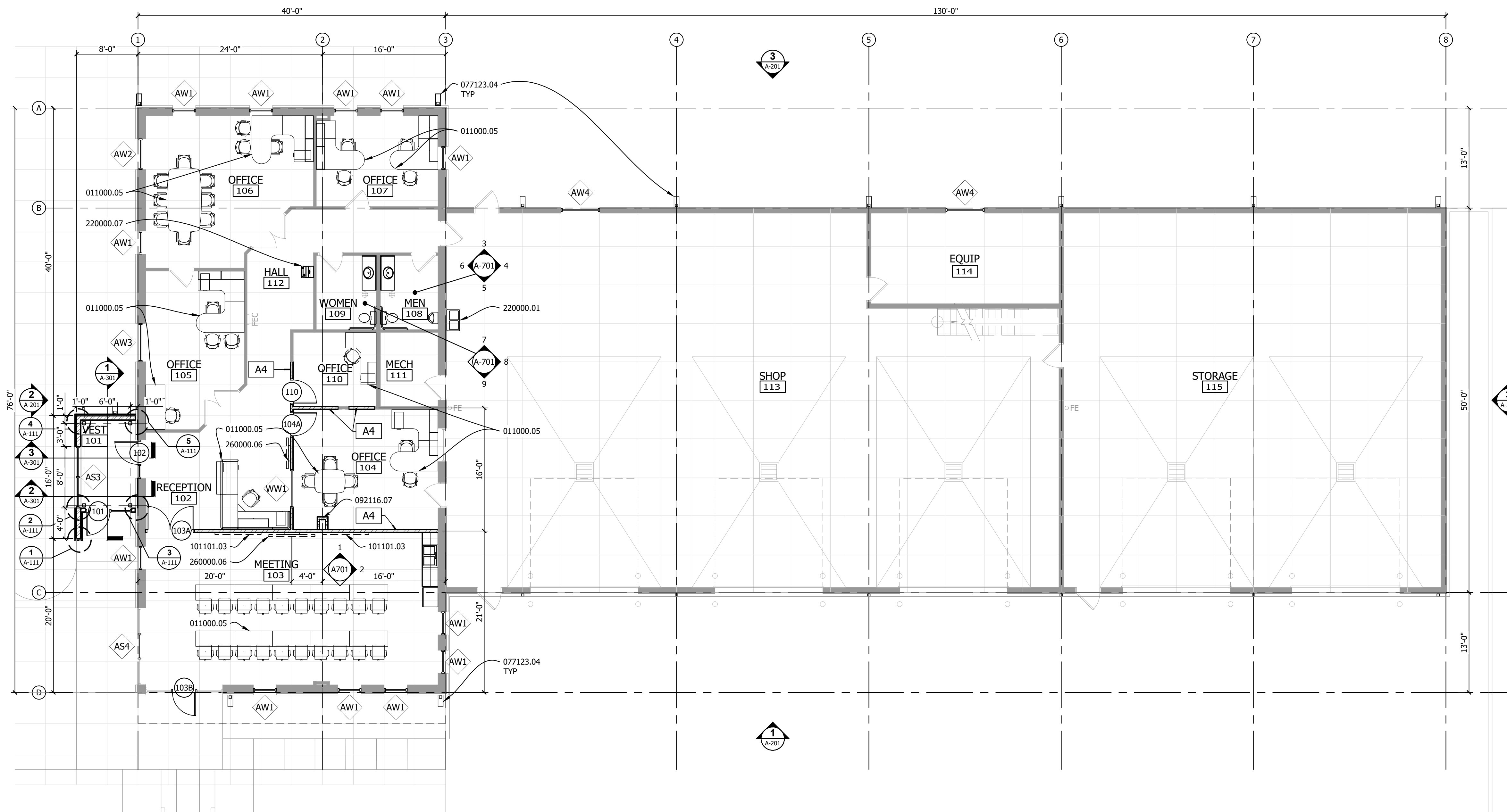
**3 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"

**4 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"

**5 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"

**REFERENCE NOTES:**

- 011000.05 OFFICE FURNISHINGS BY ALLOWANCE. GC TO PROVIDE DELIVERY AND INSTALLATION OF FURNISHINGS.
- 051000.01 STEEL COLUMN/BEAM.
- 061000.03 PLYWOOD SHEATHING.
- 072100.01 BATT INSULATION SYSTEM.
- 072100.02 1 1/2" RIGID WALL INSULATION SYSTEM.
- 072500.01 WEATHER BARRIER.
- 074646.01 CEMENT FIBER BOARD PANEL SYSTEM. FASTEN SYSTEM TO WALL STUDS BEYOND.
- 074646.10 CORNER KEY TRIM.
- 076200.15 BRAKE METAL FLASHING.
- 076200.18 PROVIDE BRAKE METAL FLASHING AT DOOR BLOCKING TO MATCH ADJACENT STOREFRONT SYSTEM.
- 077123.04 PRECAST CONCRETE SPLASH PADS.
- 079000.01 SEALANT.
- 079000.02 SEALANT AND BACKER ROD.
- 079513.01 1" INTERIOR WALL AND CEILING EXPANSION JOINT COVER.
- 079513.02 1" EXTERIOR WALL JOINT AND COVER.
- 084314.01 ALUMINUM-FRAMED STOREFRONT SYSTEM.
- 092116.06 5/8" GYPSUM BOARD.
- 092116.07 FIELD VERIFY EXISTING COLUMN LOCATION AND PROVIDE FURRING WALL.
- 092116.22 6" METAL STUDS 16" O.C.
- 101101.03 MARKERBOARD
- 220000.01 PLUMBING FIXTURE/EQUIPMENT. SEE PLUMBING.
- 220000.07 ELECTRIC WATER COOLER, SEE PLUMBING.
- 260000.06 MONITOR AND BRACKET. GC TO PROVIDE BLOCKING.



**GROUND LEVEL FLOOR PLAN**  
SCALE: 1/8"=1'-0"

**GENERAL NOTES:**

1. THIS IS A REMODEL TO AN EXISTING BUILDING. CONTRACTOR/S TO PROTECT ALL EXISTING ON-SITE CONDITIONS FROM ON GOING WORK.
2. CONTRACTOR SHALL VERIFY ALL EXISTING BUILDING DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE START OF WORK.
3. CONTRACTOR/S TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND/OR CONSTRUCTION.
4. THE DIVISION OF LABOR SHALL BE AS PER THE PROJECT SPECIFICATION MANUAL AND NOT THE NOTATION SYSTEM ON THE DRAWINGS.
5. EXTERIOR DIMENSIONS ARE TO THE FACE OF BLOCK WALL, METAL STRUCTURE, OR GRID LINE UNLESS OTHERWISE NOTED.
6. ALL PARTITIONS TO EXTEND TO DECK/STRUCTURE ABOVE UNLESS OTHERWISE INDICATED. ALL PARTITION GWB JOINTS TO BE TAPED FROM FLOOR TO DECK UNLESS OTHERWISE NOTED.
7. PROVIDE GYP BOARD CONTROL JOINT FROM A CORNER OF ALL INTERIOR DOOR FRAMES AND BORROWED LITES.
8. ALL TRADES ARE RESPONSIBLE FOR SEALING THEIR RESPECTIVE PENETRATIONS INCLUDING FIRE SEPARATIONS. SEE CODE PLANS.
9. SEE SHEET G-103 FOR PARTITION TYPES.

**FLOOR PLAN**

**Bartlett & West**

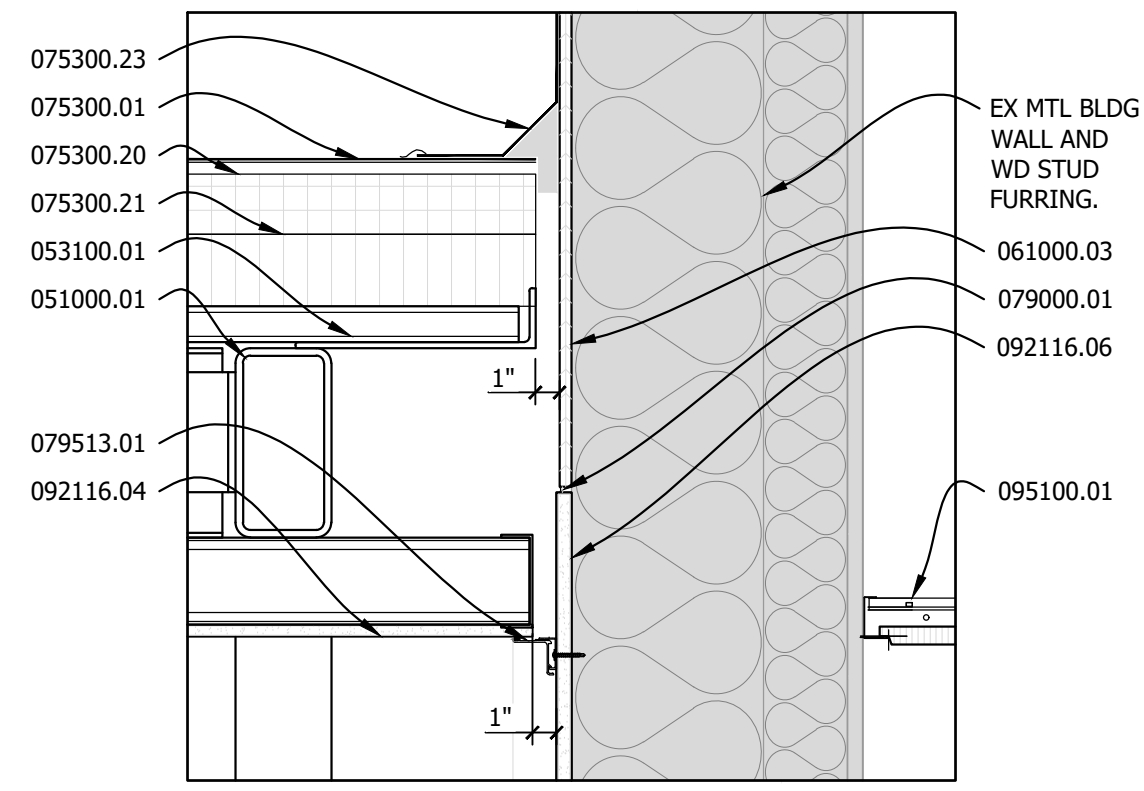
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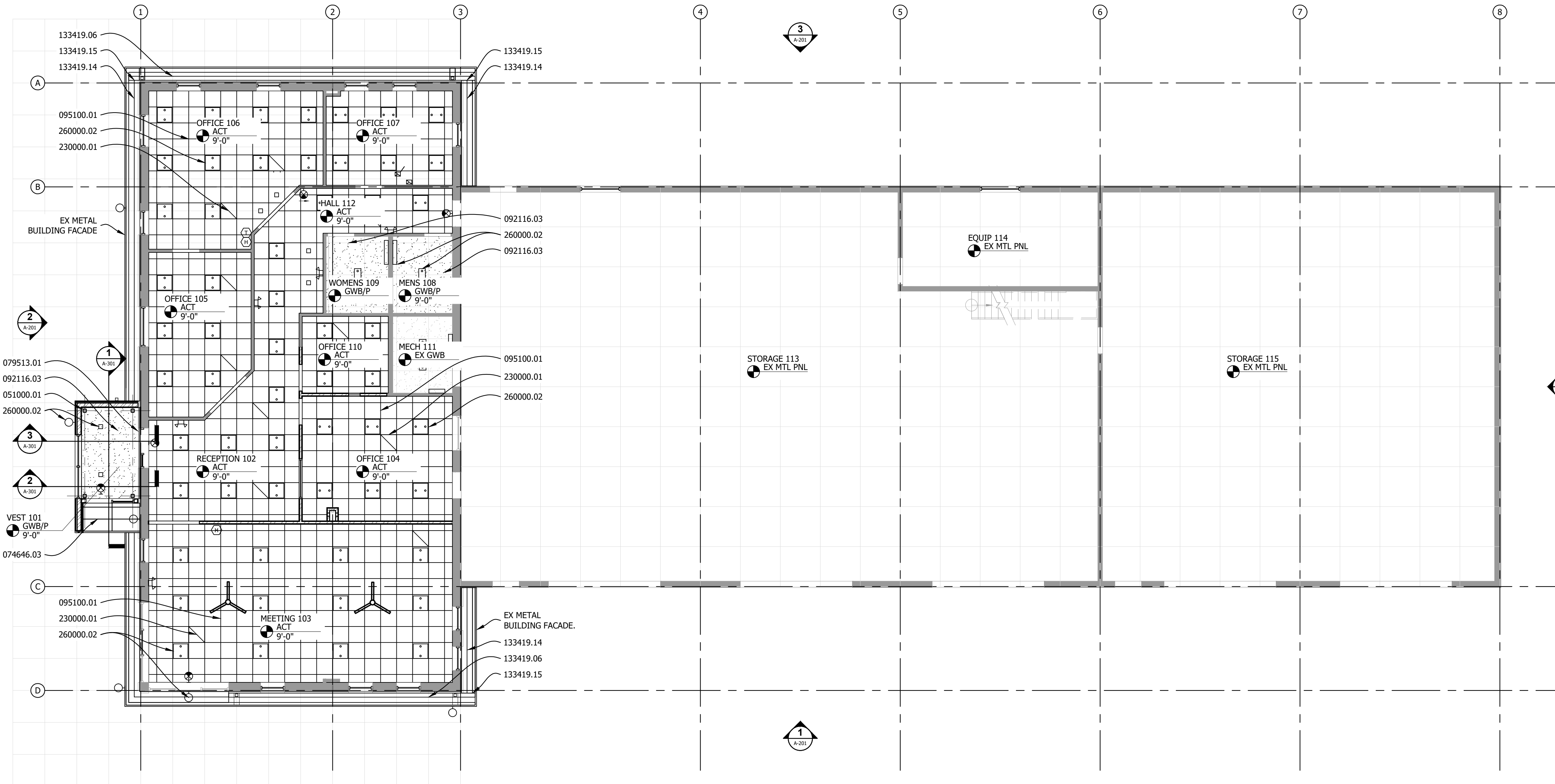
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DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
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SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>A-111</b>
SHEET NO:	

**9410 11TH AVE. SLAUGHTERHOUSE BAY RD., FORT YATES, ND 58538**





**1 WALL DETAIL**  
SCALE: 1 1/2"=1'-0"



**GROUND LEVEL REFLECTED CEILING PLAN**  
SCALE: 1/8"=1'-0"

**REFERENCE NOTES:**

#	DESCRIPTION
051000.01	STEEL COLUMN/BEAM.
053100.01	STEEL DECK. SEE STRUCTURAL
061000.03	PLYWOOD SHEATHING.
074646.03	CEMENT FIBER BOARD NON VENTED SOFFIT PANEL. FASTEN SYSTEM TO WALL STUD BEYOND.
075300.01	EPDM ROOFING SYSTEM. FULLY ADHERED.
075300.20	COVER BOARD.
075300.21	BASE AND TAPERED INSULATION.
075300.23	ROOF EXPANSION JOINT PER MANUFACTURES STANDARD DETAIL.
079000.01	SEALANT.
079513.01	1" INTERIOR WALL AND CEILING EXPANSION JOINT COVER.
092116.03	GYPSON BOARD CEILING, PAINTED.
092116.04	1/2" GYPSON BOARD CEILING OVER 3 5/8" METAL STUD.
092116.06	5/8" GYPSON BOARD.
095100.01	ACOUSTICAL CEILING TILE AND SUSPENSION GRID SYSTEM. COORDINATE WITH INSTALLATION OF MECHANICAL AND ELECTRICAL DEVICES.
133419.06	GUTTER AND DOWNSPOUT SYSTEM.
133419.14	METAL SOFFIT SYSTEM AND FLASHINGS AT EXISTING CONDITIONS.
133419.15	METAL SOFFIT CLOSURE PANEL, MATCH EXISTING.
230000.01	HVAC FIXTURE/EQUIPMENT. SEE MECHANICAL
260000.02	LIGHTING FIXTURE. SEE ELECTRICAL.

**GENERAL NOTES:**

- SEE MECHANICAL AND ELECTRICAL PLANS FOR DETAILED HVAC AND LIGHTING INFORMATION.
- COORDINATE CEILING PENETRATIONS WITH THE PLUMBING, MECHANICAL AND ELECTRICAL TRADES.
- COORDINATE CEILING SUSPENSION SYSTEMS WITH OTHER CEILING SPACE EQUIPMENT SUPPORTING DEVICES.

**REFLECTED CEILING PLAN ABBREVIATIONS**

- ACT - PROVIDE ACOUSTICAL CEILING TILE AND GRID
- EXIST - EXISTING CEILING SYSTEM TO REMAIN.
- GWB CLG - GYPSON WALL BOARD CEILING

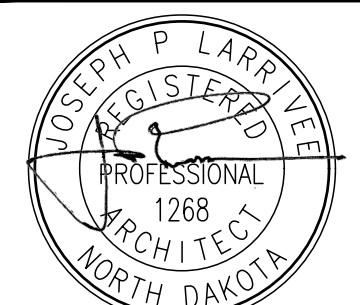
**RCP SYMBOL KEY**

- ROOM NAME AND NUMBER
- CEILING FINISH
- CEILING HEIGHT
- SUSPENDED LIGHT FIXTURE
- RECESSED DOWNLIGHT FIXTURE
- RECESSED LIGHT FIXTURE
- EXIT SIGN
- 2'-0" x 2'-0" ACOUSTIC TILE CEILING SEE SECTION 095100
- GYPSON BOARD CEILING SEE SECTION 092116
- EXPOSED STRUCTURE SEE ROOM FINISH SCHEDULE FOR FINISH
- SUPPLY AIR BY DIVISION 23
- RETURN AIR BY DIVISION 23

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**REFLECTED CEILING PLAN**

**MR&I OFFICE REMODEL**  
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<b>SHEET NO:</b>	<b>A-121</b>



REFERENCE NOTES:	
075300.01	EPDM ROOFING SYSTEM. FULLY ADHERED.
077100.01	PREFINISHED METAL COPING/FASCIA AND FLASHING SYSTEM (2 PART) W/ KEEPER. EXTEND ROOF MEMBRANE OVER WALL AND DOWN EXTERIOR FACE A MINIMUM OF 6".
077123.02	THRU-WALL SCUPPER AND DOWNSPOUT.
077123.03	OVERFLOW THRU-WALL SCUPPER AND DRIP EDGE. MOUNT 2" ABOVE FINISHED ROOF MEMBRANE.
077123.04	PRECAST CONCRETE SPLASH PADS.
077123.05	GUTTER AND DOWNSPOUT SYSTEM.
133419.05	STANDING SEAM METAL ROOF AND INSULATION SYSTEM.
133419.07	METAL ROOF TRIM.
133419.09	REPLACE METAL FACADE COPING. SLOPE TO DRAIN, MATCH EXISTING.
230000.01	HVAC FIXTURE/EQUIPMENT. SEE MECHANICAL

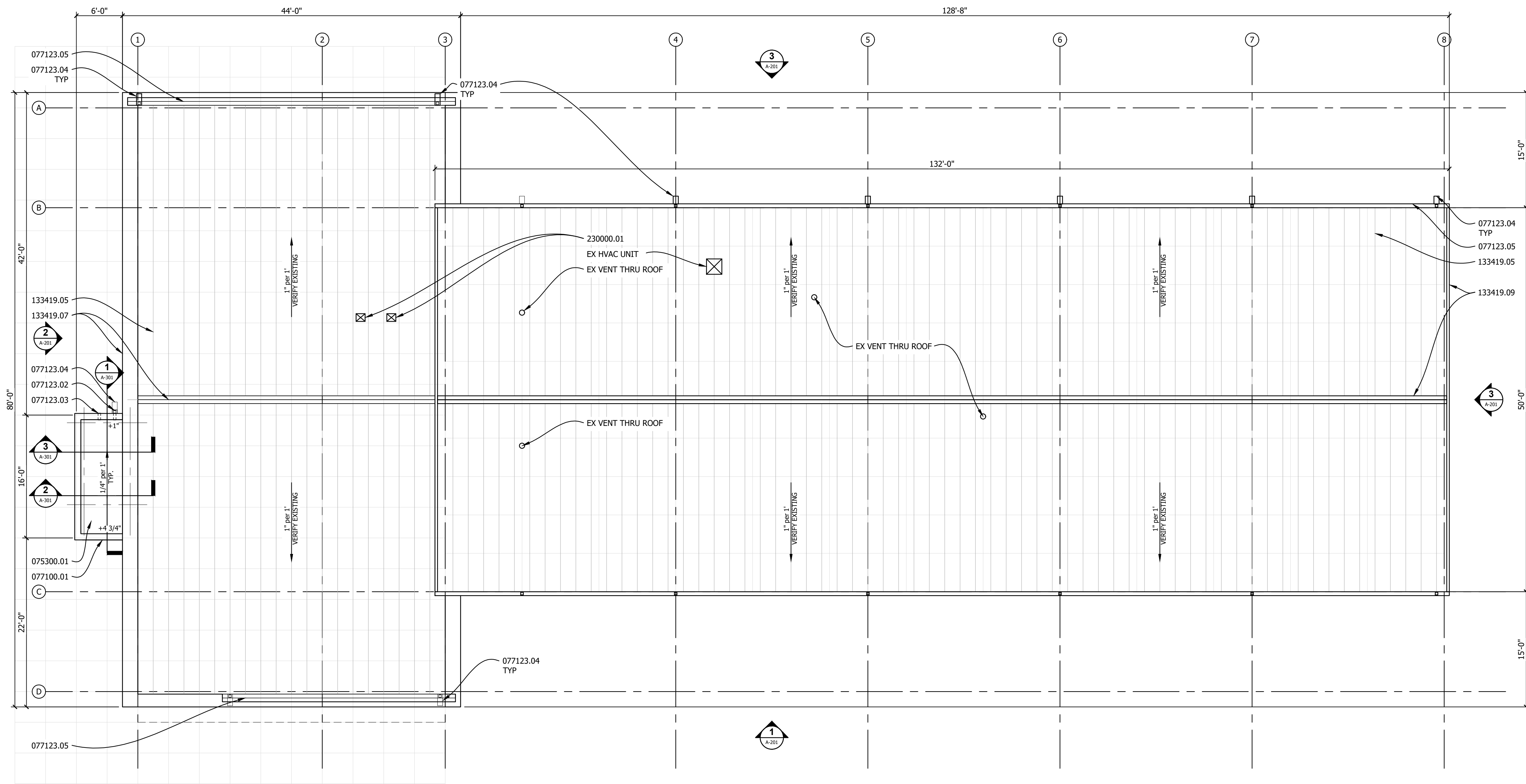
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<b>SHEET NO:</b>	<b>A-131</b>

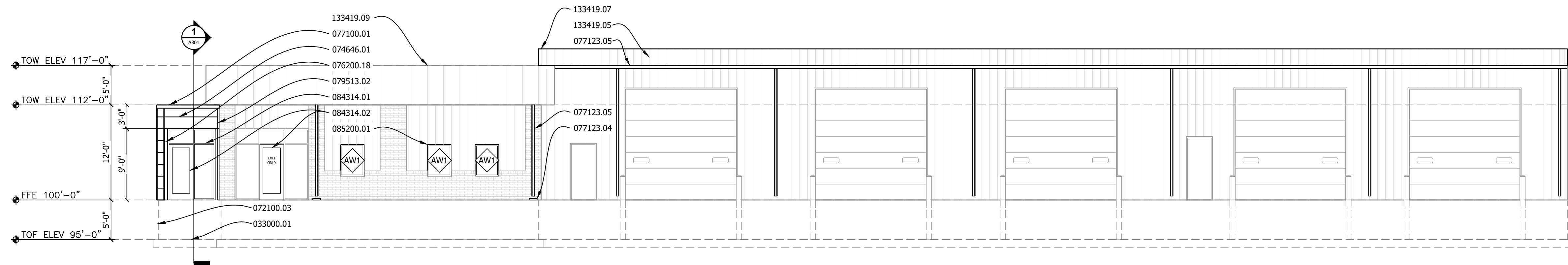
- GENERAL NOTES:**
- SLOPED ROOFS WILL BE STANDING SEAM METAL ROOFS SEE SPEC SECTION FOR DETAILED INFORMATION.
  - LOW SLOPE ROOFING TYPE IS FULLY ADHERED EPDM. SEE SPECIFICATION SECTION 'ELASTOMERIC MEMBRANE ROOFING' FOR DESCRIPTION AND LOCATIONS. COORDINATE INSTALLATION OF VAPOR RETARDED SYSTEM ON METAL AND/OR PRECAST CONCRETE DECKS. VAPOR RETARDED SYSTEM SHALL BE SUITABLE FOR COLD WEATHER APPLICATION.
  - 0" INDICATES TOP OF UNIFORM THICKNESS BOARD INSULATION. UNIFORM THICKNESS BOARD INSULATION TO BE 4" THICK PROVIDED IN TWO LIFTS MINIMUM.
  - POSITIVE ELEVATIONS INDICATE TOP OF TAPERED BOARD INSULATION. TAPERED BOARD INSULATION SHALL SLOPE AT 3" PER FOOT. TAPERED BOARD SHALL MEET THE ROOF SUMP WITH A MINIMUM THICKNESS OF 1".
  - THE G.C. SHALL PROVIDE MINIMUM 2X ROOF EDGE BLOCKING CONTINUOUS AT ENTIRE ROOF PERIMETER. G.C. TO PROVIDE BLOCKING THAT MEETS ROOFING MANUFACTURERS UPLIFT REQUIREMENTS.
  - ALL WOOD BLOCKING MATERIALS SHALL BE TREATED AND COMPATIBLE WITH OTHER ROOFING SYSTEMS AND MATERIALS.
  - ROOF CONTRACTOR SHALL REVIEW ARCHITECTURAL, MEP, AND STRUCTURAL DRAWINGS TO DETERMINE EXACT CONDITIONS AS THEY RELATE TO THE WORK. CONTRACTORS SHALL REVIEW THESE DRAWINGS AND COORDINATE WITH OTHER TRADES AS NECESSARY.
  - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ACCEPTED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND NRCA STANDARDS.
  - EXISTING ROOF PENETRATIONS SHALL BE FIELD LOCATED BY THE G.C.
  - INSPECT ROOFING INSULATION FOR MOLD AND WATER DAMAGE DURING DEMOLITION AND REPORT ANY FOUND DAMAGE TO ARCHITECT BEFORE COVERING.



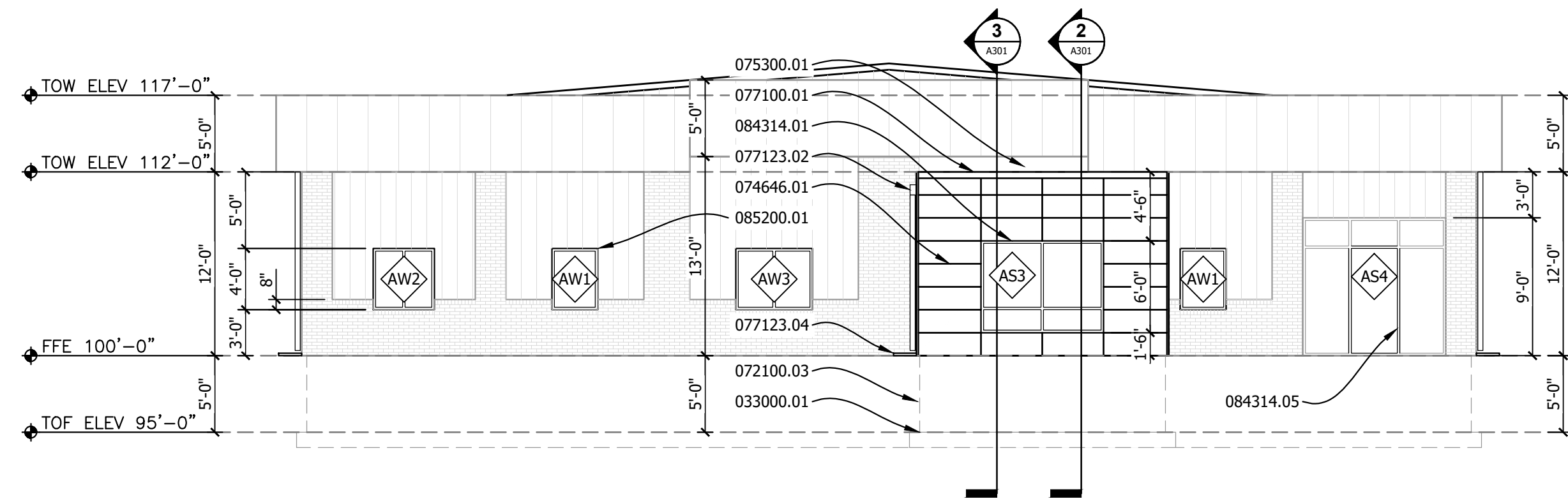
**ROOF PLAN**  
 SCALE: 1/8"=1'-0"  


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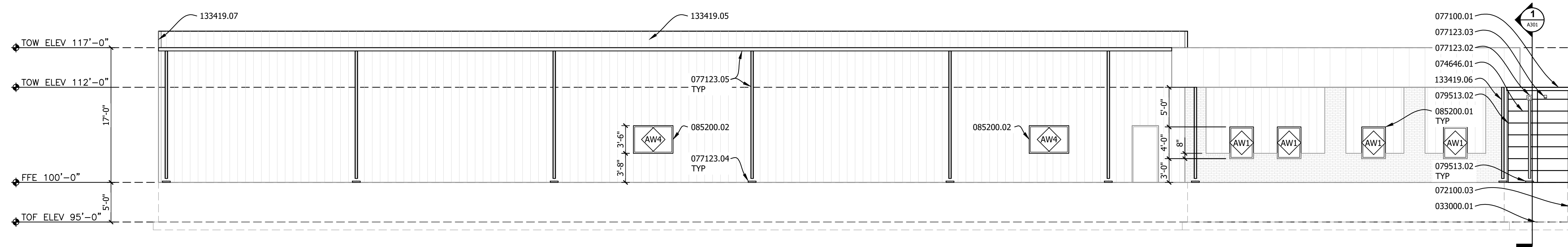
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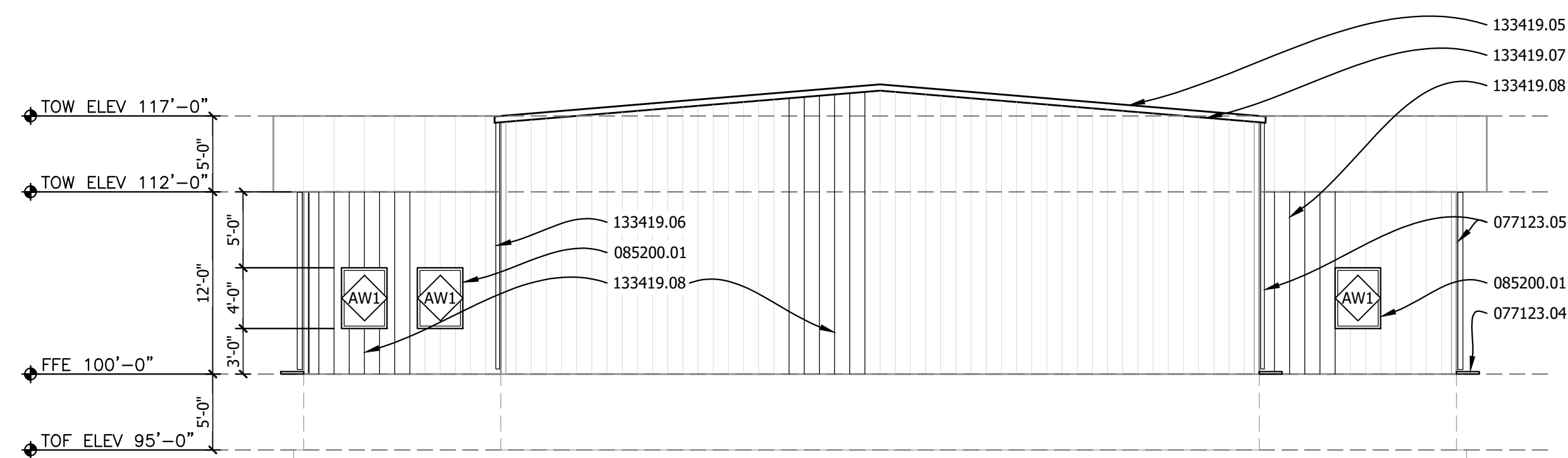
**1 SOUTH BUILDING ELEVATION**  
SCALE: 1/8"=1'-0"



**2 WEST BUILDING ELEVATION**  
SCALE: 1/8"=1'-0"



**3 NORTH BUILDING ELEVATION**  
SCALE: 1/8"=1'-0"



**4 EAST BUILDING ELEVATION**  
SCALE: 1/8"=1'-0"

REFERENCE NOTES:	
033000.01	CAST-IN-PLACE CONCRETE FOOTING/FOUNDATION WALL SYSTEM. SEE STRUCTURAL
072100.03	2" RIGID, FOUNDATION WALL INSULATION SYSTEM.
074646.01	CEMENT FIBER BOARD PANEL SYSTEM. FASTEN SYSTEM TO WALL STUDS BEYOND.
075300.01	EPDM ROOFING SYSTEM. FULLY ADHERED.
076200.18	PROVIDE BRAKE METAL FLASHING AT DOOR BLOCKING TO MATCH ADJACENT STOREFRONT SYSTEM.
077100.01	PREFINISHED METAL COPING/FASCIA AND FLASHING SYSTEM (2 PART) W/ KEEPER. EXTEND ROOF MEMBRANE OVER WALL AND DOWN EXTERIOR FACE A MINIMUM OF 6".
077123.02	THRU-WALL SCUPPER AND DOWNSPOUT.
077123.03	OVERFLOW THRU-WALL SCUPPER AND DRIP EDGE. MOUNT 2" ABOVE FINISHED ROOF MEMBRANE.
077123.04	PRECAST CONCRETE SPLASH PADS.
077123.05	GUTTER AND DOWNSPOUT SYSTEM.
079513.02	1" EXTERIOR WALL JOINT AND COVER.
084314.01	ALUMINUM-FRAMED STOREFRONT SYSTEM.
084314.02	PREFINISHED ALUMINUM DOOR.
084314.05	REPLACE EXISTING ALUMINUM DOOR STOREFRONT FRAMING WITH NEW FRAMING FOR GLAZING PANEL.
085200.01	FIXED ALUMINUM CLAD WOOD WINDOW.
085200.02	SLIDING ALUMINUM CLAD WOOD WINDOW.
133419.05	STANDING SEAM METAL ROOF AND INSULATION SYSTEM.
133419.06	GUTTER AND DOWNSPOUT SYSTEM.
133419.07	METAL ROOF TRIM.
133419.08	REPLACE DAMAGED MECHANICALLY FASTENED STEEL SIDING, MATCH PROFILE AND COLOR.
133419.09	REPLACE METAL FACADE COPING. SLOPE TO DRAIN, MATCH EXISTING.

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  - CONTRACTOR/S TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND/OR CONSTRUCTION.
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  - ALL PARTITIONS TO EXTEND TO DECK/STRUCTURE ABOVE UNLESS OTHERWISE INDICATED. ALL PARTITION GWB JOINTS TO BE TAPED FROM FLOOR TO DECK UNLESS OTHERWISE NOTED.
  - PROVIDE GYP BOARD CONTROL JOINT FROM A CORNER OF ALL INTERIOR DOOR FRAMES AND BORROWED LITES.
  - ALL TRADES ARE RESPONSIBLE FOR SEALING THEIR RESPECTIVE PENETRATIONS INCLUDING FIRE SEPARATIONS. SEE CODE PLANS.
  - SEE SHEET G-103 FOR PARTITION TYPES.



**ELEVATIONS**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



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DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
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SCALE:	AS NOTED
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DRAWING NO:	A-201
SHEET NO:	

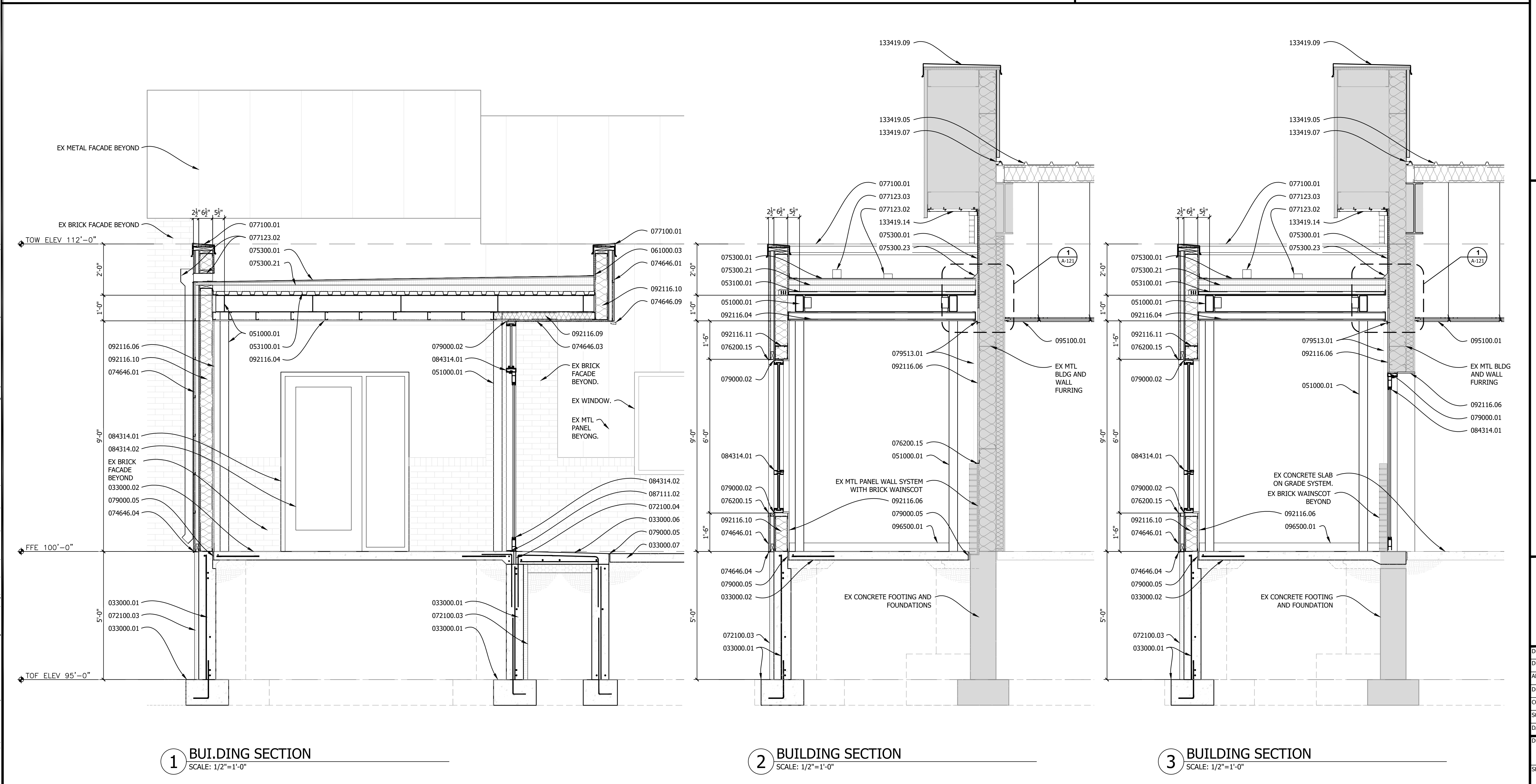


**REFERENCE NOTES:**

033000.01 CAST-IN-PLACE CONCRETE FOOTING/FOUNDATION WALL SYSTEM. SEE STRUCTURAL.	077100.01 PREFINISHED METAL COPING/FASCIA AND FLASHING SYSTEM (2 PART) W/ KEEPER. EXTEND ROOF MEMBRANE OVER WALL AND DOWN EXTERIOR FACE A MINIMUM OF 6".	095100.01 ACOUSTICAL CEILING TILE AND SUSPENSION GRID SYSTEM. COORDINATE WITH INSTALLATION OF MECHANICAL AND ELECTRICAL DEVICES.
033000.02 CAST-IN-PLACE CONCRETE SLAB-ON-GRADE SYSTEM WITH VAPOR BARRIER AND PREPARED SUBBASE. SEE STRUCTURAL.	077123.02 THRU-WALL SCUPPER AND DOWNSPOUT.	096500.01 RESILEINT WALL BASE SYSTEM.
033000.06 CAST-IN-PLACE CONCRETE STOOP SYSTEM. SEE STRUCTURAL.	077123.03 OVERFLOW THRU-WALL SCUPPER AND DRIP EDGE. MOUNT 2" ABOVE FINISHED ROOF MEMBRANE.	133419.05 STANDING SEAM METAL ROOF AND INSULATION SYSTEM.
033000.07 CAST-IN-PLACE CONCRETE SIDEWALK, SEE SITE PLAN.	079000.01 SEALANT.	133419.07 METAL ROOF TRIM.
051000.01 STEEL COLUMN/BEAM.	079000.02 SEALANT AND BACKER ROD.	133419.09 REPLACE METAL FACADE COPING. SLOPE TO DRAIN, MATCH EXISTING.
053100.01 STEEL DECK. SEE STRUCTURAL.	079000.05 1/2" EXPANSION JOINT MATERIAL AND SEALANT. SEE STRUCTURAL/CIVIL.	133419.14 METAL SOFFIT SYSTEM AND FLASHINGS AT EXISTING CONDITIONS.
061000.03 PLYWOOD SHEATHING.	079513.01 1" INTERIOR WALL AND CEILING EXPANSION JOINT COVER.	
072100.03 2" RIGID, FOUNDATION WALL INSULATION SYSTEM.	084314.01 ALUMINUM-FRAMED STOREFRONT SYSTEM.	
072100.04 1" RIGID INSULATION BETWEEN SLABS LOCATE BELOW THRESHOLD.	084314.02 PREFINISHED ALUMINUM DOOR.	
074646.01 CEMENT FIBER BOARD PANEL SYSTEM. FASTEN SYSTEM TO WALL STUDS BEYOND.	087111.02 DOOR THRESHOLD. PLACE IN BED OF SEALANT.	
074646.03 CEMENT FIBER BOARD NON VENTED SOFFIT PANEL. FASTEN SYSTEM TO WALL STUD BEYOND.	092116.04 1/2" GYPSUM BOARD CEILING OVER 3 5/8" METAL STUD.	
074646.04 CEMENT FIBER BOARD SILL FLASHING.	092116.06 5/8" GYPSUM BOARD.	
074646.09 CEMENT FIBER BOARD OVERHANG FLASHING.	092116.09 3 5/8" MTL STUDS 12" O.C. W/ EXTERIOR PLYWOOD SHEATHING, BATT INSULATION AND WEATHER BARRIER.	
075300.01 EPDM ROOFING SYSTEM. FULLY ADHERED.	092116.10 6" MTL STUDS 16" O.C. W/ G.W.B., BATT INSULATION, EXTERIOR PLYWOOD SHEATHING, WEATHER BARRIER, AND 1 1/2" RIGID INSULATION.	
075300.21 BASE AND TAPERED INSULATION.	092116.11 HEADER. SEE STRUCTURAL.	
075300.23 ROOF EXPANSION JOINT PER MANUFACTURES STANDARD DETAIL.		
076200.15 BRAKE METAL FLASHING.		

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5. EXTERIOR DIMENSIONS ARE TO THE FACE OF BLOCK WALL, METAL STRUCTURE, OR GRID LINE UNLESS OTHERWISE NOTED.
6. PROVIDE TEMPORARY BARRIERS TO PROTECT OWNERS PERSONNEL AND GENERAL PUBLIC FROM INJURY DUE TO CONSTRUCTION WORK. TEMPORARY BARRIERS SHOULD KEEP OUT DUST AND CONSTRUCTION DEBRIS FROM OWNER OCCUPIED SPACES.
7. ALL PARTITIONS TO EXTEND TO DECK/STRUCTURE ABOVE UNLESS OTHERWISE INDICATED. ALL PARTITION GWB JOINTS TO BE TAPED FROM FLOOR TO DECK UNLESS OTHERWISE NOTED.
8. ALL TRADES ARE RESPONSIBLE FOR SEALING THEIR RESPECTIVE PENETRATIONS INCLUDING FIRE SEPARATIONS. SEE CODE PLANS.
9. SEE SHEET G-103 FOR PARTITION TYPES.



**1 BUILDING SECTION**  
SCALE: 1/2"=1'-0"

**2 BUILDING SECTION**  
SCALE: 1/2"=1'-0"

**3 BUILDING SECTION**  
SCALE: 1/2"=1'-0"

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**SECTIONS**  
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SHEET NO:	

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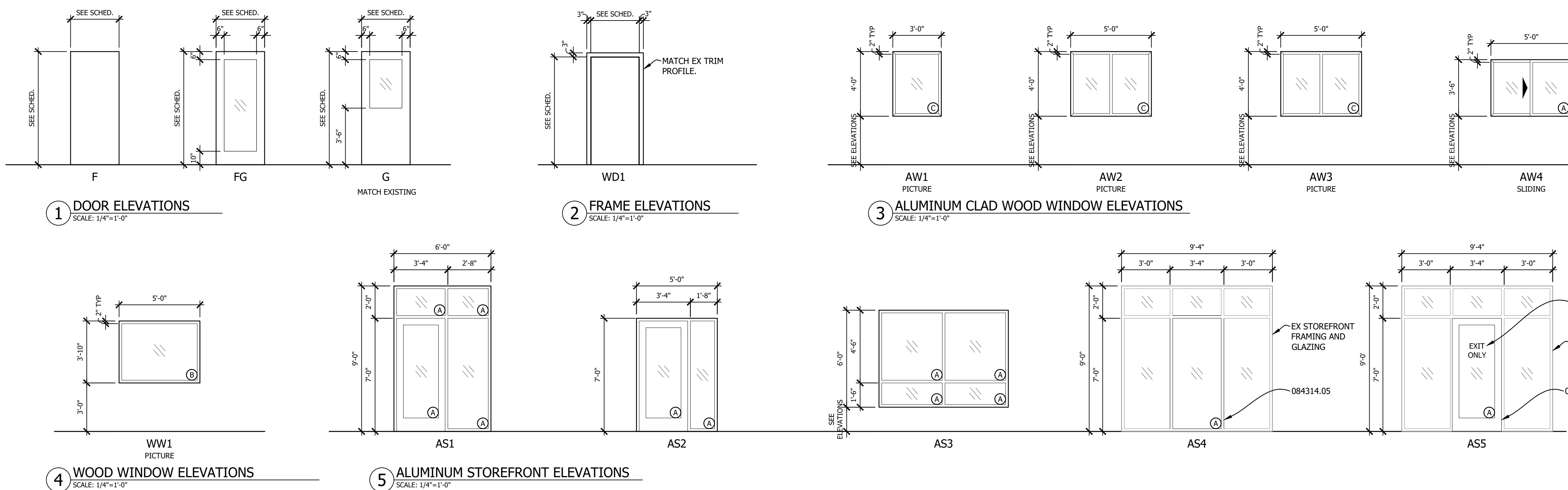
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ROOM FINISH SCHEDULE										REMARKS
ROOM NO	RM NAME	FLOOR	BASE	WALLS				CEILING		
				N	E	S	W	MATL	HEIGHT	
101	VEST	LVT	RCB	GWB/P	GWB/P	GWB/P	GWB/P	GWB CLG/P	9'-0"	PAINT STEEL COLUMNS. DO NOT PAINT EXISTING BRICK.
102	RECEPTION	LVT	RCB	EX GWB/P	GWB/P	GWB/P	EX GWB/P	ACT	9'-0"	--
103	MEETING	LVT	RCB	GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	ACT	9'-0"	--
104	OFFICE	LVT	RCB	EX GWB & GWB/P	EX GWB/P	GWB/P	GWB/P	ACT	9'-0"	--
105	OFFICE	LVT	RCB	EX GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	ACT	9'-0"	--
106	OFFICE	LVT	RCB	EX GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	ACT	9'-0"	--
107	OFFICE	LVT	RCB	EX GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	ACT	9'-0"	--
108	MEN	LVT	RCB	EX GWB/P	GWB/P	EX GWB/P	EX GWB/P	GWB CLG/P	9'-0"	PATCH GWB AS NEEDED TO ACCOMMODATE THE WORK, TAPE AND PREPARE FOR FINISHES. COORDINATE WITH M/C.
109	WOMEN	LVT	RCB	EX GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	GWB CLG/P	9'-0"	PATCH GWB AS NEEDED TO ACCOMMODATE THE WORK, TAPE AND PREPARE FOR FINISHES. COORDINATE WITH M/C.
110	OFFICE	LVT	RCB	EX GWB/P	GWB/P	GWB/P	EX GWB/P	ACT	9'-0"	--
111	MECH	EX CONC	EX RCB	EX GWB	EX GWB	EX GWB	EX GWB	EX GWB CLG	9'-0"	PATCH AND PAINT WALL/CEILING TO SUPPORT MEP WORK.
112	HALL	LVT	RCB	EX GWB/P	EX GWB/P	EX GWB/P	EX GWB/P	ACT	9'-0"	--
113	SHOP	EX CONC	-	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	--	SEE PLUMBING FOR CONCRETE FLOOR REMOVALS AND PATCHING.
114	EQUIP	EX CONC	--	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	--	--
115	STORAGE	EX CONC	--	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	EX MTL PNL	--	--

DOOR AND FRAME SCHEDULE														RATING	HW SET	REMARKS	
MARK	DOOR						FRAME										
	WD	HGT	THK	EL	MATL	GLAZING	WD	HGT	THK	EL	MATL	DETAIL					
101	3'-0"	7'-0"	1 3/4"	FG	ALUM	1" INSUL	6'-0"	9'-0"	4 1/2"	AS1	ALUM	1/A-301	--	1/A-301	--	1	--
102	3'-0"	7'-0"	1 3/4"	FG	ALUM	1/4" TEMPERED	5'-0"	7'-0"	4 1/2"	AS2	ALUM	3/A-301	--	3/A-301	--	3	--
103A	6'-0"	6'-8"	1 3/4"	FG	WD	EXIST	6'-4"	6'-10"	5 3/4"	WD1	WD	--	--	--	--	--	INSTALL SALVAGED DOOR, FRAME, HARDWARE, AND BLINDS.
103B	3'-0"	7'-0"	1 3/4"	FG	ALUM	1" INSUL	9'-4"	9'-0"	4 1/2"	AS5	ALUM	--	--	--	--	2	INSTALL NEW DOOR IN EXIST FRAME
104A	3'-0"	6'-8"	1 3/4"	G	WD	1/4" SAFETY	3'-4"	6'-10"	5 3/4"	WD1	WD	--	--	--	--	4	INSTALL SALVAGED WINDOW BLINDS
110	3'-0"	6'-8"	1 3/4"	G	WD	1/4" SAFETY	3'-4"	6'-10"	5 3/4"	WD1	WD	--	--	--	--	4	INSTALL SALVAGED WINDOW BLINDS

DOOR HARDWARE SCHEDULE											REMARKS
HARDWARE SET	HINGES			LATCH	EXIT DEVICE	CLOSER	GASKET	SWEEP	THRESHOLD	STOPS	
	QTY	SIZE	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	DESIGN BASIS	
1	AS REQR	4 1/2" X 4 1/2"	BB1191 NRP US32D	--	CD - 99 - NILOP - 626 20-079 626	4040XP - CUSH - AL	S88GR	964C	S205A	--	PROVIDE IVES 8103 10" PULL, 626.
2	AS REQR	4 1/2" X 4 1/2"	BB1191 NRP US32D	--	CD - 99 - EO - 626 20-079 626	4040XP - CUSH - AL	S88GR	964C	S205A	--	--
3	AS REQR	4 1/2" X 4 1/2"	BB1279 US26D	--	--	4040XP - CUSH - AL	--	--	--	--	PROVIDE IVES 9103 10" PULL/PUSH BAR COMBO, 626.
4	AS REQR	4 1/2" X 4 1/2"	BB1279 US26D	NDS3PD - RHO - 626	--	--	--	--	--	3211T-32D	PROVIDE DOOR SILENCERS.



REFERENCE NOTES:	
084314.02	REFINISHED ALUMINUM DOOR.
084314.05	REPLACE EXISTING ALUMINUM DOOR STOREFRONT FRAMING WITH NEW FRAMING FOR GLAZING PANEL.

- GENERAL NOTES:**
- THIS IS A REMODEL TO AN EXISTING BUILDING. CONTRACTOR/S TO PROTECT ALL EXISTING ON-SITE CONDITIONS FROM ON GOING WORK.
  - CONTRACTOR SHALL VERIFY ALL EXISTING BUILDING DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE START OF WORK.
  - CONTRACTOR/S TO LOCATE ALL UNDERGROUND UTILITIES PRIOR TO EXCAVATION AND/OR CONSTRUCTION.
  - THE DIVISION OF LABOR SHALL BE AS PER THE PROJECT SPECIFICATION MANUAL AND NOT THE NOTATION SYSTEM ON THE DRAWINGS.
  - EXTERIOR DIMENSIONS ARE TO THE FACE OF BLOCK WALL, METAL STRUCTURE, OR GRID LINE UNLESS OTHERWISE NOTED.
  - ALL PARTITIONS TO EXTEND TO DECK/STRUCTURE ABOVE UNLESS OTHERWISE INDICATED. ALL PARTITION GWB JOINTS TO BE TAPED FROM FLOOR TO DECK UNLESS OTHERWISE NOTED.
  - PROVIDE GYP BOARD CONTROL JOINT FROM A CORNER OF ALL INTERIOR DOOR FRAMES AND BORROWED LTIES.
  - ALL TRADES ARE RESPONSIBLE FOR SEALING THEIR RESPECTIVE PENETRATIONS INCLUDING FIRE SEPARATIONS. SEE CODE PLANS.
  - SEE SHEET G-103 FOR PARTITION TYPES.

ROOM SCHEDULE KEY	
FLOORING:	EX CONC - EXIST CONCRETE FLOORING CONC/S - SEALED CONCRETE CONC/H - HARDENED CONCRETE CPT - CARPET WO OPT - WALK OFF CARPET EX PT - EXISTING PORCELAIN TILE OVER CONC. LVT - LUXURY VINYL TILE VCT - VINYL COMPOSITION TILE
BASE:	RCB - RUBBER COVE BASE ECB - EPOXY COVE BASE
WALL:	EX GWB - EXISTING GYPSUM WALL BOARD PARTITION EX GWB/P - EXISTING GYPSUM WALL BOARD PARTITION, PAINT GWB/P - GYPSUM WALL BOARD PARTITION, PAINT EX MTL PNL - EXISTING METAL LINER PANEL
CEILING:	EX MTL PNL - EXISTING METAL LINER PANEL EX GWB CLG - EXISTING GYPSUM WALL BOARD CEILING GWB CLG/P - GYPSUM WALL BOARD CEILING, PAINTED ACT - LAY IN ACOUSTICAL CEILING TILE AND GRID

GLAZING SCHEDULE KEY	
(A)	IG-1 INSULATED GLASS UNITS:
(B)	MONOLITHIC SAFETY GLASS
(C)	IG-2 INSULATED GLASS UNITS WITH BETWEEN GLASS BLINDS.

SUPPLIER TO REVIEW GLAZING FOR COMPLIANCE WITH APPLICABLE CODES AND STANDARDS.

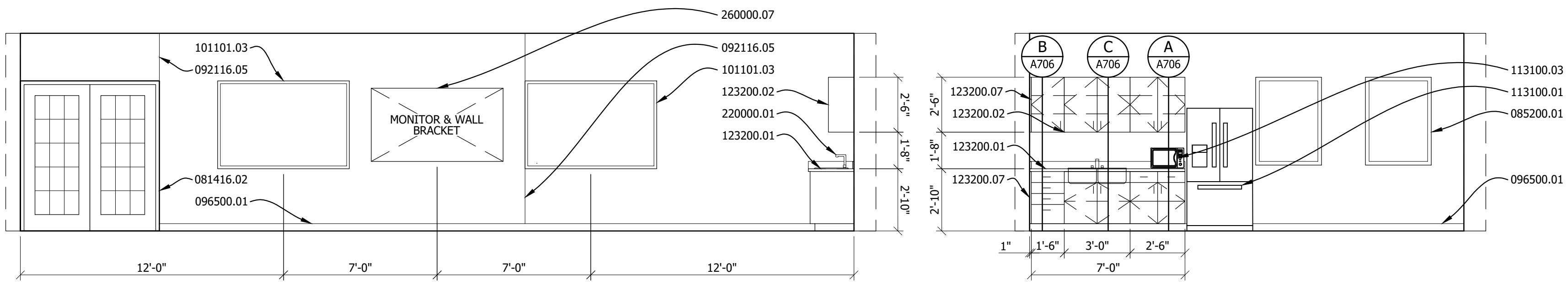
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 3458 E CENTURY AVENUE - BISMARCK, ND 58503  
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**SCHEDULES**  
 MR&I OFFICE REMODEL  
 9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

DESIGNED BY: JPL  
 DRAWN BY: JBN  
 APPROVED BY: JPL  
 DESIGN PROJ: 12493.700  
 CONST PROJ: ---  
 SCALE: AS NOTED  
 DATE: OCTOBER 2024  
 DRAWING NO: **A-601**  
 SHEET NO: ---

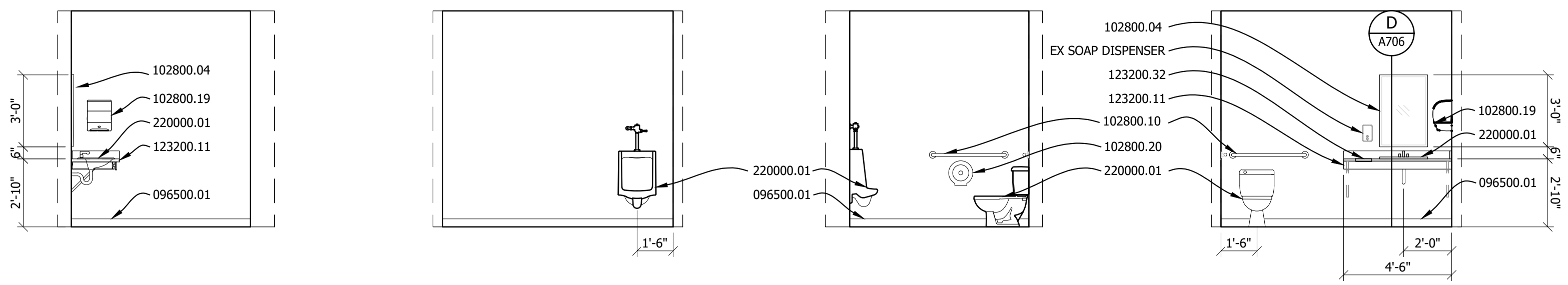
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Last edit on: 10/22/2024 5:11 PM by: JBN01642 Drawing Name: F:\Proj\12000\12493\12493.700\AutoCAD\Plan Set\12493.700 - ALUM - PLANS.dwg Layout Name: A-601 Plotted By: JBN01642 Plotted on: 10/22/2024 5:17:04 PM



1 MEETING 103 - NORTH  
SCALE: 1/4"=1'-0"

2 MEETING 103 - EAST  
SCALE: 1/4"=1'-0"

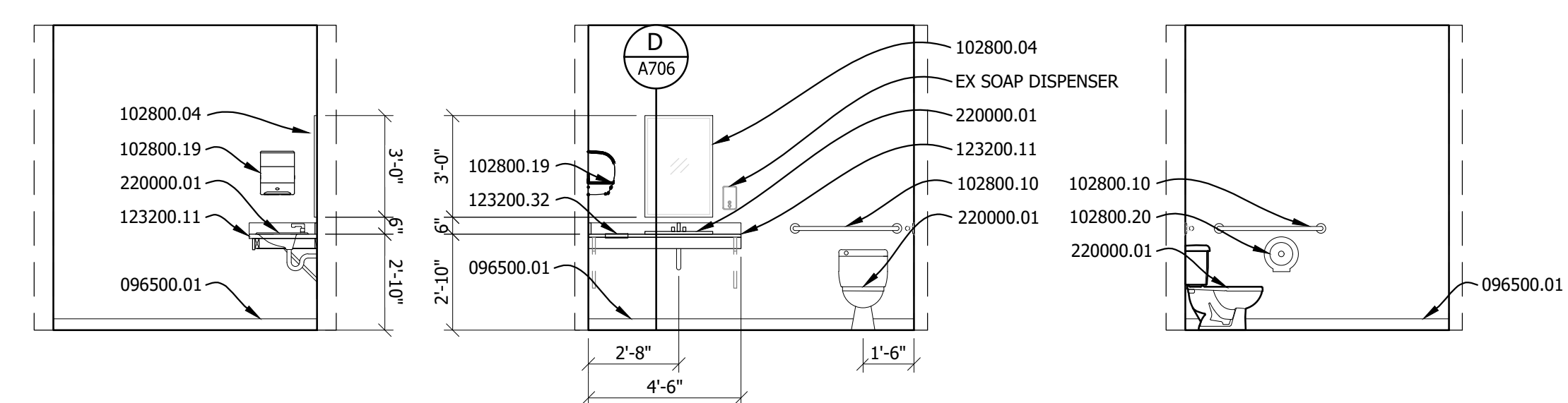


3 MEN 108 - NORTH  
SCALE: 1/4"=1'-0"

4 MEN 108 - EAST  
SCALE: 1/4"=1'-0"

5 MEN 108 - SOUTH  
SCALE: 1/4"=1'-0"

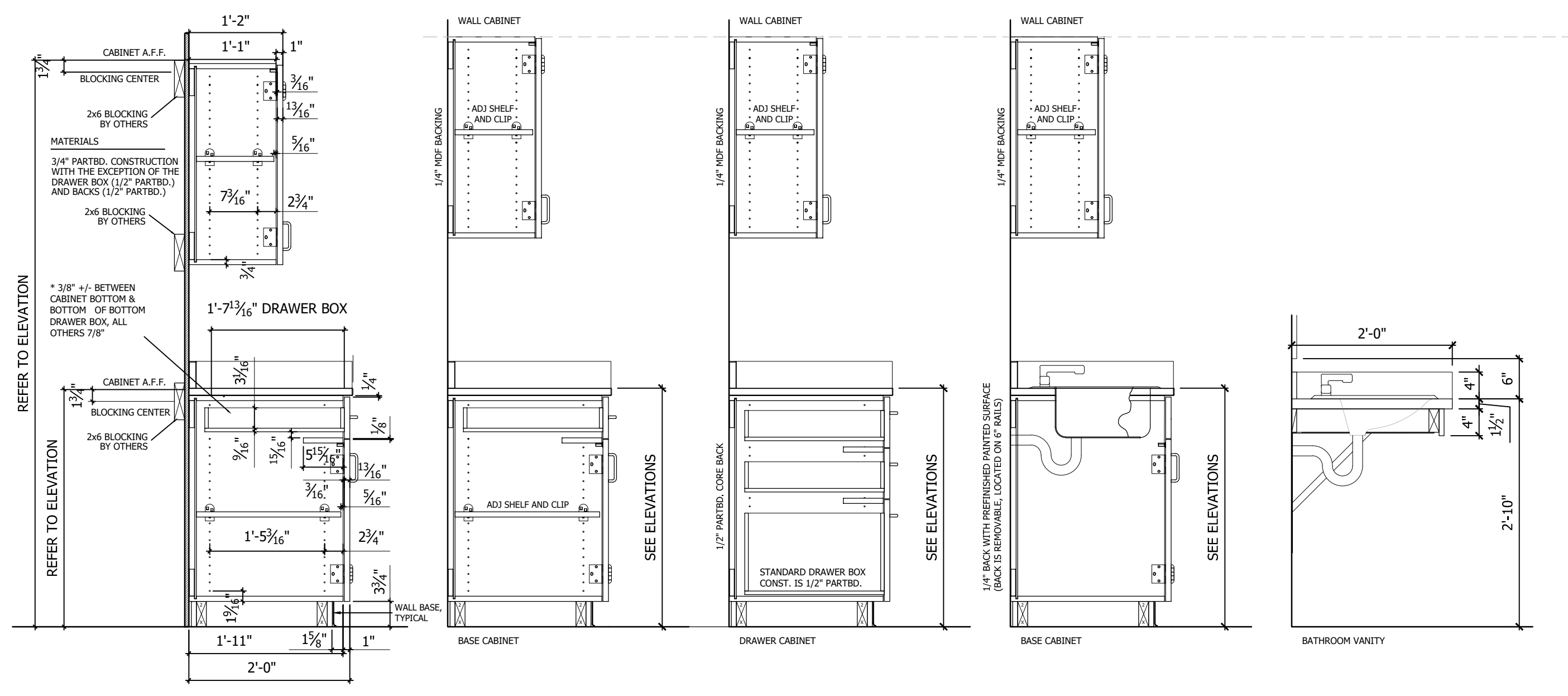
6 MEN 108 - WEST  
SCALE: 1/4"=1'-0"



7 WOMEN 109 - NORTH  
SCALE: 1/4"=1'-0"

8 WOMEN 109 - EAST  
SCALE: 1/4"=1'-0"

9 WOMEN 109 - SOUTH  
SCALE: 1/4"=1'-0"



CASEWORK TYPICAL DIMENSIONS  
3/4" = 1'-0"

A CASEWORK SECTION  
3/4" = 1'-0"

B CASEWORK SECTION  
3/4" = 1'-0"

C CASEWORK SECTION  
3/4" = 1'-0"

D VANITY/SHELF SECT  
3/4" = 1'-0"

REFERENCE NOTES:

#	DESCRIPTION
081416.02	INSTALL SALVAGED WOOD DOOR, FRAME, AND HARDWARE. SEE DOOR AND HARDWARE SCHEDULES.
085200.01	FIXED ALUMINUM CLAD WOOD WINDOW.
092116.05	GYPSON BOARD CONTROL JOINT.
096500.01	RESILIENT WALL BASE SYSTEM.
101101.03	MARKERBOARD
102800.04	MIRROR.
102800.10	ADA COMPLIANT GRAB BAR. SEE COVER FOR REQUIREMENTS.
102800.19	PAPER TOWEL DISPENSER.
102800.20	TOILET PAPER DISPENSER.
113100.01	REFRIGERATOR, FRENCH DOOR (36" CLEAR)
113100.03	MICROWAVE
123200.01	PLASTIC LAMINATE BASE CABINET WITH SOLID SURFACE COUNTERTOP WITH BACK AND SIDE SPLASHES.
123200.02	PLASTIC LAMINATE WALL CABINET.
123200.07	PLASTIC LAMINATE FILLER PANEL.
123200.11	SOLID SURFACE COUNTERTOP WITH BACK AND SIDE SPLASHES ON HEAVY DUTY METAL WALL BRACKETS.
123200.32	STAINLESS STEEL COUNTERTOP TRASH CHUTE.
220000.01	PLUMBING FIXTURE/EQUIPMENT. SEE PLUMBING.
260000.07	MONITOR AND WALL BRACKET. SEE ELECTRICAL.

GENERAL NOTES:

- THIS IS A REMODEL TO AN EXISTING BUILDING. CONTRACTOR/S TO PROTECT ALL EXISTING ON-SITE CONDITIONS FROM ON GOING WORK.
- CONTRACTOR SHALL VERIFY ALL EXISTING BUILDING DIMENSIONS AND NOTIFY ARCHITECT OF ANY DISCREPANCIES BEFORE START OF WORK.
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- PROVIDE GYP BOARD CONTROL JOINT FROM A CORNER OF ALL INTERIOR DOOR FRAMES AND BORROWED LITES.
- ALL TRADES ARE RESPONSIBLE FOR SEALING THEIR RESPECTIVE PENETRATIONS INCLUDING FIRE SEPARATIONS. SEE CODE PLANS.
- SEE SHEET G-103 FOR PARTITION TYPES.

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**ROOM ELEVATIONS**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	JPL
DRAWN BY:	JBN
APPROVED BY:	JPL
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	A-701
SHEET NO:	



MECHANICAL / HVAC

Table of mechanical and HVAC symbols including pipe sizes (LPG, G, V, W, A), steam supply/return, condensate pump, feedwater pump, storm sewer, roof drain, chilled water supply/return, condenser water supply/return, heating hot water supply/return, heat pump supply/return, refrigerant liquid/suction, manual volume damper, diffusers, duct fittings, and various dampers and sensors.

PLUMBING / PIPE

Table of plumbing and pipe symbols including floor/wall mounted flush valves, tank type water closets, urinals, lavatories, janitors basins, double/single compartment sinks, showers, drinking fountains, emergency showers, shower heads, shower enclosures, cleanouts, plumbing fixture ID tags, domestic hot/cold water, hot water circulating, storm drains, overflow storm drains, shut-off valves, control valves, check valves, three way valves, balancing valves, triple duty valves, strainers, relief valves, solenoid valves, pressure reducing valves, reducers, pipe anchors, sliding expansion joints, pressure gauges, traps, thermostatic traps, float traps, backflow preventers, thermometers, unions, wall hydrants, hose bibbs, cleanouts, caps, shut-off valves, elbows, tees, tees with shut-off valves, sanitary tees, 45 degree elbows, P-type traps, and pipe guides.

LIGHTING / ELECTRICAL

Table of lighting and electrical symbols including pole/ceiling mounted lighting fixtures, emergency lighting, daylight controlled fixtures, ceiling mounted light fixtures with night light, paddle ceiling fans, exit lights, ceiling mounts, wall mounts, light tracks, receptacles, junction boxes, plugmolds, time switches, lighting contactors, spring wound timers, hand-off-auto selector switches, manual starters, lighting panels, distribution panels, telephone terminal panels, thermostats, humidistats, communication/data outlets, ceiling mounted communication/data outlets, floor mounted communication/data outlets, television outlets, wall/ceiling/column/horn speakers, motion detectors, closed circuit television outlets, pushbutton stations, relay cabinets, clock speakers, card readers, magnetic locks, alarm contacts, security cameras, single/double pole switches, 3-way/4-way switches, single pole switches with pilot lamp, momentary contacts, single pole switches with key operated, dimmer switches, low voltage switches, vacancy sensors, occupancy sensors, and power packs.

GENERAL SYMBOLS

Table of general symbols including north arrow, detail reference (M100), plan note reference, revision delta, room number reference (100), section cut reference (1 M100), continuation, connection to existing system, break line, and matchline.

ABBREVIATIONS

Table of abbreviations categorized by GENERAL, PLUMBING, MECHANICAL, and ELECTRICAL. Includes terms like AFF (Above Finished Floor), CA (Compressed Air), AHU (Air Handling Unit), AC (Alternating Current), etc.

FIRE ALARM / PROTECTION

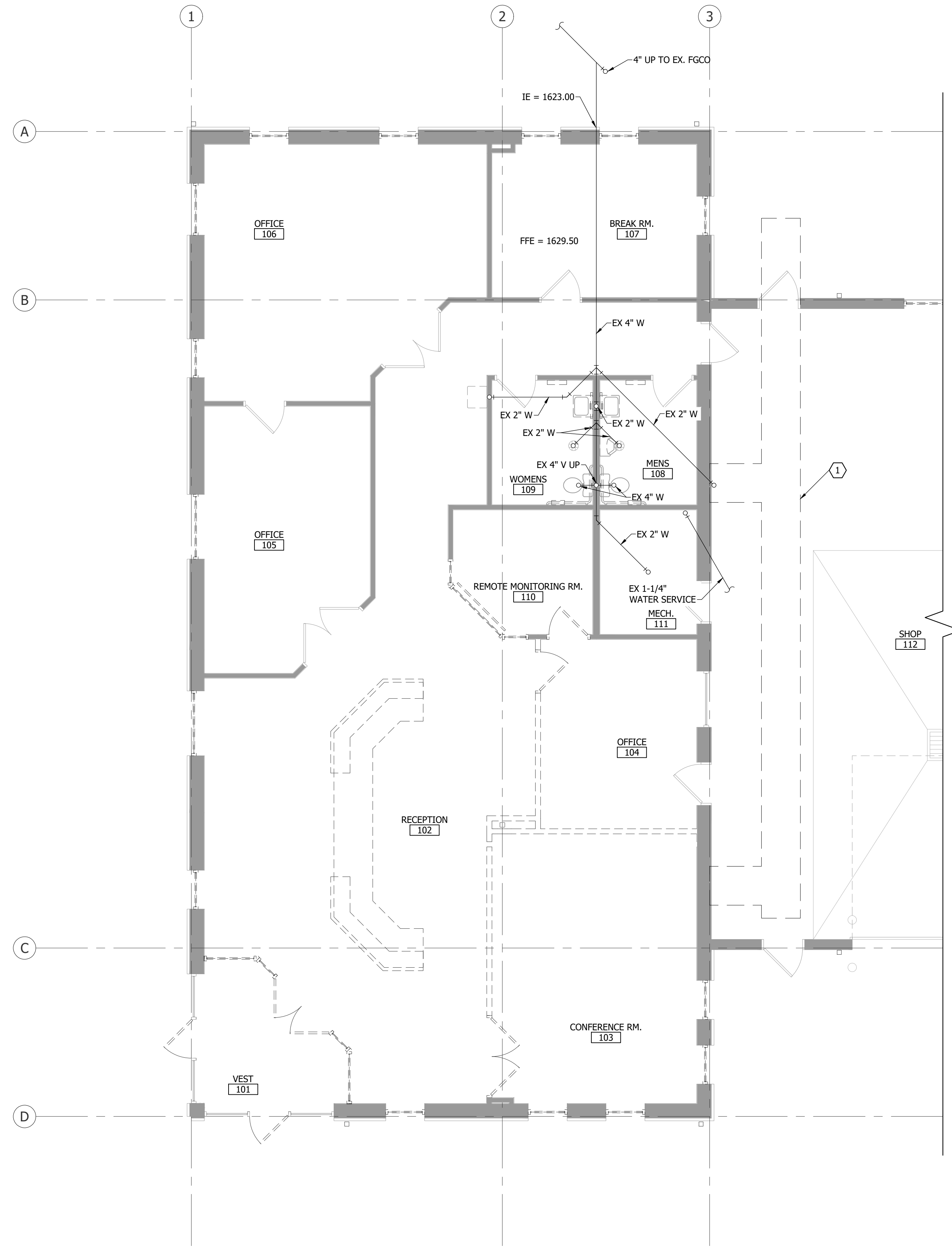
Table of fire alarm and protection symbols including fire alarm control panel, fireman's smoke control system, firefighter's telephone panel, voice evacuation control unit, amplifier panel, fire alarm annunciator panel, remote power supply, remote indicating light, remote test station, fan shutdown relay, door hold-open device, addressable control relay, Knox box, fire alarm pull station, smoke detector, smoke detector with sounder base, heat detector, flame detector, duct smoke detector, wall mounted fire alarm horn/bell, wall mounted fire alarm horn/strobe combination, ceiling mounted fire alarm strobe light, ceiling mounted fire alarm speaker/strobe, ceiling mounted fire alarm strobe light, wall mounted fire alarm wall strobe light, wall mounted fire alarm speaker, wall mounted fire alarm speaker/strobe, beam detector - receiver, beam detector - transmitter, combination smoke and fixed temperature thermal detector, gas detector, fireman's phone jack, master phone station, post indicating valve, tamper switch, flow switch, air sampling smoke detector, single pole switch with key operated, and candela rating.

Vertical text on the left margin: Drawing Name: F:\proj\2000\12493\12493\_700\AutoCAD\Plan Set\MEP SYMBOLS & ABBREVIATIONS.dwg, Layout Name: MEP SYMBOLS & ABBREVIATIONS.dwg, Plot Date: 10/17/2024 4:21 PM by: SDW01521

Right margin containing the Bartlett & West logo, address (3458 E CENTURY AVENUE, BISMARCK, ND 58503), contact information, and a professional engineer seal for Nathan J. Gauffrey, PE #8361, dated 10/11/2024. Also includes project details: MR&I OFFICE REMODEL, 9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538, and drawing information: DESIGNED BY: NJG, DRAWN BY: SDM/NJG, APPROVED BY: MSV, DESIGN PROJ: 12493\_700, CONST PROJ: ---, SCALE: AS NOTED, DATE: OCTOBER 2024, DRAWING NO: MEP000, SHEET NO: ---.



Last edit on: 10/17/2024 4:05 PM by: SDM01521 Drawing Name: F:\proj\12000\12493\12493.700\AutoCad\Plan Set\MEP\12493.700P- PLUMBING UNDERFLOOR DEMOLITION PLAN.dwg Layout Name: PLUMBING UNDERFLOOR DEMOLITION PLAN Plotted on: 10/17/2024 5:16:17 PM



**PLUMBING UNDERFLOOR DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

**REFERENCE NOTES:**

① P/C TO BE RESPONSIBLE FOR CONCRETE AND TRENCHING COSTS AND INCLUDE IN THE P/C BID PACKAGE LINE ITEM TO GAIN ACCESS FOR PLUMBING UNDERFLOOR IMPROVEMENTS. P/C TO FIELD COORDINATE ALL REQUIREMENTS AND DIRECTLY SUB-CONTRACT WITH G/C TO PROVIDE ALL CONCRETE REMOVAL REQUIRED IN AREA INDICATED.

#	DATE	DESCRIPTION	BY
	10/01/2024	BID SET	SDM

- GENERAL NOTES:**
- P/C TO COORDINATE WORK WITH ALL OTHER TRADES.
  - ALL EX UNDERFLOOR PIPING TO REMAIN UNLESS NOTED OTHERWISE.
  - THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.

**PLUMBING UNDERFLOOR DEMOLITION PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
NATHAN J. GAFFNEY  
PE 8361  
DATE 10/11/2024  
NORTH DAKOTA

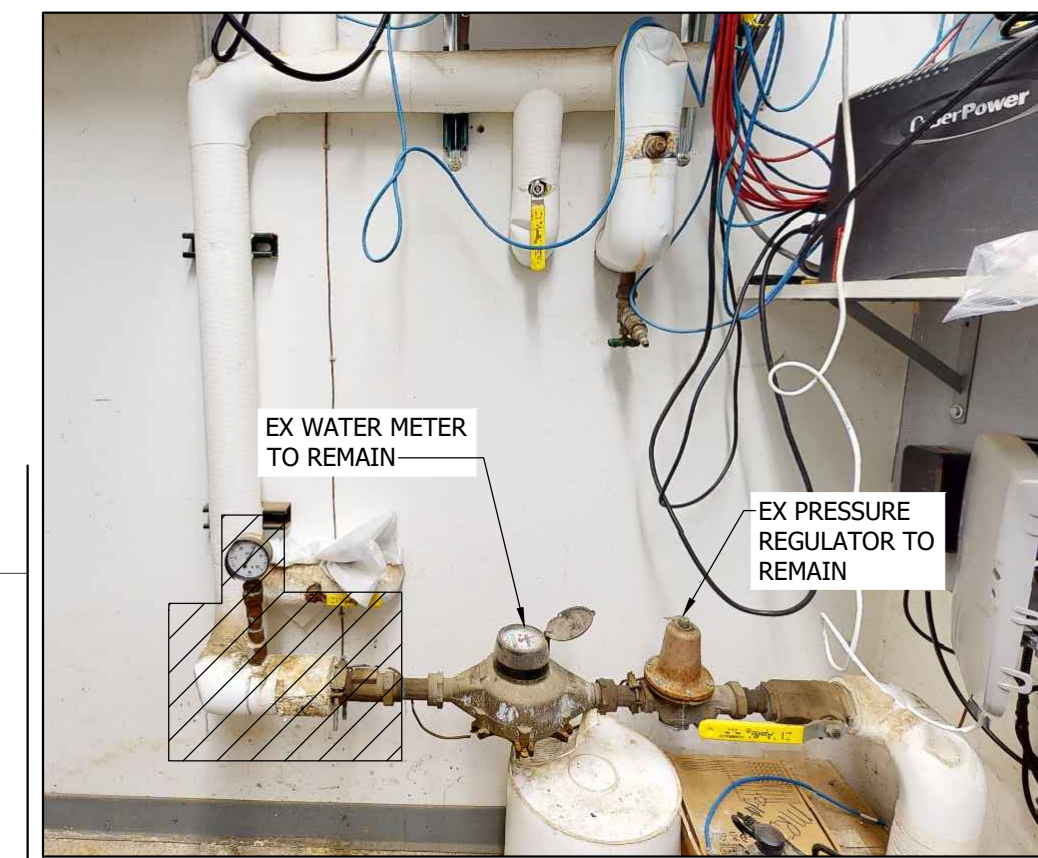
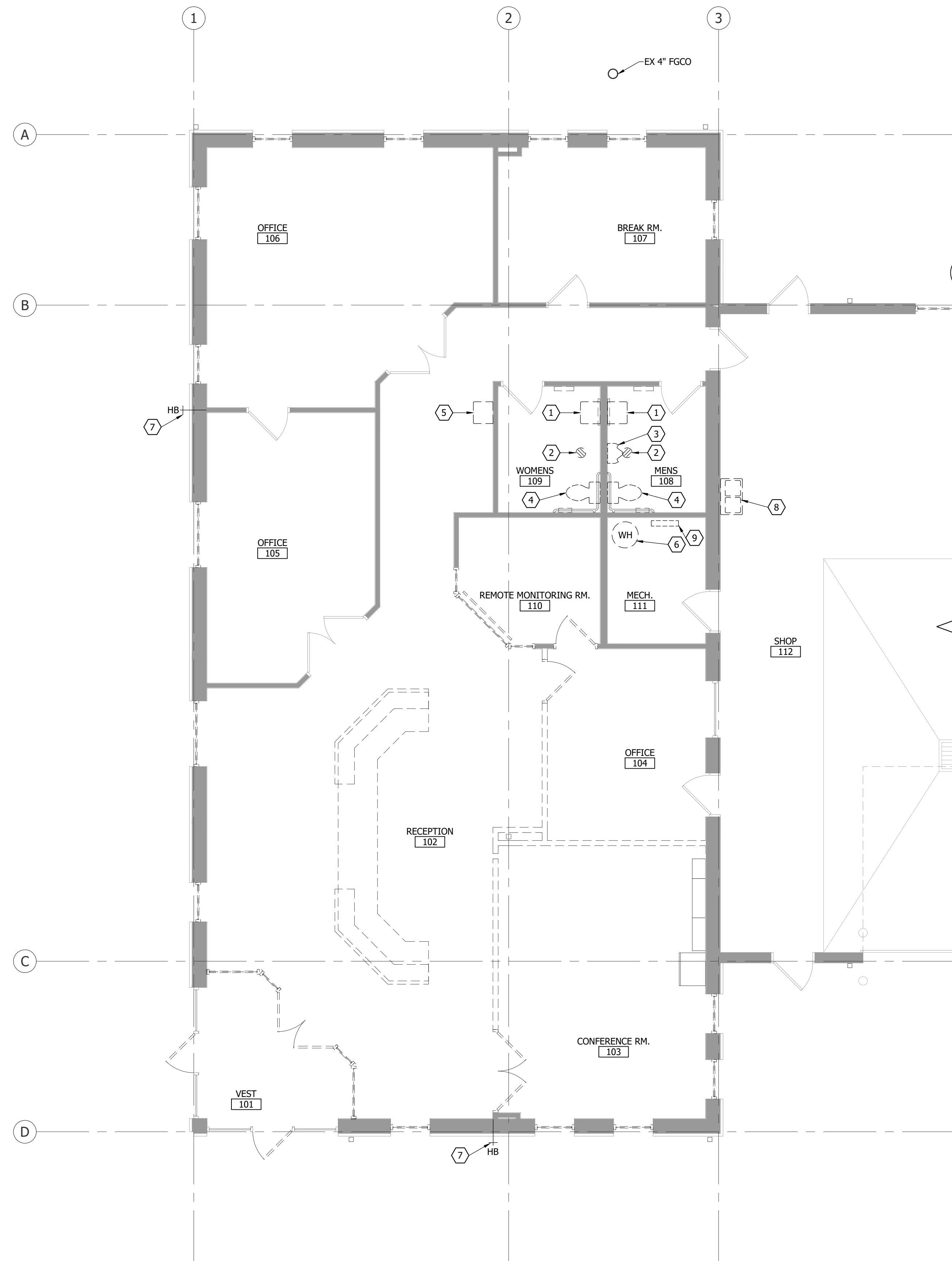
**KEY PLAN:**

DESIGNED BY: NJG  
DRAWN BY: SDM/NJG  
APPROVED BY: MSV  
DESIGN PROJ: 12493.700  
CONST PROJ: ---  
SCALE: AS NOTED  
DATE: OCTOBER 2024  
DRAWING NO: **P-101**  
SHEET NO:

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**1 WATER SERVICE ENTRANCE**  
NOT TO SCALE

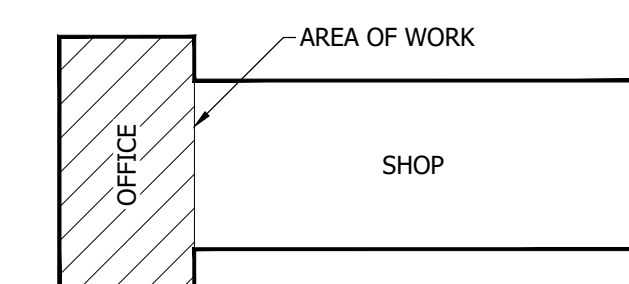
**REFERENCE NOTES:**

- ① REMOVE EXISTING WALL MOUNTED LAVATORY, FAUCET, P-TRAP FITTINGS, P-TRAP ADA COVER, SUPPLY WATER SHUT-OFF VALVES, AND PREPARE FOR CONNECTION OF NEW LAVATORY.
- ② REMOVE DRAIN COVER, PREPARE EXISTING DRAIN BODY FOR NEW DRAIN COVER.
- ③ REMOVE EXISTING WALL MOUNTED URINAL, DOMESTIC WATER AND WASTE CONNECTIONS, AND FLUSH VALVE. EX CW, W, & V PIPING SERVING EX URINAL TO BE CAPPED AND ABANDONED IN WALL.
- ④ REMOVE EXISTING FLOOR MOUNTED FLUSH-TANK WATER CLOSET, SUPPLY, AND SHUT-OFF VALVE. PREPARE EXISTING PLUMBING CONNECTIONS FOR NEW FLOOR MOUNTED FLUSH-TANK WATER CLOSET.
- ⑤ REMOVE EXISTING ELECTRIC WATER COOLER. PREPARE EXISTING PLUMBING CONNECTIONS FOR NEW WATER COOLER.
- ⑥ REMOVE EX WATER HEATER AND REPLACE WITH NEW. PREPARE EXISTING PIPING FOR CONNECTION TO NEW WATER HEATER.
- ⑦ EX HOSE BIB AND ASSOCIATED PIPING TO REMAIN.
- ⑧ REMOVE EX TWO COMPARTMENT UTILITY SINK. PREPARE EXISTING PIPING FOR INSTALLATION OF NEW UTILITY SINK "S-2".
- ⑨ WATER SERVICE INLET DEMOLITION. SEE PHOTO 1/ P102

**GENERAL NOTES:**

1. P/C TO COORDINATE WORK WITH ALL OTHER TRADES.
2. ALL EX CW, HW, W, AND V PIPING TO REMAIN UNLESS NOTED OTHERWISE.
3. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.

**KEY PLAN:**

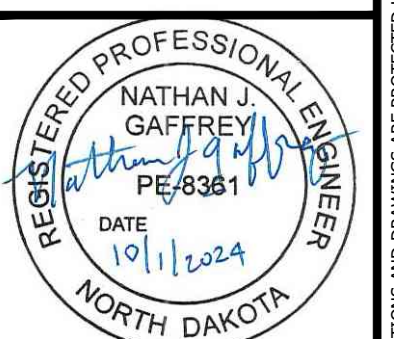


DATE	DESCRIPTION	BY
10/01/2024	BID SET	DWM

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**PLUMBING DEMOLITION PLAN**

**MR&I OFFICE REMODEL**  
**9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538**

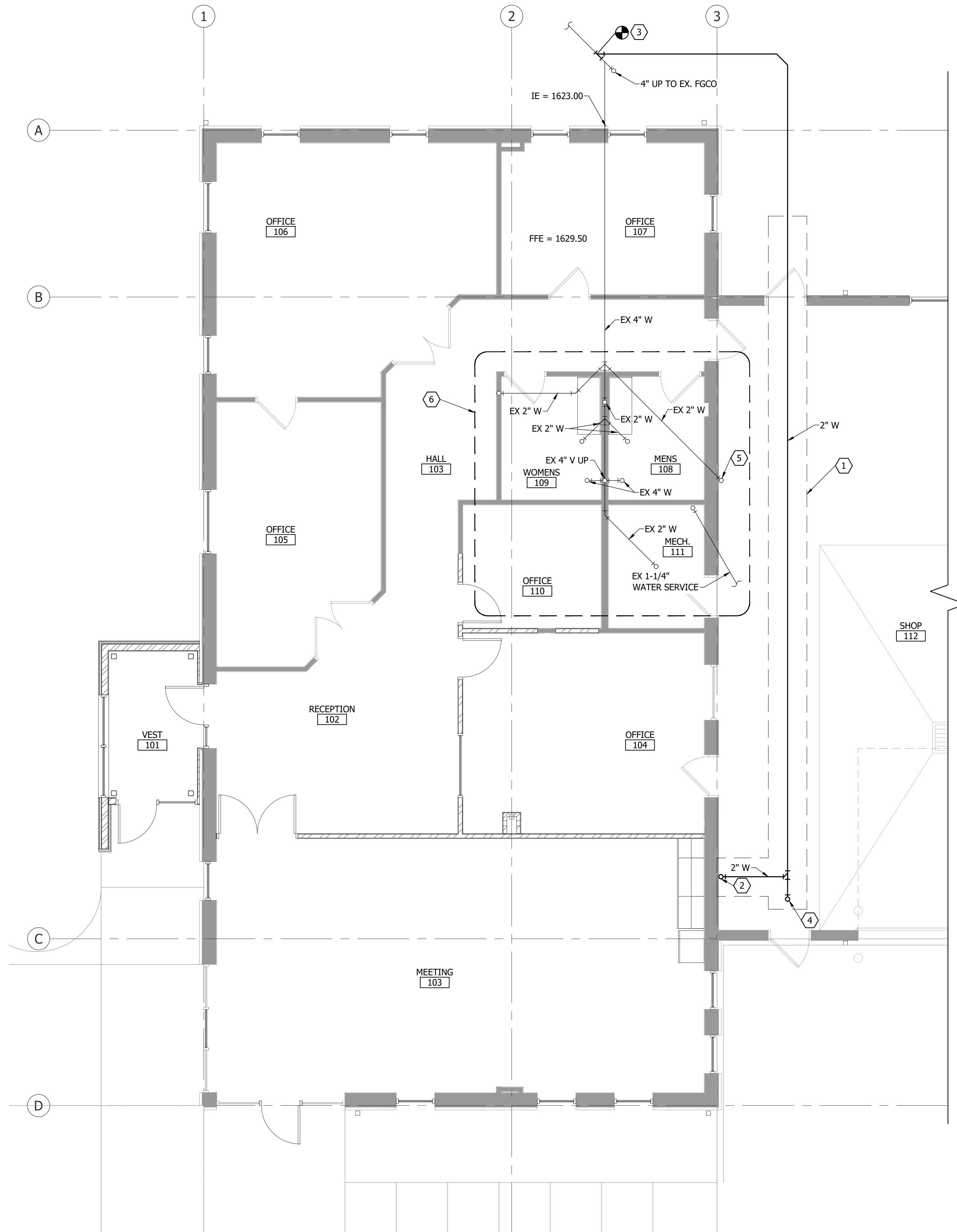


DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>P-102</b>
SHEET NO:	

**PLUMBING DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

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**REFERENCE NOTES:**

- ① P/C RESPONSIBLE FOR ALL TRENCHING BACKFILL AND CONCRETE INFILL AND INCLUDE ALL ASSOCIATED COSTS IN THE P/C'S BID PACKAGE LINE ITEM. P/C TO FIELD COORDINATE AND SUB-CONTRACT DIRECTLY WITH G/C TO PROVIDE ALL CONCRETE INFILL REQUIREMENTS IN AREA INDICATED.
- ② 2" W UP TO "S-1".
- ③ P/C TO CONNECT 2" W TO EX 4" WASTE PIPING. FIELD VERIFY EXACT CONNECTION REQUIREMENTS.
- ④ 2" W UP TO "FGCO".
- ⑤ 2" W UP TO "UR-1" & "S-2". TIE NEW 2" W INTO EX 2" W.
- ⑥ REFER TO DTL 5/P-501.

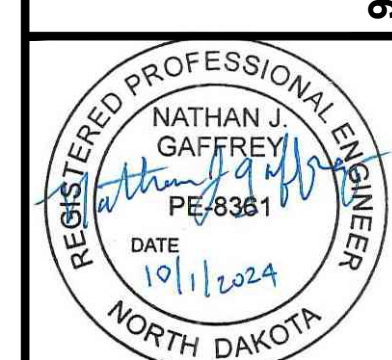
#	DATE	DESCRIPTION
1	10/01/2024	BID SET

**GENERAL NOTES:**

1. P/C TO COORDINATE WORK WITH ALL OTHER TRADES.
2. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.

**PLUMBING UNDERFLOOR IMPROVEMENT PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



**KEY PLAN:**

OFFICE

AREA OF WORK

SHOP

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ.:	12493.700
CONST PROJ.:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO.:	<b>P-111</b>
SHEET NO.:	

 **PLUMBING UNDERFLOOR IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

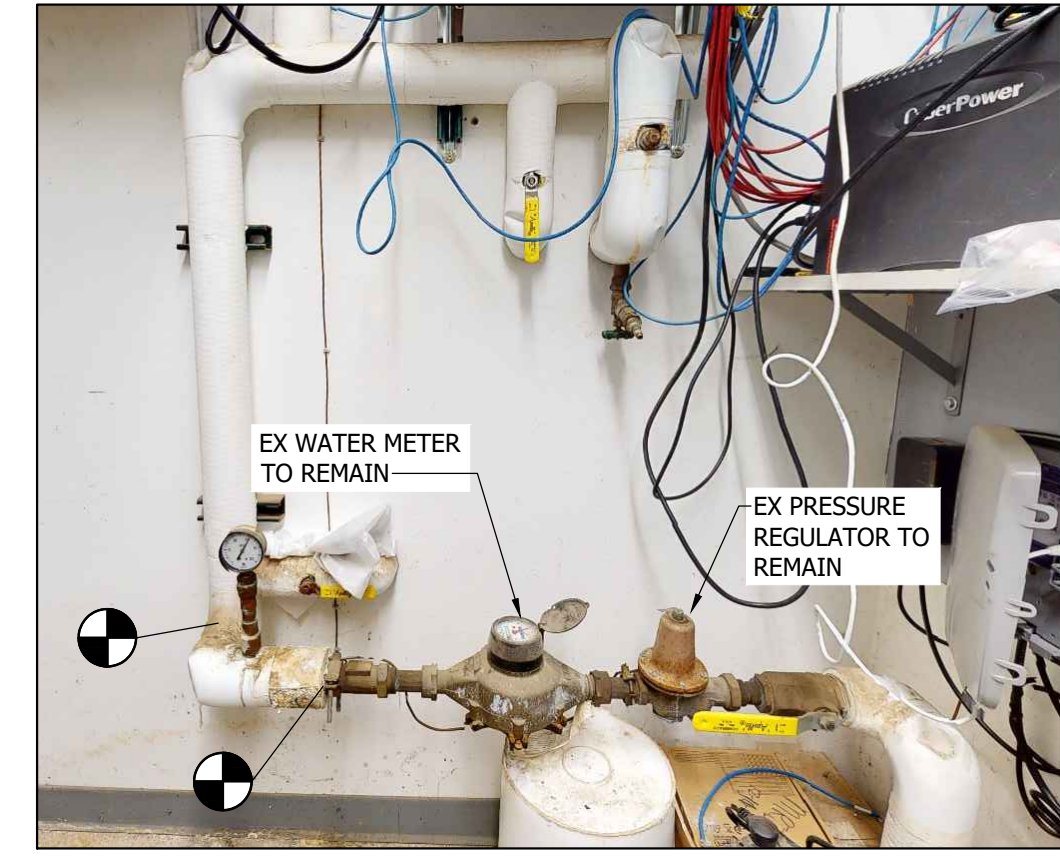
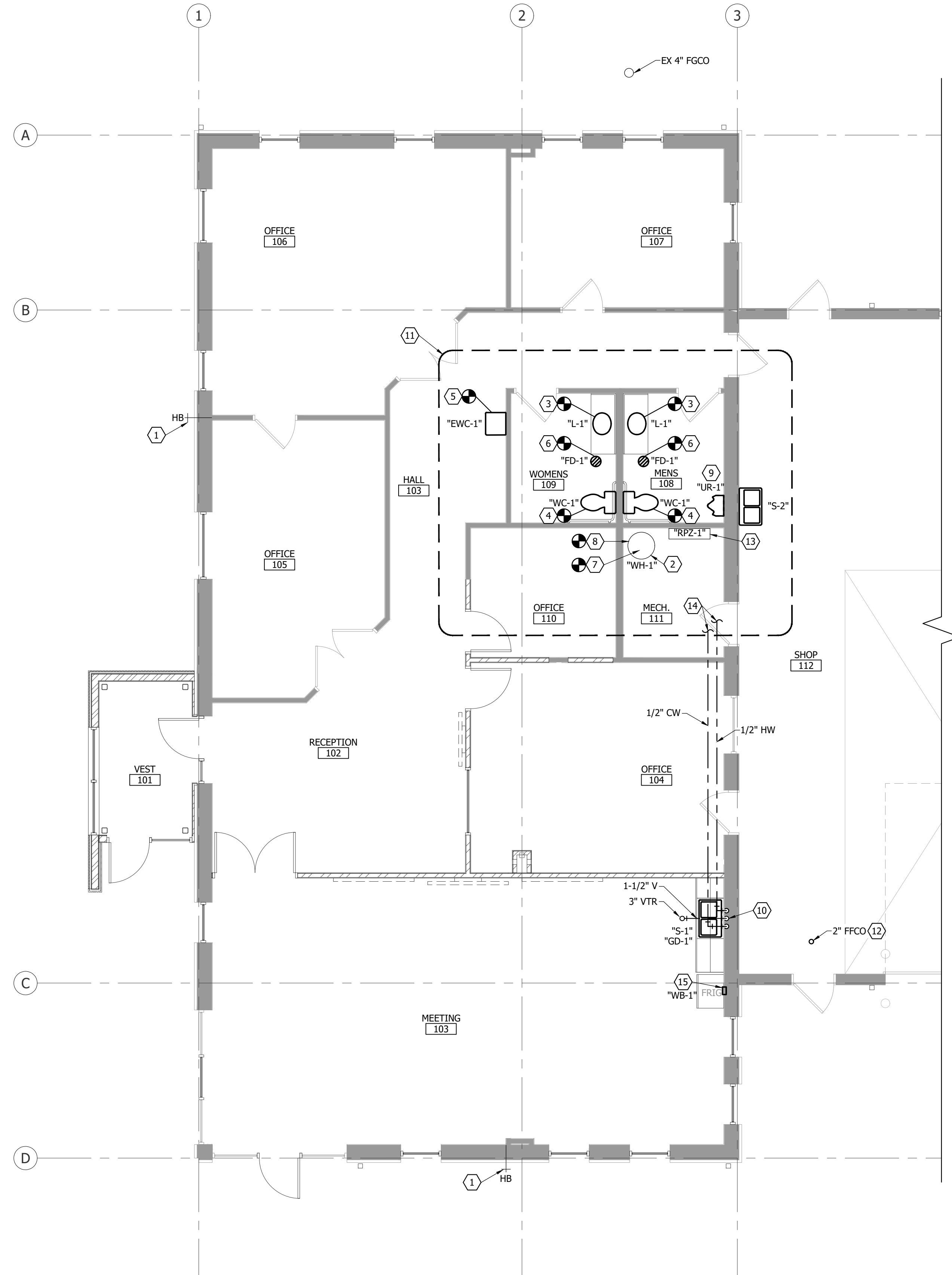
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Last edit on: 10/17/2024 4:23 PM by: SDM01521 Drawing Name: F:\Proj\12493\12493\_700\AutoCad\Plan Set\MEP\12493\_700\PLUMBING IMPROVEMENT PLAN.dwg Layout Name: PLUMBING IMPROVEMENT PLAN Plotted on: 10/17/2024 5:16:43 PM



**1 WATER SERVICE ENTRANCE-MODIFIED**  
NOT TO SCALE

BY	DATE	DESCRIPTION
DMW	10/01/2024	BID SET

NO.	DESCRIPTION
1	EX HOSE BIB AND ASSOCIATED PIPING TO REMAIN.
2	NEW WATER HEATER "WH-1". CONNECT TO EXISTING DOMESTIC COLD WATER SUPPLY AND HOT WATER SUPPLY. REFER TO DETAIL 3/P501.
3	P/C TO CONNECT NEW 1/2" CW, 1/2" HW, 2" W, TO EX PIPING STUB-OUTS. PROVIDE NEW SHUTOFF VALVE AND WATER SUPPLY LINE.
4	P/C TO CONNECT NEW 1/2" CW, & 4" W TO EX PIPING STUB-OUTS. PROVIDE NEW SHUTOFF VALVE AND WATER SUPPLY LINE.
5	P/C TO CONNECT NEW 1/2" CW, & 1-1/2" W TO EX PIPING STUB-OUTS.
6	P/C TO PROVIDE NEW 4 INCH DIAMETER FLOOR DRAIN COVER OVER EX FLOOR DRAIN.
7	CONNECT HW TO OUTLET OF NEW WATER HEATER AND PROVIDE SHUT OFF VALVE AND UNION.
8	CONNECT CW TO NEW DOMESTIC COLD WATER SERVICE DOWN STREAM FROM WATER METER AND PRV.
9	CONNECT NEW 1-1/2" V AND 2" W SERVING "UR-1" INTO EX 1-1/2" V AND EX 2" W SERVING NEW "S-2". CONNECT NEW 3/4" CW INTO "UR-1".
10	CONNECT NEW 1/2" CW, 1/2" HW, 1-1/2" V DOWN TO "S-1".
11	REFER TO DTL 5/P-501.
12	REFER TO DTL 2/P-501.
13	P/C TO PROVIDE NEW RPZ TO EX WATER SERVICE PIPING REFER TO DTL 1/P-501.
14	P/C TO CONNECT 1/2" CW, HW PIPING TO EX PIPING IN MECH RM 111. FIELD VERIFY EXACT CONNECTION REQUIREMENTS.
15	PROVIDE "WB-1" OATEY 12K ICE MAKER BOX OR PREAPPROVED EQUAL. MOUNT AT 2 FEET AFF BEHIND REFRIGERATOR. REFER TO DTL 5/501.

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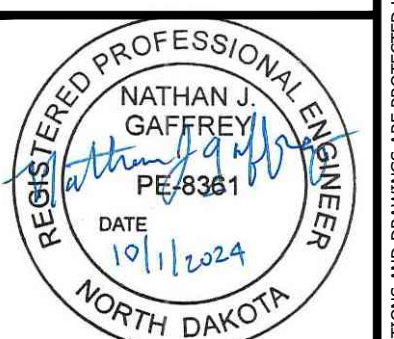
**GENERAL NOTES:**

- P/C TO COORDINATE WORK WITH ALL OTHER TRADES.
- THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.

**KEY PLAN:**



DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493_700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>P-112</b>
SHEET NO:	



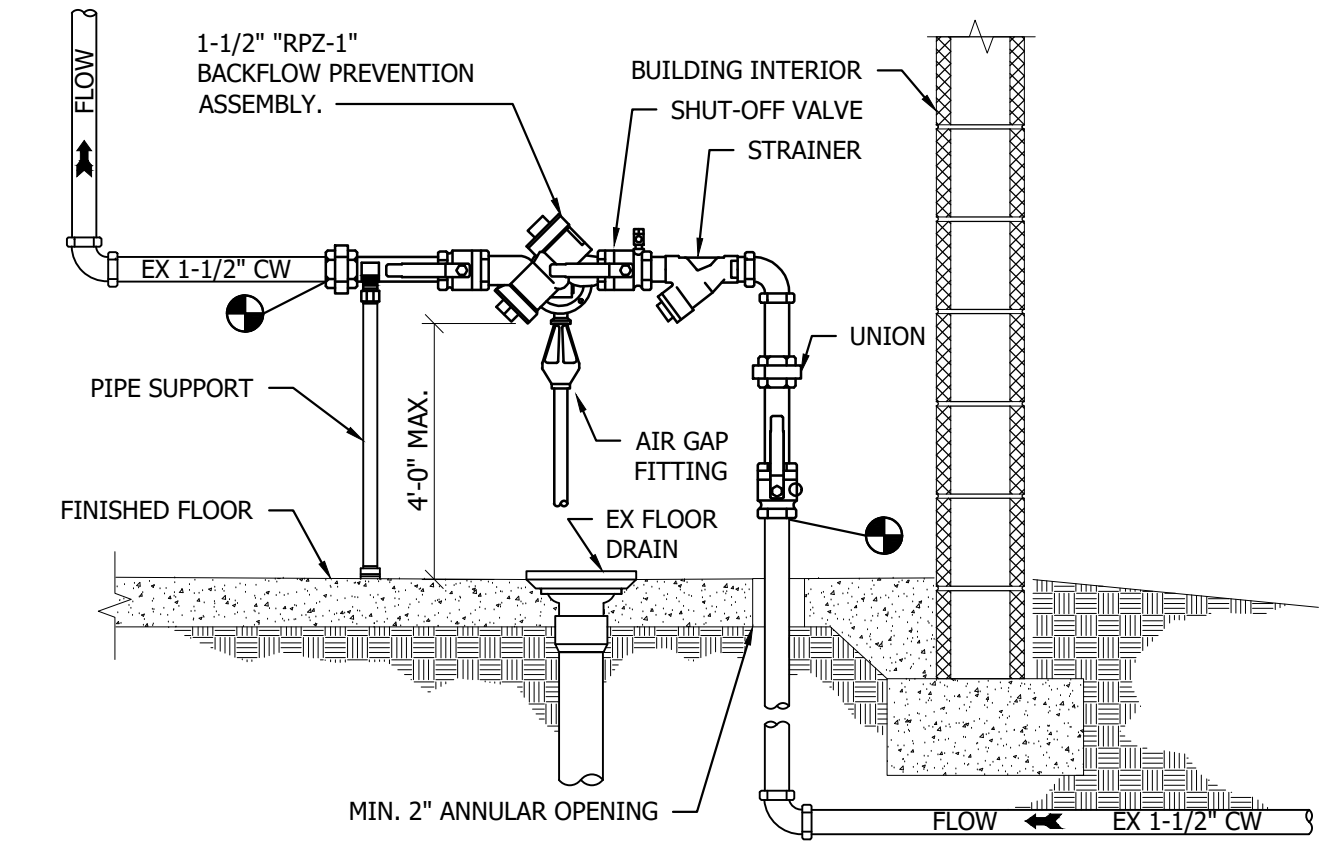
**PLUMBING IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

**PLUMBING IMPROVEMENT PLAN**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

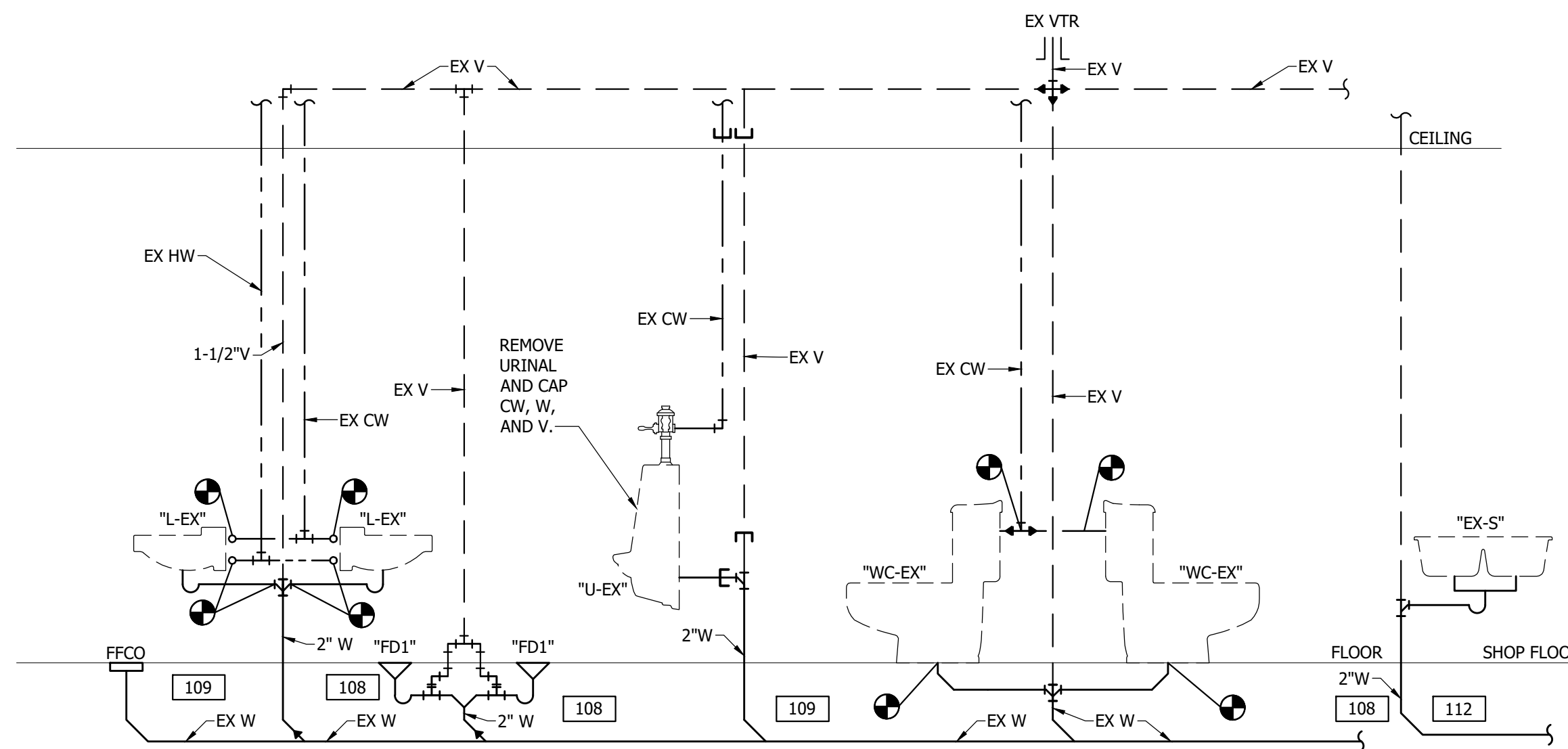
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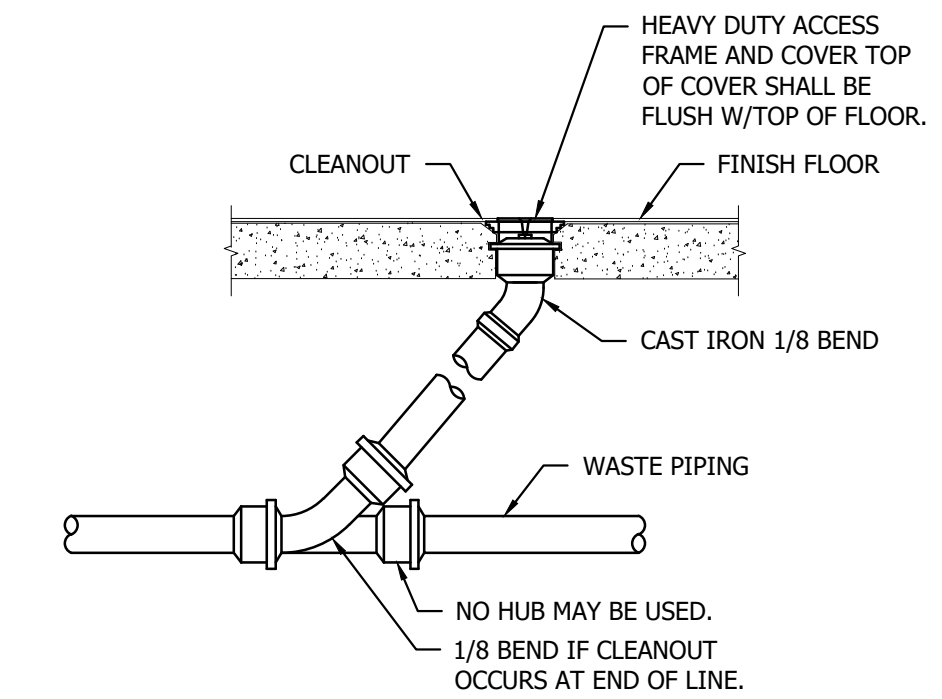
MARK	FIXTURE	MFR	MODEL	MOUNTING	ROUGH-IN SIZES (INCHES)				DESCRIPTION	ACCESSORIES
					CW	HW	WASTE	VENT		
"WC-1"	WATER CLOSET (ADA)	AMERICAN STANDARD	270AB.101 CADET	FLOOR	1/2	-	4	2	VITREOUS CHINA, FLOOR OUTLET, 1.28 GPF.	SEAT: AMERICAN STANDARD 5321.110
"UR-1"	URINAL (ADA)	AMERICAN STANDARD	6590.001 WASHBROOK	WALL	3/4	-	2	2	FLUSH VALVE, ELONGATED RIM, VITREOUS CHINA, 0.75 INCH TOP SPUD, 0.125 GPF WASHOUT FLUSH ACTION	FLUSH VALVE: AMERICAN STANDARD #605.013.002 (TOP SPUD) MANUAL MOUNT AT ADA HEIGHT
"L-1"	LAVATORY (ADA)	AMERICAN STANDARD	427.444EC CADET	COUNTERTOP	1/2	1/2	2	1-1/2	SELF-RIMMING, STAINLESS STEEL, 4-INCH CENTER FAUCET HOLES, FRONT OVERFLOW AND CHROME PLATED DRAIN TAIL PIECE	WASTE & SUPPLY PIPING COVER: TRUEBRO MODEL #102 E-Z FAUCET: AMERICAN STANDARD 2385.003 RELIANT+ (GRID DRAIN) INSULATION KIT: TRUEBRO LAV-GUARD 2 E-Z
"S-1"	SINK (ADA)	ELKAY	LRADQ331950	COUNTERTOP	1/2	1/2	2	1-1/2	DUAL COMPARTMENT, SELF-RIMMING, 5-INCH BOWL DEPTH, TYPE 304(18-8) STAINLESS STEEL SINK WITH HOLES IN DECK TO MATCH FAUCET	WASTE & SUPPLY PIPING COVER: TRUEBRO MODEL #102 E-Z DRAIN: ELKAY LK-35 FAUCET: AMERICAN STANDARD LKD2423BHC (LESS HANDSPRAY) BOTTLE FILLER: BRITA USS-323 2 STAGE FILTRATION SYSTEM FOOD DISPOSAL: INSINKERATOR BADGER 5 WITH POWER CORD
"S-2"	SINK	MUSTEE	27F	FLOOR	1/2	1/2	2	1-1/2	DUAL COMPARTMENT, FREE-STANDING, ONE-PIECE MOLDED CONSTRUCTION, TWIN DRAIN WASTE COUPLING, HEAVY GAUGE STEEL LEGS WITH LEVELING BUILD IN, P-TRAP, MOLD AND MILDEW RESISTANT	WASTE & SUPPLY PIPING COVER: TRUEBRO MODEL #102 E-Z FAUCET: MUSTEE MODEL 93.600
"EWC-1"	ELECTRIC WATER COOLER	HALSEY TAYLOR	HTHB-HAC8SS-W	WALL	3/4	-	1-1/2	1-1/2	ELECTRIC WATER COOLER, BUBBLER MECHANICAL PUSHBAR ACTIVATION, BOTTLE FILLER SENSOR ACTIVATED, 8.0 GPH CHILLING CAPACITY, STAINLESS STEEL ENCLOSURE.	REFRIGERANT: R-134A
"WH-1"	ELECTRIC WATER HEATER	RELIANCE	6 50 EORS	FLOOR	3/4	-	-	-	ELECTRIC WATER HEATER, 240 V/ 1 PHASE, 4500 W DUAL HEATING ELEMENT, GLASS LINED TANK, 50 GALLON CAPACITY.	PROVIDE WITH FACTORY TEMPERATURE AND PRESSURE RELIEF VALVE. PROVIDE THERM-X-TROL #ST-5-DD EXPANSION TANK 2.0 GALLON VOLUME.
"RPZ-1"	REDUCED PRESSURE BACKFLOW PREVENTER	WATTS	919QT-S	WALL	1	-	-	-	REDUCED PRESSURE BACKFLOW PREVENTER WITH STRAINER AND SHUT OFF VALVES.	-



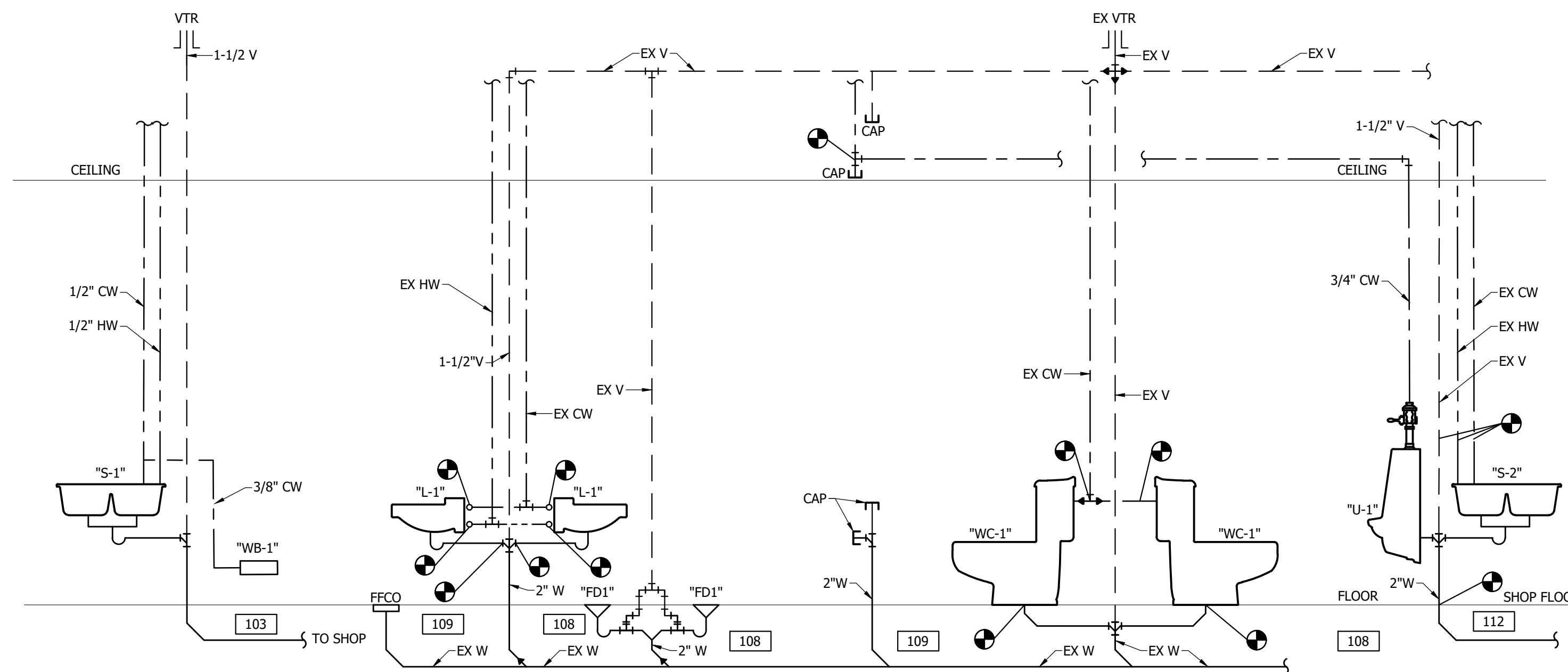
1 RPZ ASSEMBLY WITH STRAINER DETAIL  
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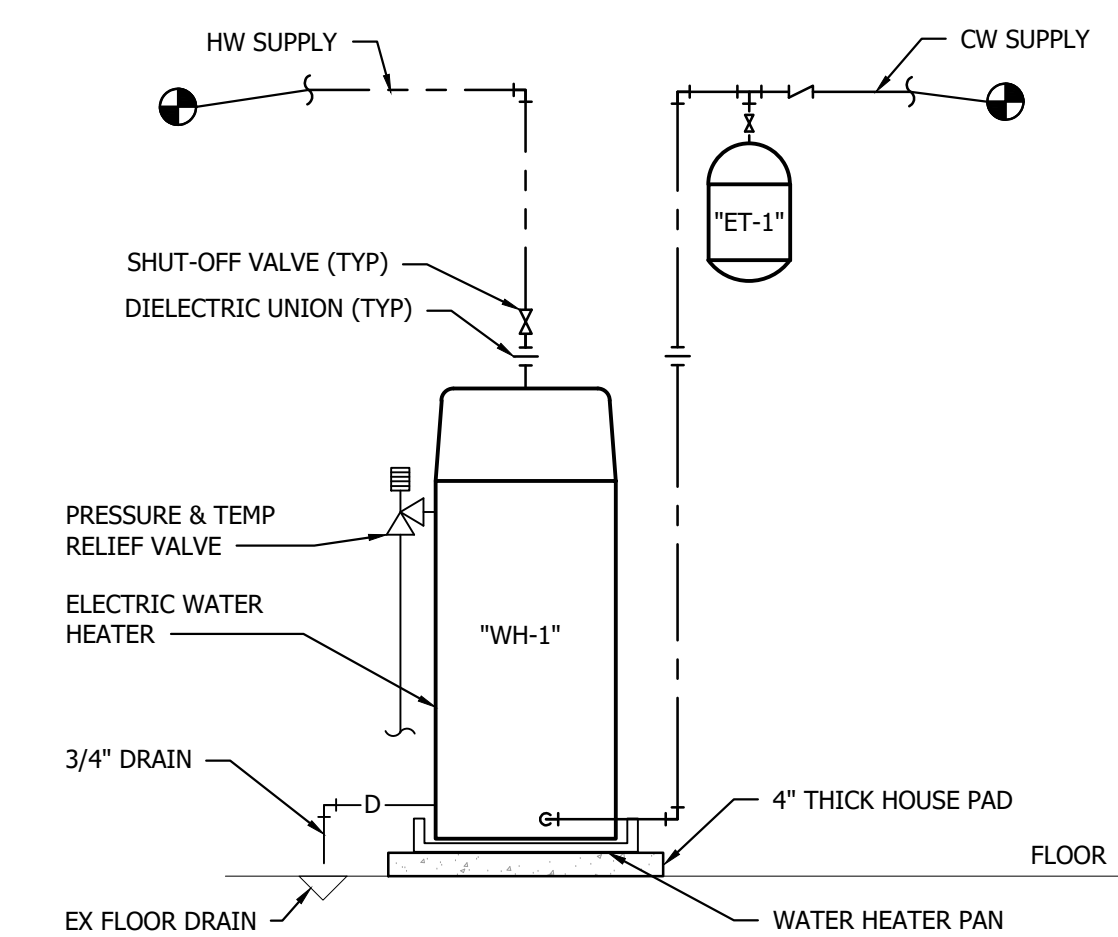
4 DEMO PLUMBING RISER DIAGRAM  
NOT TO SCALE



2 FINISHED FLOOR CLEANOUT DETAIL  
NOT TO SCALE



5 NEW PLUMBING RISER DIAGRAM  
NOT TO SCALE



3 ELECTRIC WATER HEATER DETAIL  
NOT TO SCALE

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**PLUMBING DETAILS  
SCHEDULES & RISERS**

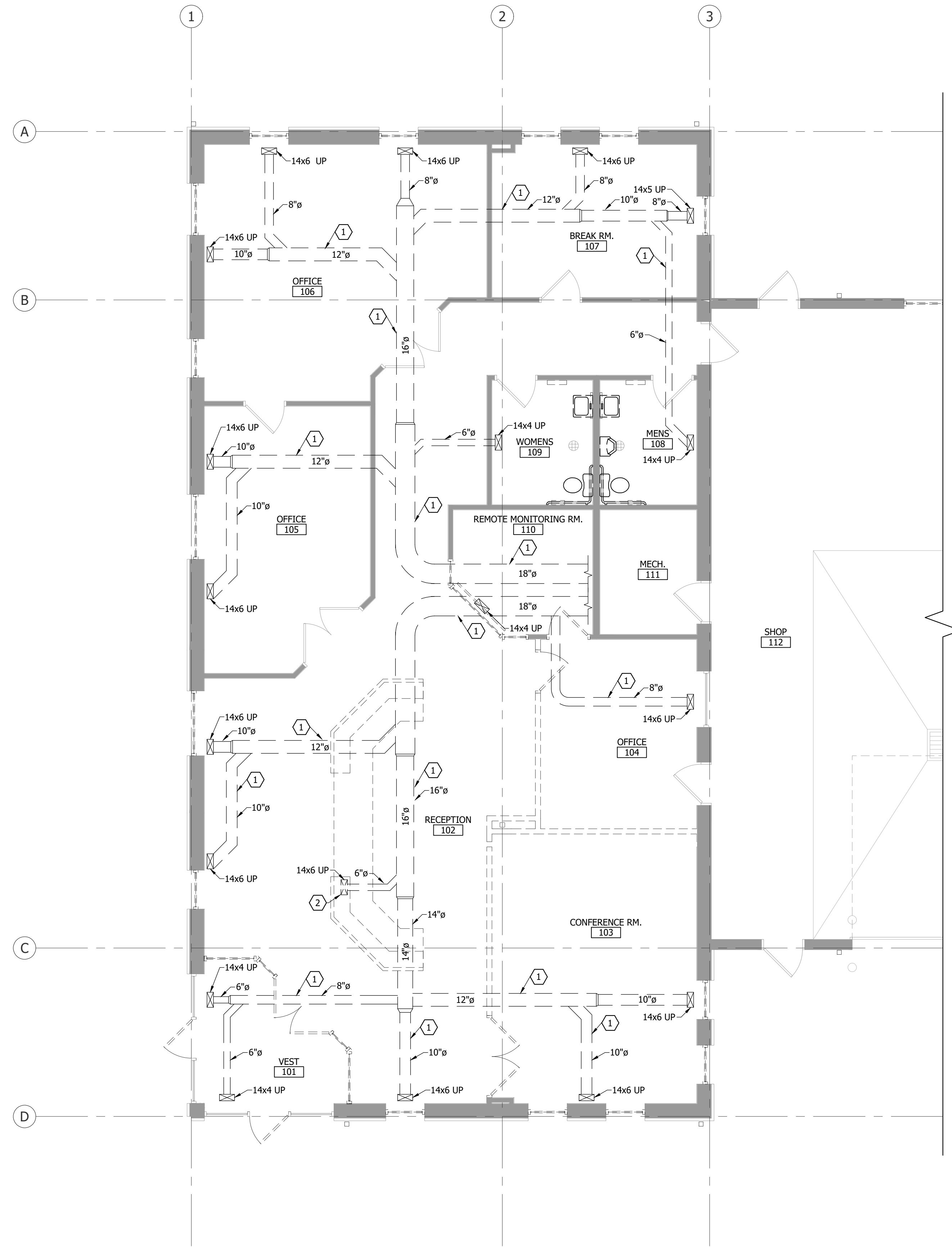
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
NATHAN J. GAFFNEY  
PE #8361  
DATE 10/11/2024  
NORTH DAKOTA

DESIGNED BY: NJG  
DRAWN BY: SDM/NJG  
APPROVED BY: MSV  
DESIGN PROJ: 12493.700  
CONST PROJ: ---  
SCALE: AS NOTED  
DATE: OCTOBER 2024  
DRAWING NO: **P-501**  
SHEET NO:




Last edit on: 10/17/2024 4:25 PM by: SDM01521 Drawing Name: F:\Proj\12000\12493\12493.700\AutoCAD\Plan Set\MEP\12493.700\MEP\12493.700.dwg Layout Name: MECHANICAL UNDERFLOOR DEMOLITION PLAN Plotted on: 10/17/2024 5:16:35 PM



**MECHANICAL UNDERFLOOR DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

REFERENCE NOTES:	
1	ALL UNDERSLAB DUCTWORK TO REMAIN.
2	REMOVE DIFFUSER AND CAP. INFILL DIFFUSER OPENING WITH CONCRETE TO PROVIDE APPROPRIATE SUPPORT FOR FOOT TRAFFIC.

DATE	DESCRIPTION	BY
10/01/2024	BID SET	SDM



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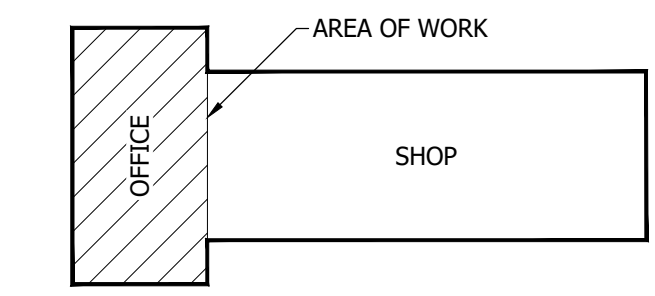
- GENERAL NOTES:**
- M/C TO COORDINATE WORK WITH OTHER TRADES.
  - THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.
  - M/C TO PROVIDE DUCT CLEANING FOR ALL UNDER FLOOR DUCTS WITH HEPA-FILTERED VACUUM AND COMPRESSED AIR TO REMOVE ALL DIRT, DUST, AND DEBRIS.

**MECHANICAL UNDERFLOOR DEMOLITION PLAN**

**MR&I OFFICE REMODEL**

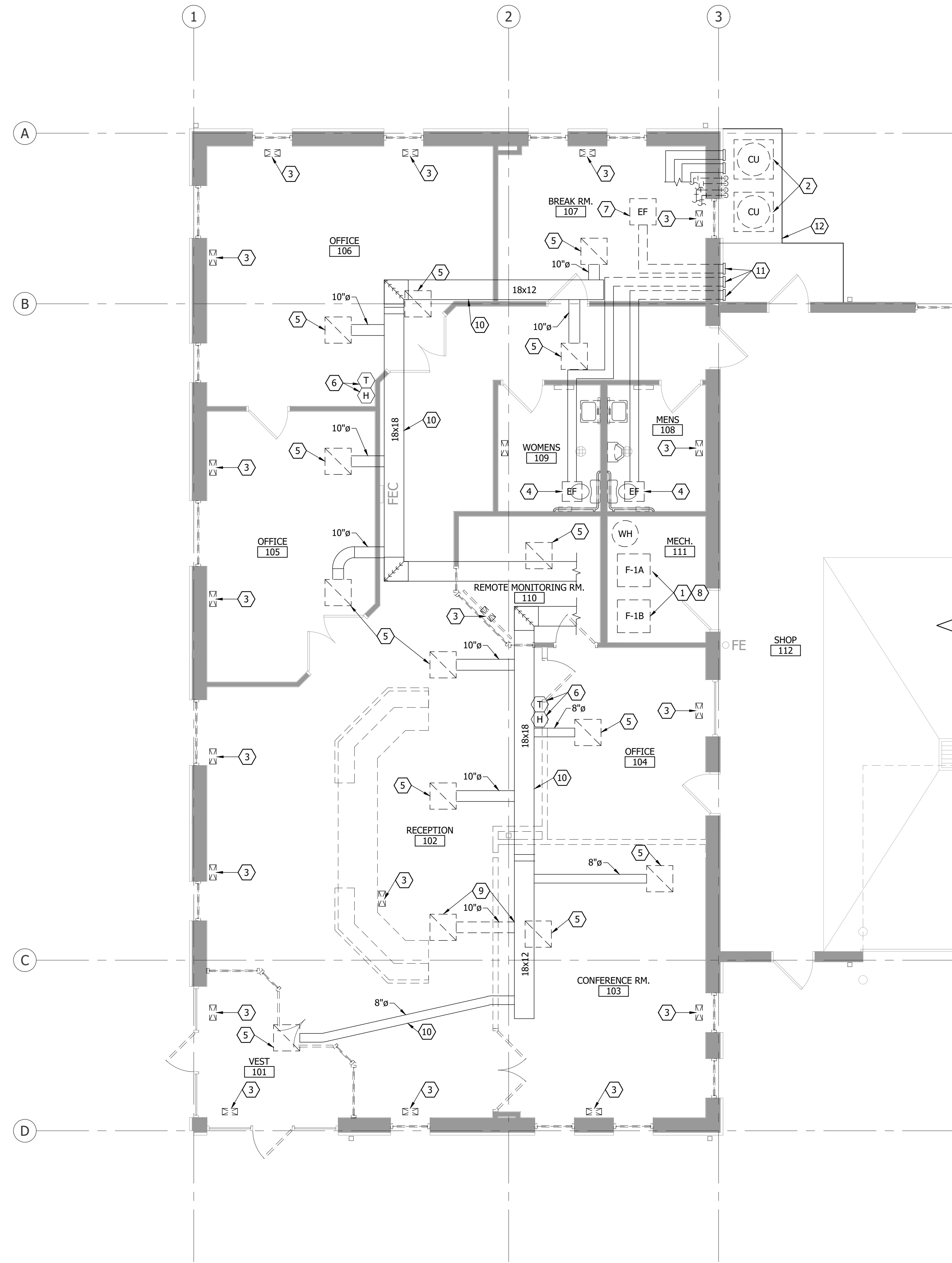
**9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538**

REGISTERED PROFESSIONAL ENGINEER  
NATHAN J. GAFFREY  
PE 8361  
DATE 10/11/2024  
NORTH DAKOTA

KEY PLAN:																			
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DESIGNED BY:	NJG																		
DRAWN BY:	SDM/NJG																		
APPROVED BY:	MSV																		
DESIGN PROJ:	12493.700																		
CONST PROJ:	---																		
SCALE:	AS NOTED																		
DATE:	OCTOBER 2024																		
DRAWING NO:	<b>M-101</b>																		
SHEET NO:																			

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**MECHANICAL DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

REFERENCE NOTES:	
1	REMOVE EXISTING PROPANE FIRED DOWNFLOW FURNACES, A-COILS, DUCTWORK CONNECTIONS, AND CONTROL WIRE. PREPARE EXISTING DUCT FOR CONNECTION TO NEW DOWNFLOW FURNACE. (TYP).
2	REMOVE EXISTING CONDENSING UNITS, REFRIGERANT PIPING, AND ALL ASSOCIATED APPURTENANCES, AND CONTROL WIRE (TYP). EVACUATE REFRIGERANT LINES, STORE REFRIGERANT IN SAFE AND LEGAL CONTAINER. TURN REFRIGERANT OVER TO OWNER.
3	REMOVE ALL EXISTING FLOOR SUPPLY AIR GRILLES (TYP).
4	REMOVE EXISTING BATHROOM EXHAUST FANS. PREPARE EXISTING DUCTWORK FOR CONNECTION TO NEW CEILING EXHAUST FANS.
5	REMOVE EX CEILING RETURN GRILLES (TYP). PREPARE DUCTWORK FOR CONNECTION TO NEW RETURN AIR GRILLES (TYP).
6	REMOVE EX THERMOSTAT AND HUMIDISTAT AND ALL CONTROL WIRE AND CONDUIT. (TYP).
7	REMOVE EX CEILING EXHAUST FAN, ASSOCIATED EXHAUST DUCTWORK AND APPURTENANCES.
8	REMOVE EX DUCT MOUNTED HUMIDIFIERS AND PREPARE FOR CONNECTION OF NEW HUMIDIFIERS. (TYP).
9	REMOVE EX REMOVE EX CEILING RETURN GRILLE AND DUCTWORK TO MAIN. CAP DUCTWORK AT MAIN.
10	EX RA DUCT TO REMAIN.
11	REMOVE EXHAUST LOUVERS. PROVIDE INSULATION IN THE INTERSTITIAL SPACE AND PROVIDE WEATHERPROOF MATCHING METAL SIDING FOR COVER. (TYP).
12	REMOVE ANY EXISTING CONCRETE PAD SERVING EX "CU" CONDENSING UNITS.

GENERAL NOTES:	
1.	M/C TO COORDINATE WORK WITH OTHER TRADES.
2.	THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.
3.	M/C TO PROVIDE DUCT CLEANING FOR ALL UNDER FLOOR DUCTS WITH HEPA-FILTERED VACUUM AND COMPRESSED AIR TO REMOVE ALL DIRT, DUST, AND DEBRIS.

**MECHANICAL DEMOLITION PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
NATHAN J. GAFFNEY  
PE 8361  
DATE 10/17/2024  
NORTH DAKOTA

KEY PLAN:	
	AREA OF WORK
	SHOP

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493-700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>M-102</b>
SHEET NO:	

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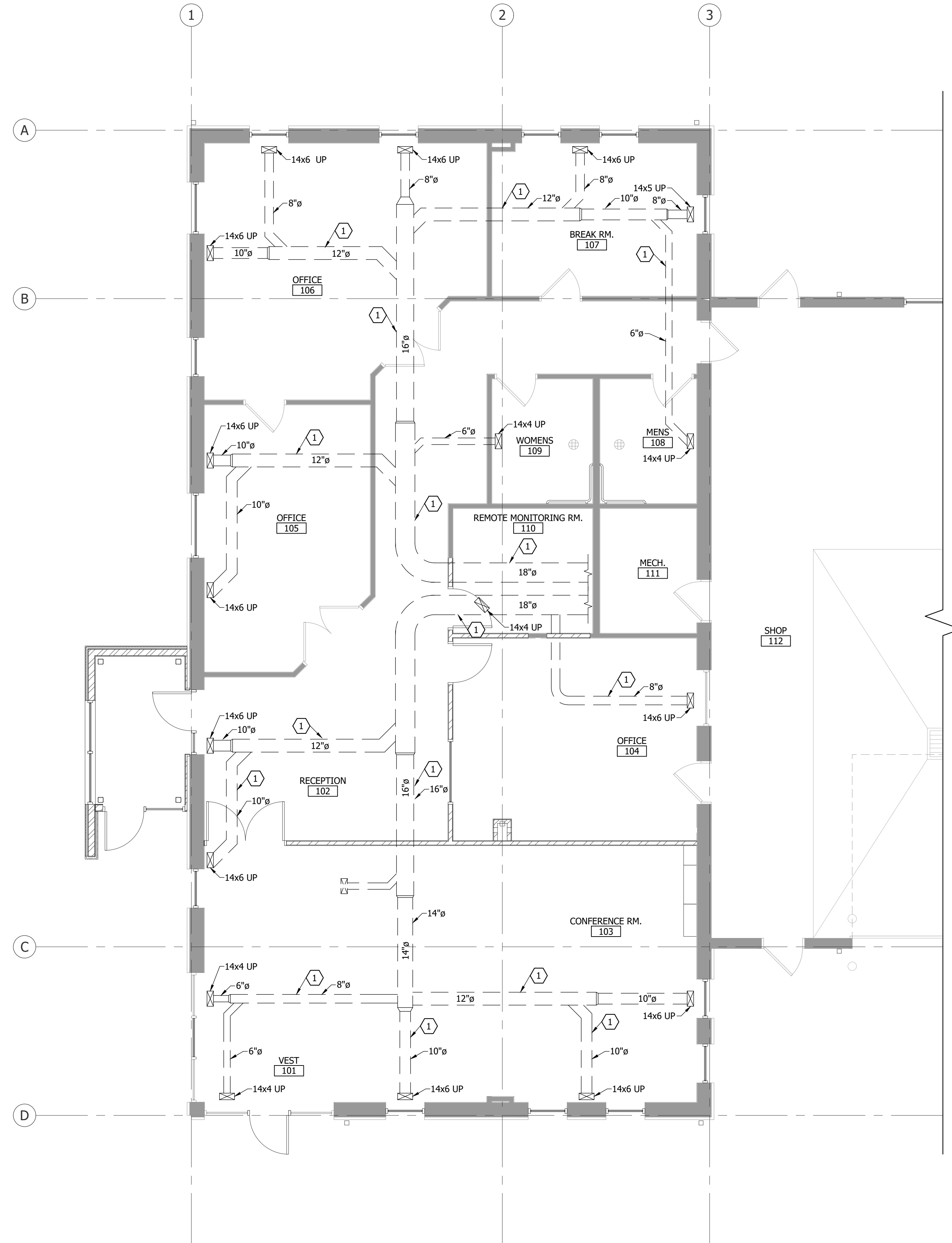
3458 E CENTURY AVENUE - BISMARCK, ND 58503  
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BY: DIMW  
DATE: 10/01/2024  
# 10/01/2024  
DESCRIPTION: BID SET

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**MECHANICAL UNDERFLOOR IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

REFERENCE NOTES:	
1	ALL UNDERSLAB DUCTWORK TO BE PROFESSIONALLY CLEANED (TYP).

DATE	DESCRIPTION	BY
10/01/2024	BID SET	SDM



GENERAL NOTES:	
1.	M/C TO COORDINATE WORK WITH OTHER TRADES.
2.	THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.
3.	M/C TO PROVIDE DUCT CLEANING FOR ALL UNDER FLOOR DUCTS WITH HEPA-FILTERED VACUUM AND COMPRESSED AIR TO REMOVE ALL DIRT, DUST, AND DEBRIS.
4.	M/C TO PREPARE UNDERFLOOR DUCT SA RISERS FOR NEW SA FLOOR REGISTERS. FIELD VERIFY EXACT REQUIREMENTS.

MECHANICAL UNDERFLOOR IMPROVEMENT PLAN	
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538	MR&I OFFICE REMODEL

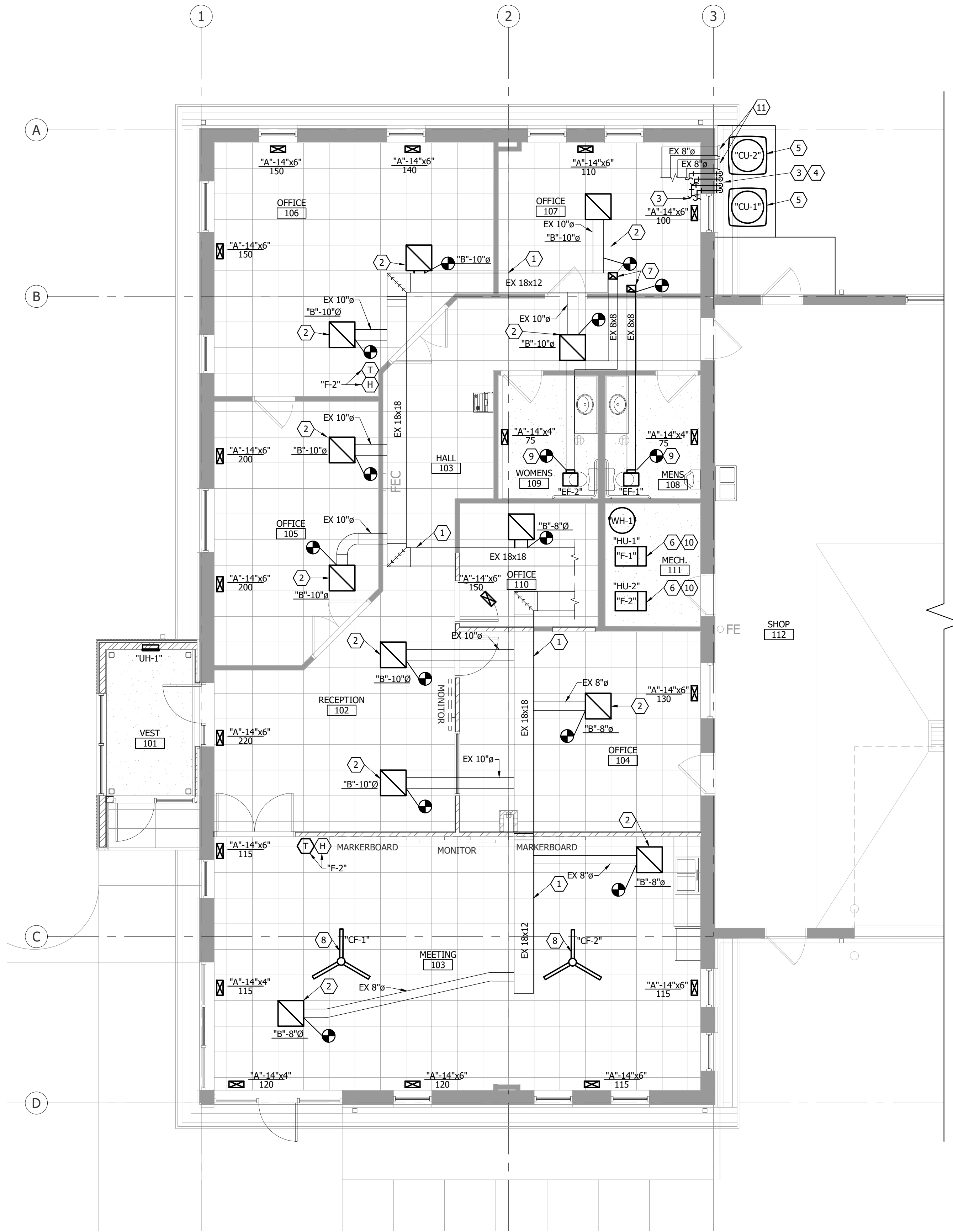
REGISTERED PROFESSIONAL ENGINEER	NATHAN J. GAFFREY
	PE 8361
DATE	10/11/2024
	NORTH DAKOTA

KEY PLAN:	
	AREA OF WORK
	SHOP

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ.:	12493.700
CONST PROJ.:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO.:	<b>M-111</b>
SHEET NO.:	

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**MECHANICAL IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

BY	DATE	DESCRIPTION
DWM	10/01/2024	BID SET

**REFERENCE NOTES:**

- ① CLEAN INTERIOR OF ALL EX RETURN AIR DUCT MAINS AND BRANCHES.
- ② PROVIDE NEW RA DIFFUSERS (TYP). CONNECT EXISTING RETURN AIR DUCTWORK TO NEW RA DIFFUSER (TYP). MODIFY EXISTING RETURN AIR DUCTWORK TO PROVIDE PROPER CONNECTION TO NEW RA DIFFUSERS (TYP).
- ③ ROUTE RL & RS REFRIGERANT PIPING FROM "CU-1" AND "CU-2" ABOVE CEILING TO NEW "F-1" AND "F-2" LOCATED IN MECHANICAL ROOM. EQUIPMENT MANUFACTURER SHALL BE RESPONSIBLE FOR SIZING RL & RS REFRIGERANT PIPING.
- ④ M/C TO PROVIDE EXTERIOR RL & RS REFRIGERANT PIPING INSULATION WITH ALUMINUM JACKET (TYP).
- ⑤ M/C TO PROVIDE A 4" AFG CONCRETE HOUSEKEEPING PAD FOR CONDENSING UNIT "CU-1" AND "CU-2". PAD SIZE SHALL BE 6" LARGER THAN THE FOOTPRINT OF UNIT (TYP).
- ⑥ CONNECT NEW HUMIDIFIERS "HU-1" AND "HU-2" TO "F-1" AND "F-2". ROUTE HUMIDIFIER DRAIN TO EX FLOOR DRAIN IN MECH RM 111. INSTALL PER MANUFACTURER REQUIREMENTS.
- ⑦ PROVIDE NEW GOOSENECK DUCT UP THRU ROOF. NEW DUCT TO MATCH EXISTING DUCT SIZE. REFER TO DETAIL 4/M501.
- ⑧ M/C TO REFER TO MANUFACTURER'S RECOMMENDATION ON MOUNTING REQUIREMENTS. M/C TO MOUNT FAN TO BOTTOM OF STRUCTURE WITH 4-1/2" DOWNROD.
- ⑨ REFER TO DETAIL 5/M501 FOR FAN MOUNTING REQUIREMENTS.
- ⑩ REFER TO DETAIL 1/M501 FOR FURNACE INSTALLATION DETAIL.
- ⑪ EXISTING OUTSIDE AIR LOUVERS TO REMAIN.

**GENERAL NOTES:**

1. M/C TO COORDINATE WORK WITH OTHER TRADES.
2. ALL RL & RS REFRIGERANT SIZING TO BE PER MANUFACTURERS RECOMMENDATIONS.
3. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EXACT CONDITIONS.
4. M/C TO PROVIDE DUCT CLEANING WITH HEPA-FILTERED VACUUM AND COMPRESSED AIR FLUSH TO REMOVE ALL DIRT, DUST & DEBRIS. DUCT SYSTEMS TO BE CLEANED INCLUDE UNDER FLOOR SA, OSA, AND RA.

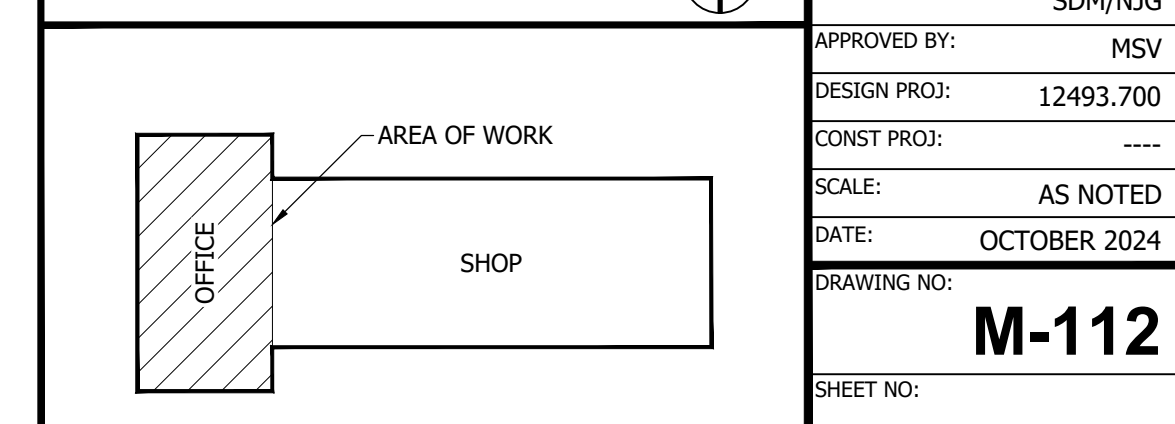
**Bartlett & West**  
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**MECHANICAL IMPROVEMENT PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
NATHAN J. GAFFNEY  
Nathan J. Gaffney  
PE 8361  
DATE 10/11/2024  
NORTH DAKOTA

**KEY PLAN:**



DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>M-112</b>
SHEET NO:	

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**FURNACE/EVAPORATOR COIL/CONDENSING UNIT SCHEDULE**

FURNACE MARK	MFGR	MODEL	SUPPLY AIRFLOW (CFM)	OUTSIDE AIRFLOW (CFM)	ESP (IN WC)	HEATING				EVAPORATOR COIL				CONDENSER				NOTES						
						INPUT (MBH)	MIN. OUTPUT (MBH)	MOTOR (HP)	VOLTS/PHASE	MFGR	MODEL	COOLING AIRFLOW (CFM)	EAT DB/WB (°F)	LAT DB/WB (°F)	SENSIBLE CAPACITY (MBH)	TOTAL CAPACITY (MBH)	MARK		MFGR	MODEL	AMB TEMP (°F)	VOLTS/PHASE	MCA (AMPS)	MOCAP (AMPS)
F-1	DAIKIN	DC96VE0603BN	1200	225	0.5	60	57.6	0.5	120/1	DAIKIN	CAPFA3626C6	1200	79/63	55/53	31.6	35.6	CU-1	DAIKIN	DC35EN3610	95	240/1	17.5	30	1-11
F-2	DAIKIN	DC96VE0603BN	1200	225	0.5	60	57.6	0.5	120/1	DAIKIN	CAPFA3626B3	1200	79/63	55/53	31.6	35.6	CU-2	DAIKIN	DC35EN3610	95	240/1	17.5	30	1-11

- NOTES:
1. PROVIDE WITH STAINLESS-STEEL HEAT EXCHANGER.
  2. TWO-STAGE PROPANE GAS VALVE.
  3. INSULATED HEAT EXCHANGER AND BLOWER SECTION.
  4. PROPANE GAS PRESSURE REGULATOR. FIELD VERIFY PROPANE GAS INLET PRESSURE.
  5. THERMOSTAT-WALL-MOUNTED, 7-DAY PROGRAMABLE.
  6. R-32 REFRIGERANT.
  7. SINGLE STAGE SCROLL COMPRESSOR.
  8. PROVIDE APRILAIRE MODEL 700 HUMIDIFIERS WITH REMOTE DIGITAL DISPLAY HUMIDIFIER CONTROL OR PREAPPROVED EQUAL.
  9. PROVIDE REFRIGERANT LEAK DETECTION SENSORS IN SUPPLY DUCT WORK OF EACH FURNACE UNIT. REFRIGERANT LEAK DETECTION SHALL BE IN COMPLIANCE WITH ASHRAE STANDARD 15.
  10. PROVIDE VISUAL AND AUDIBLE ALARM FOR REFRIGERANT LEAK DETECTION.
  11. PROVIDE F-1 AND F-2 WITH MERV-8 AIR FILTERS.

**FAN SCHEDULE**

MARK	MFGR	MODEL	AIRFLOW (CFM)	E.S.P. (IN. WC.)	MOTOR HP	FLA	VOLTS	PHASE	NOTES
EF-1	GREENHECK	SP-A200	140	0.30	0.01	0.46	120	1	1,2
EF-2	GREENHECK	SP-B110ES	70	0.30	0.02	0.27	120	1	1,2
CF-1	MONTE CARLO	5HV52RZW	4400	--	FRAC	--	120	1	3,4,5
CF-2	MONTE CARLO	5HV52RZW	4400	--	FRAC	--	120	1	3,4

- NOTES:
1. INTEGRAL DISCONNECT SWITCH.
  2. GRAVITY BACKDRAFT DAMPER.
  3. PROVIDE WITH A SINGLE LEVITON DSF01-10Z SOLID STATE SPEED CONTROL OR PREAPPROVED EQUAL TO CONTROL BOTH "CF-1" AND "CF-2" SIMULTANEOUSLY.
  4. PROVIDE WITH 4-1/2 INCH DOWNROD AND T-BAR CEILING MOUNTING HARDWARE.
  5. FAN AND SOLID STATE SPEED CONTROL TO BE WHITE IN COLOR.

**ELECTRIC UNIT HEATER SCHEDULE**

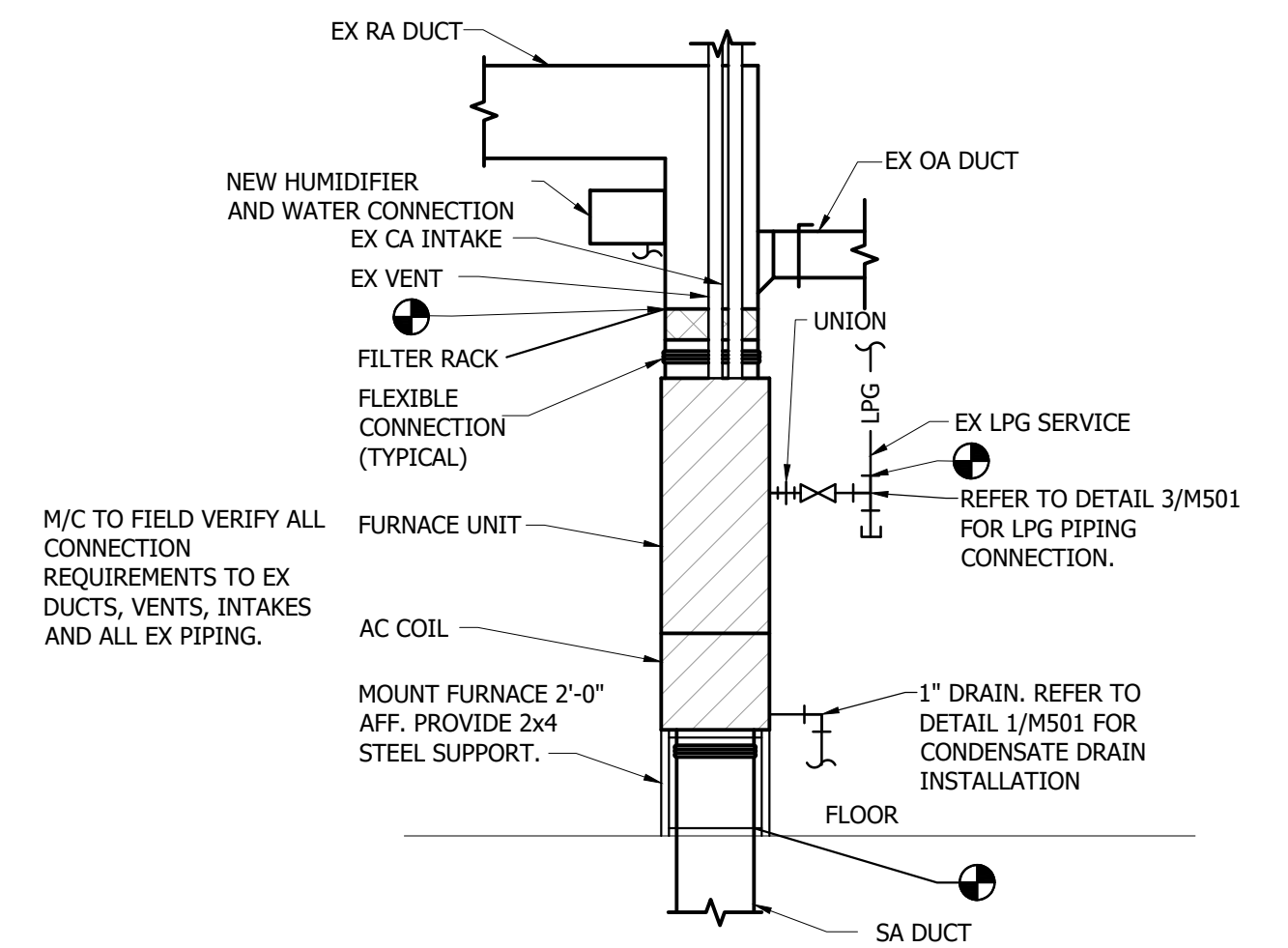
MARK	MFGR	MODEL	FAN AIRFLOW (CFM)	HEATING CAPACITY (KW)	MIN. OUTPUT (MBH)	ELECTRICAL VOLTS/PHASE	MCA (AMPS)	NOTES
EUH-1	QMARK	AWH3150F	100	1.5	5110	120/1	12.5	1-6

- NOTES:
1. INTEGRAL THERMOSTAT
  2. INTEGRAL DISCONNECT SWITCH
  3. SINGLE POINT ELECTRICAL CONNECTION
  4. THERMAL CUTOFF.
  5. WALL RECESSED MOUNTED.
  6. COLOR SHALL BE WHITE.

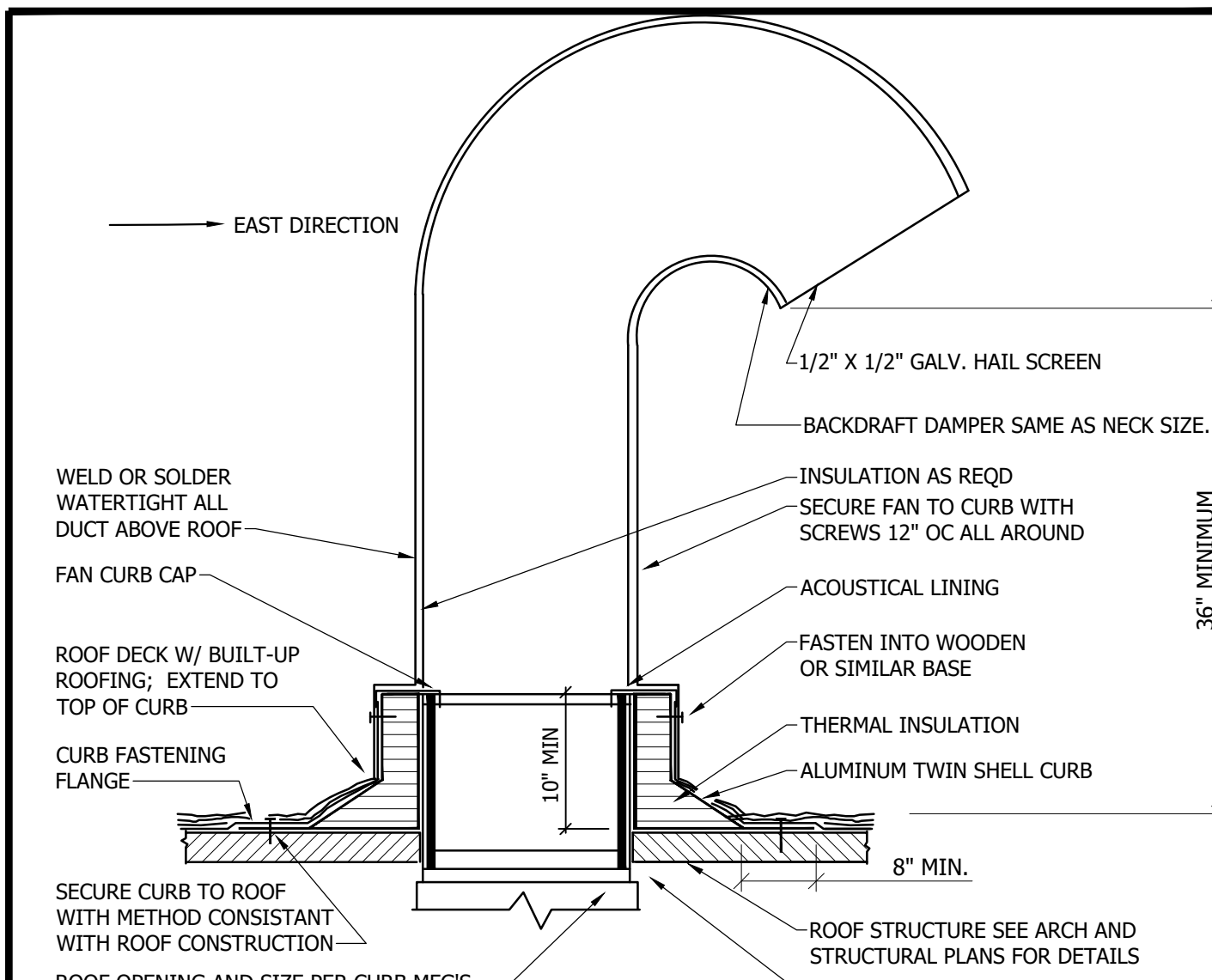
**GRILLES, REGISTERS, & DIFFUSERS SCHEDULE**

MARK	MFGR	MODEL	SERVICE	FACE SIZE	FRAME TYPE	FINISH	VOLUME CONTROL
A	TITUS	CT-PP-0	SA	REFER TO PLANS	TF	WHITE	YES
B	TITUS	50F	RA	24x24	T, S	WHITE	YES

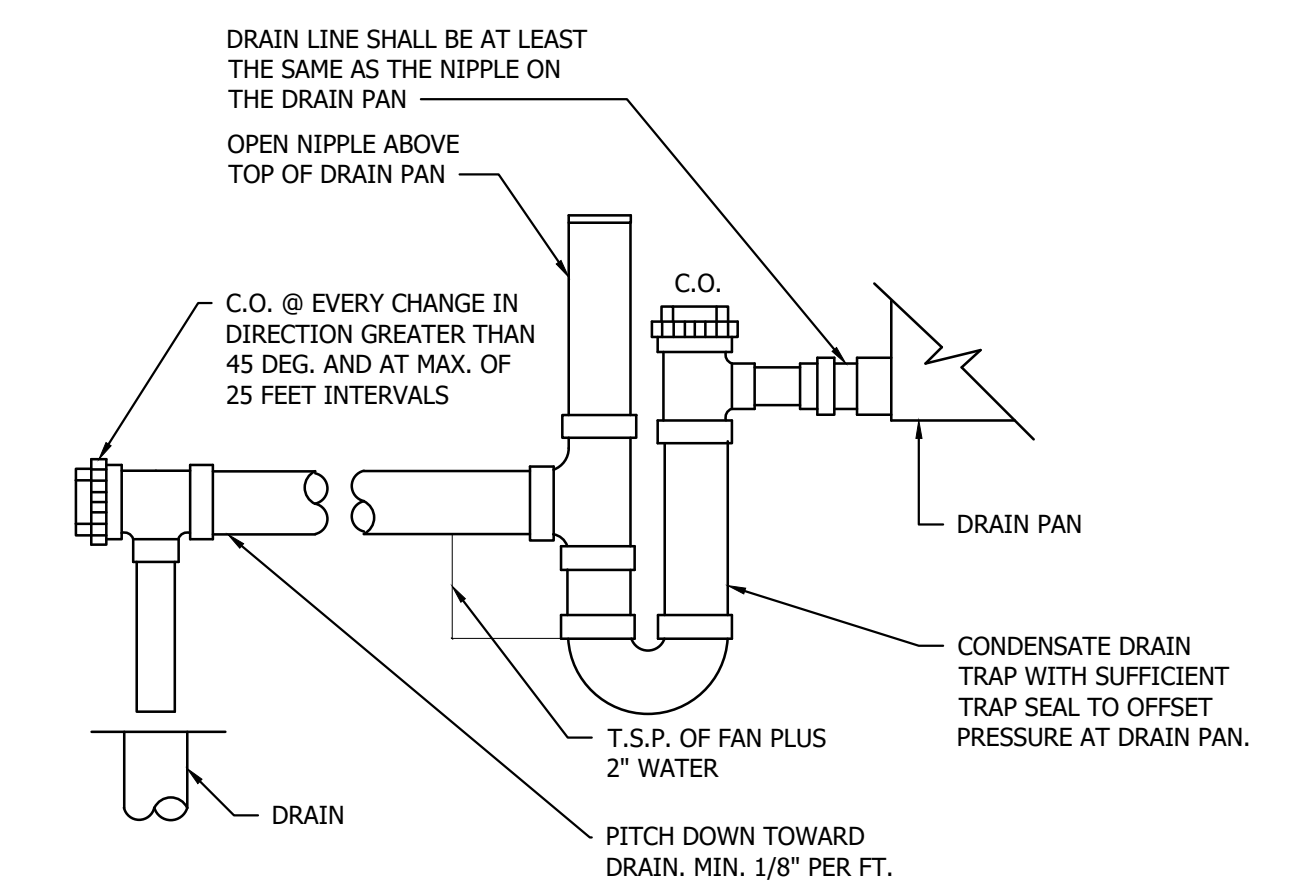
- ABBREVIATIONS:
- T - LAY-IN CEILING MOUNT
  - TF - LAY-IN FLOOR MOUNT
  - S - SURFACE MOUNT
  - E - EXPOSED DUCT MOUNT



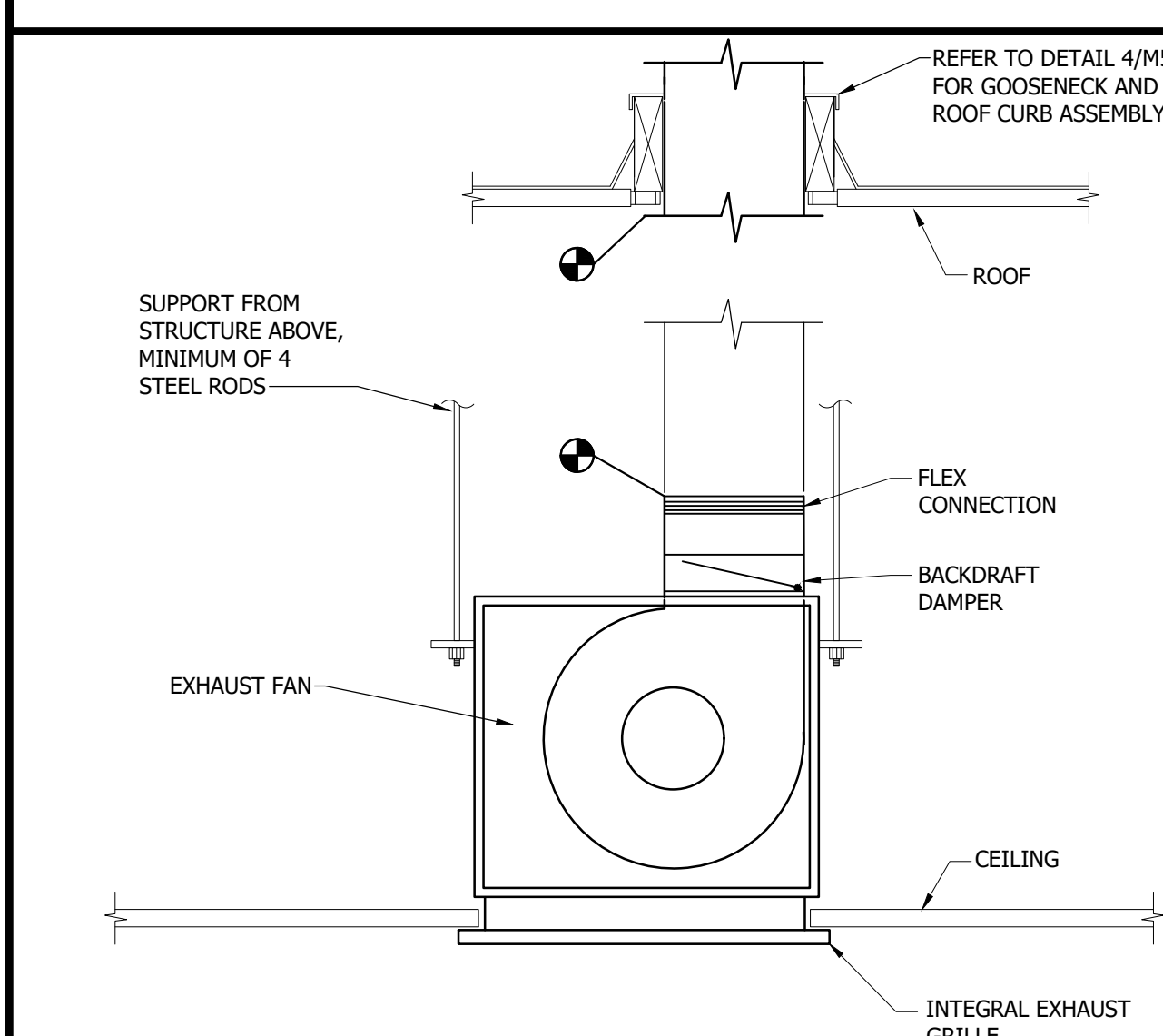
**1 DOWN FLOW FURNACE DETAIL (F-1 & F-2)**  
NOT TO SCALE



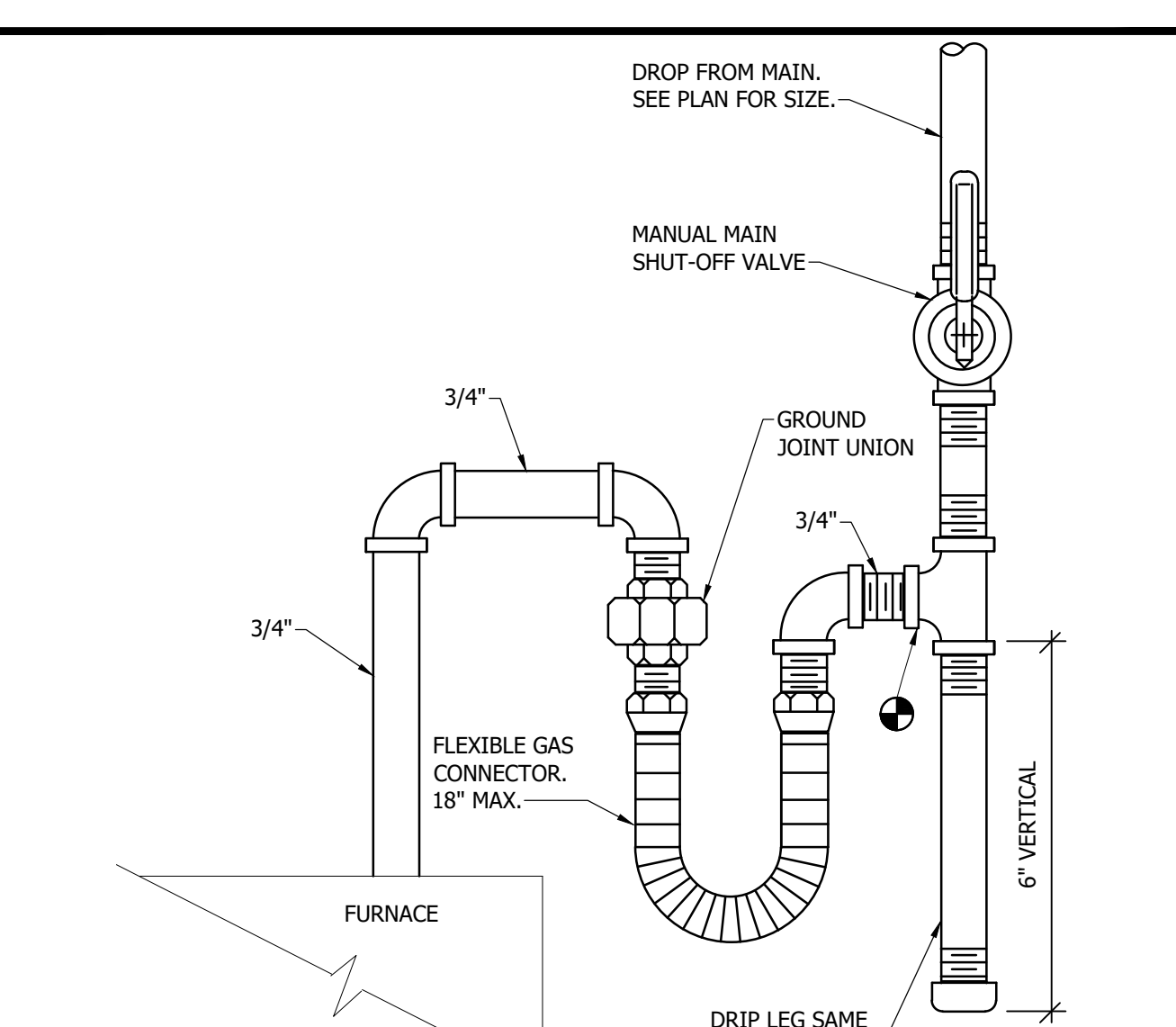
**4 GOOSENECK DETAIL THRU ROOF (EF-1 & EF-2)**  
NOT TO SCALE



**2 CONDENSATE DRAIN TRAP DETAIL (F-1 & F-2)**  
NOT TO SCALE



**5 EXHAUST FAN DETAIL (EF-1 & EF-2)**  
NOT TO SCALE



**3 NATURAL GAS HOOKUP DETAIL (F-1 & F-2)**  
NOT TO SCALE

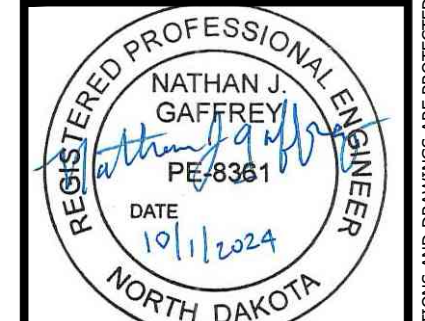
DATE	DESCRIPTION
10/01/2024	BID SET

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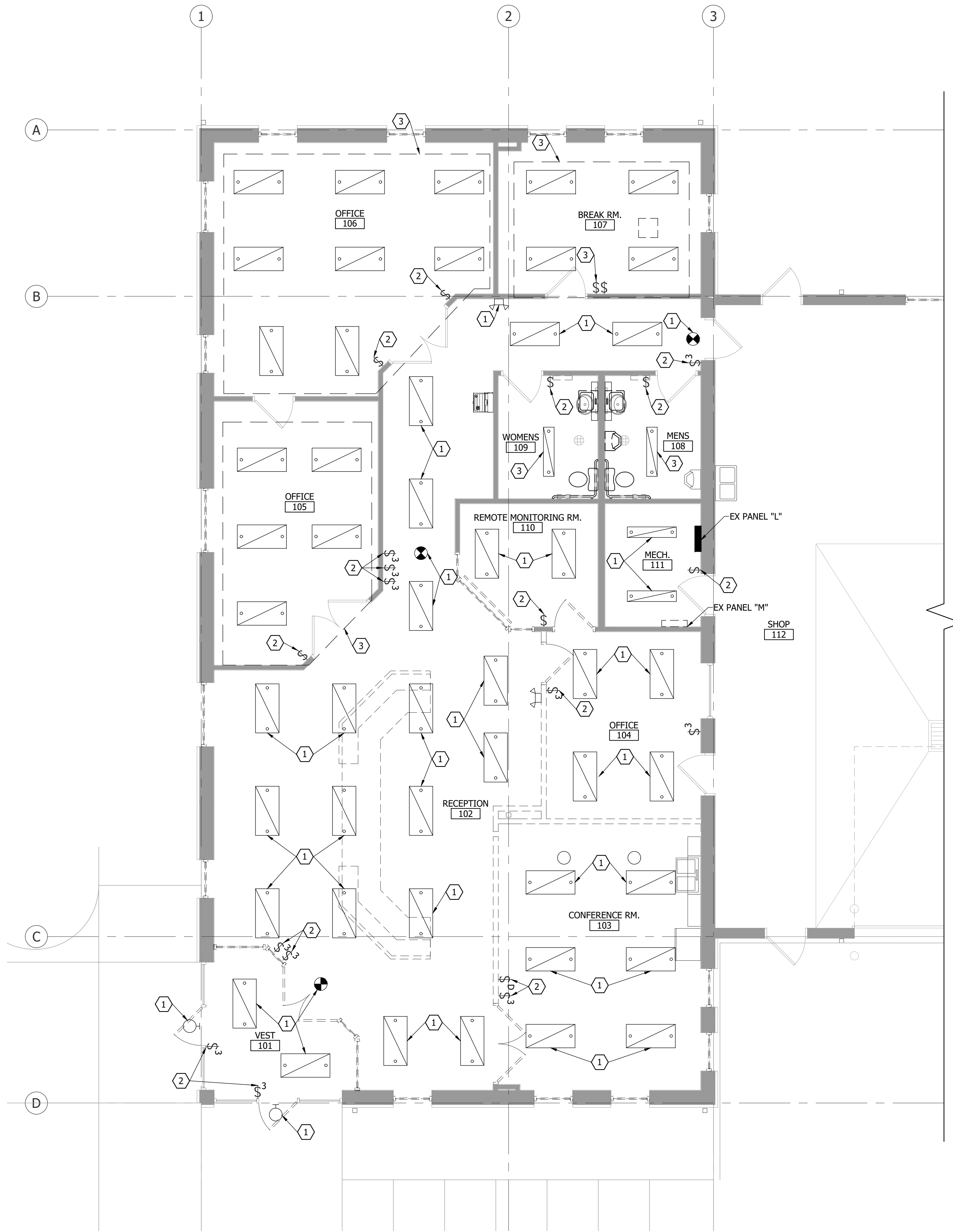
**MECHANICAL DETAILS & SCHEDULES**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>M-501</b>
SHEET NO:	





**LIGHTING DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

**REFERENCE NOTES:**

- E/C TO REMOVE LIGHTING FIXTURE AND ALL WIRE AND CONDUIT BACK TO ASSOCIATED PANELBOARD.
- E/C TO REMOVE EX LIGHTING SWITCH AND ALL ASSOCIATED WIRED AND CONDUIT.
- E/C TO REMOVE LIGHTING FIXTURES AND FIXTURE WHIPS IN THIS AREA BACK TO NEAREST JUNCTION BOX. EXISTING HOMERUN TO PANEL TO REMAIN.

#	DATE	DESCRIPTION
10/01/2024	BID SET	

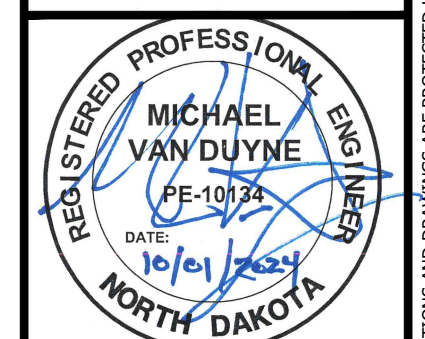
**Bartlett & West**  
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**GENERAL NOTES:**

- E/C TO FIELD COORDINATE ALL WORK WITH OTHER TRADES.
- THE EX CONDITIONS HAVE BEEN SHOWN BASED ON CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE TO THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.

**LIGHTING DEMOLITION PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



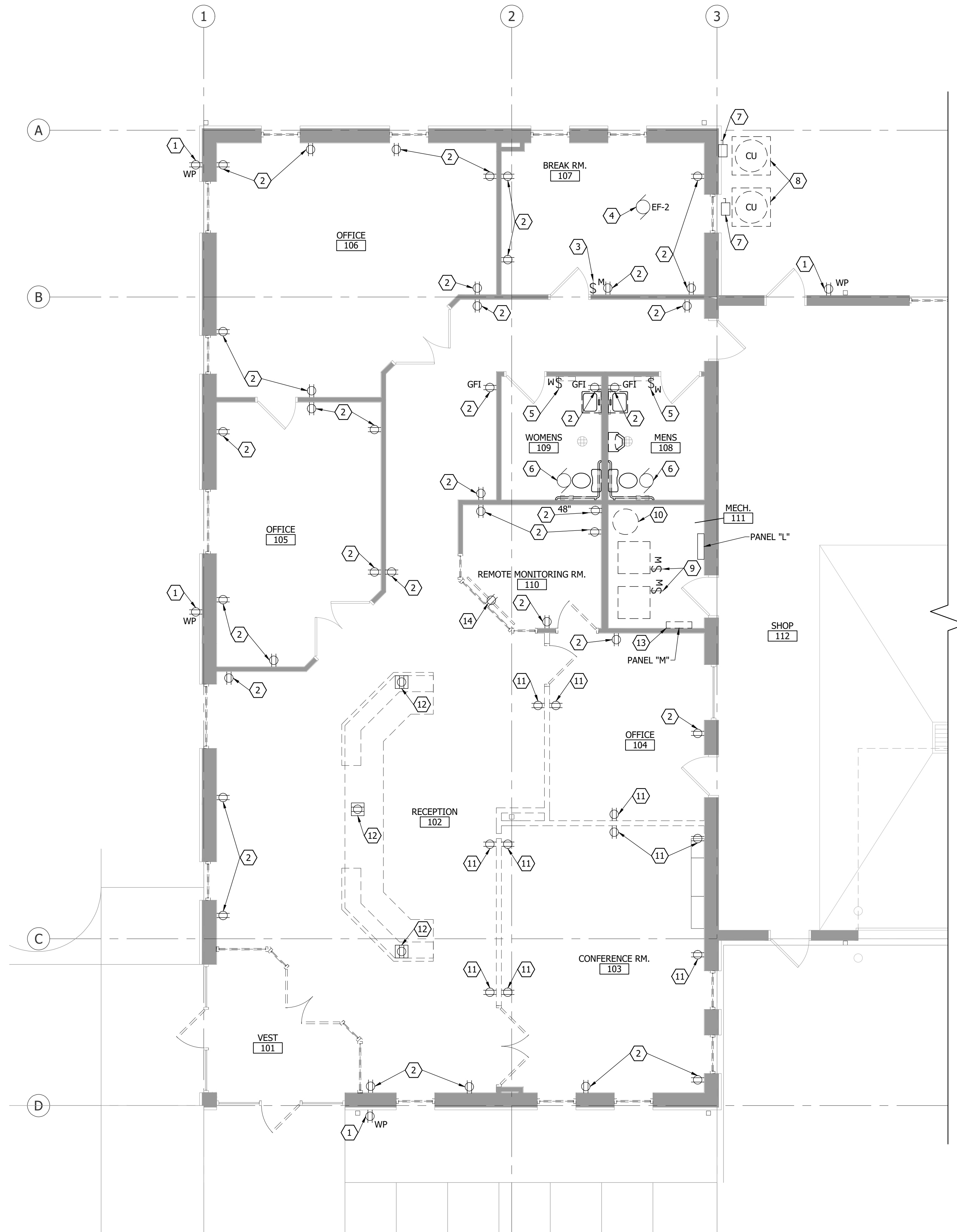
**KEY PLAN:**

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-101</b>
SHEET NO:	--- of ---

Last edit on: 10/17/2024 4:39 PM by: SDW01521 Drawing Name: F:\Proj\12000\12493\12493.700\AutoCad\Plan Set\MEP\12493.700E - LIGHTING DEMOLITION PLAN.dwg Layout Name: LIGHTING DEMOLITION PLAN Plotted By: SDW01521 Plotted on: 10/17/2024 5:17:56 PM

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**POWER DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

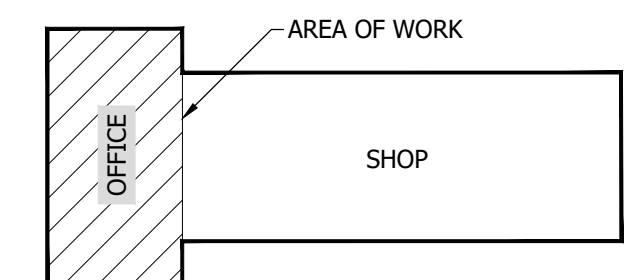
**REFERENCE NOTES:**

- ① EX EXTERIOR RECEPTACLE, ALL ASSOCIATED WIRE AND CONDUIT TO REMAIN.
- ② EX RECEPTACLE, COVER PLATE, AND POWER CONNECTION TO BE REMOVED. EX WIRE AND CONDUIT TO REMAIN AND BE RECONNECTED TO NEW RECEPTACLE. REFER TO POWER IMPROVEMENT PLAN.
- ③ EX EXHAUST FAN SWITCH, COVER PLATE, ALL ASSOCIATED WIRE AND CONDUIT TO BE REMOVED.
- ④ EX EXHAUST FAN POWER CONNECTION AND ALL ASSOCIATED WIRE AND CONDUIT BACK TO PANEL TO BE REMOVED.
- ⑤ EX EXHAUST FAN SWITCH, COVER PLATE, AND POWER CONNECTION TO BE REMOVED. EX WIRE AND CONDUIT TO REMAIN AND BE RECONNECTED TO NEW EXHAUST FAN SWITCH. REFER TO POWER IMPROVEMENT PLAN.
- ⑥ EX EXHAUST FAN POWER CONNECTION TO BE REMOVED. EX WIRE AND CONDUIT TO REMAIN AND BE RECONNECTED TO NEW EXHAUST FAN. REFER TO POWER IMPROVEMENT PLAN.
- ⑦ EX DISCONNECT SWITCH, POWER CONNECTION, AND ALL ASSOCIATED CONDUIT AND WIRE BACK TO PANEL TO BE REMOVED.
- ⑧ EX CONDENSING UNIT POWER CONNECTION AND ALL ASSOCIATED WIRE AND CONDUIT TO BE REMOVED.
- ⑨ EX FURNACE POWER CONNECTION, TOGGLE SAFETY SWITCH, AND ALL ASSOCIATED WIRE AND CONDUIT BACK TO PANEL BOARD TO BE REMOVED.
- ⑩ EX WATER HEATER TO BE REMOVED. POWER CONNECTION, ALL ASSOCIATED WIRE AND CONDUIT TO BE DISCONNECTED AND REMOVED BACK TO EXISTING PANEL. REFER TO IMPROVEMENT PLAN FOR RECONNECTION.
- ⑪ EX RECEPTACLE, COVER PLATE, POWER CONNECTION, AND ALL ASSOCIATED WIRE AND CONDUIT BACK TO PANEL BOARD TO BE REMOVED.
- ⑫ EX FLOOR RECEPTACLE, FLOOR BOX, COVER PLATE, POWER CONNECTION, AND ALL ASSOCIATED WIRE AND CONDUIT TO BE REMOVED. EX FLOOR BOX OPENING TO BE FILLED IN WITH GROUT LEVEL WITH SLAB ON GRADE.
- ⑬ EX POWER PANEL TO BE REMOVED AND REPLACED. REFER TO ELECTRICAL DEMOLITION RISER DIAGRAM.
- ⑭ EX CEILING RECEPTACLE, COVER PLATE, POWER CONNECTION, AND ALL ASSOCIATED WIRE AND CONDUIT TO BE REMOVED.

**GENERAL NOTES:**

1. E/C TO FIELD COORDINATE ALL WORK WITH OTHER TRADES.
2. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON A CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE TO THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.
3. ALL EX ELECTRICAL EQUIPMENT TO REMAIN UNLESS NOTED OTHERWISE.

**KEY PLAN:**



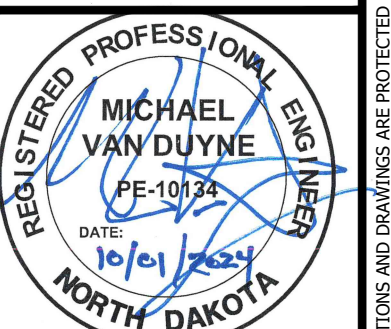
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**POWER DEMOLITION PLAN**

MR&I OFFICE REMODEL  
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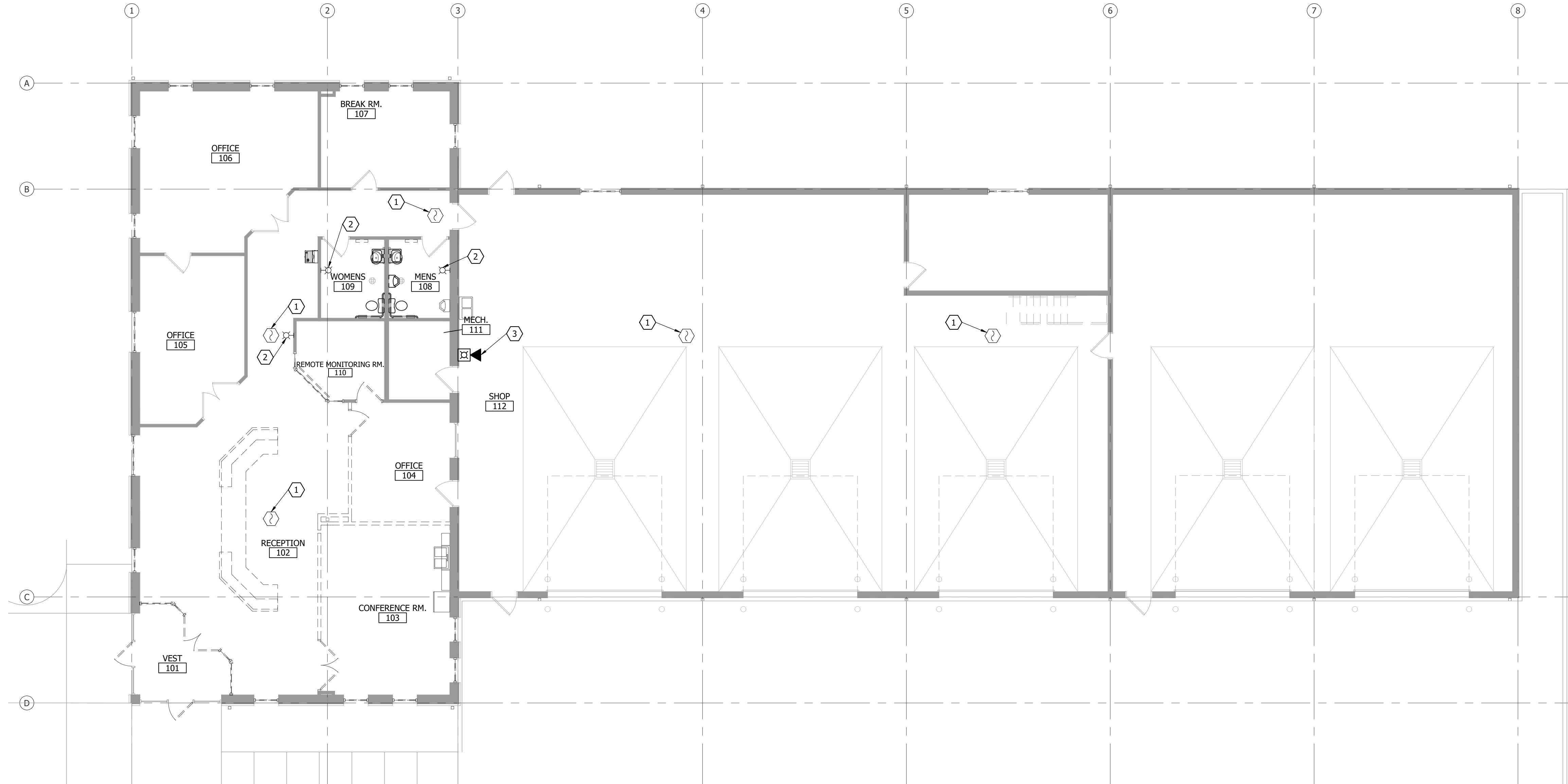


DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-102</b>
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REFERENCE NOTES:	
①	EX SMOKE DETECTOR, ALL ASSOCIATED WIRE AND CONDUIT BACK TO EX FIRE ALARM CONTROL PANEL TO BE REMOVED.
②	EX STROBE DEVICE, ALL ASSOCIATED WIRE AND CONDUIT BACK TO EX FIRE ALARM CONTROL PANEL TO BE REMOVED.
③	EX HORN/STROBE DEVICE, ALL ASSOCIATED WIRE AND CONDUIT BACK TO FIRE ALARM CONTROL PANEL TO BE REMOVED.

BY	DATE	DESCRIPTION
DWM	10/01/2024	BID SET

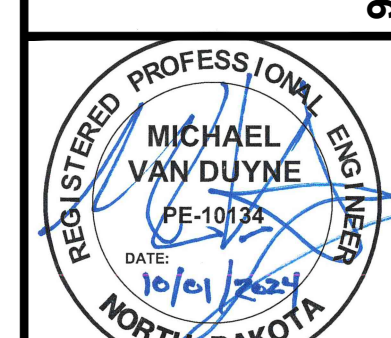


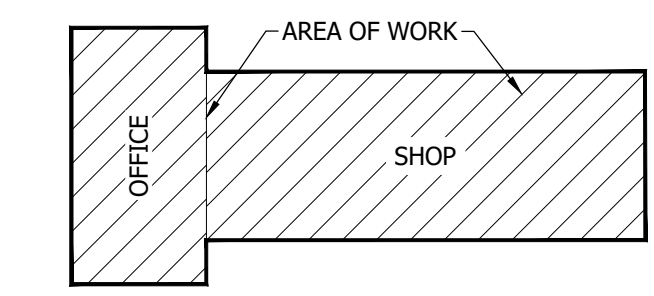
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GENERAL NOTES:	
1.	E/C TO FIELD COORDINATE ALL WORK WITH OTHER TRADES.
2.	THE EX CONDITIONS HAVE BEEN SHOWN BASED ON A CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE TO THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.
3.	ALL EX FIRE ALARM EQUIPMENT, DEVICES, AND WIRING TO BE REMOVED.
4.	FIELD VERIFY EX FIRE ALARM CONTROL PANEL LOCATION.

**FIRE ALARM DEMOLITION PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

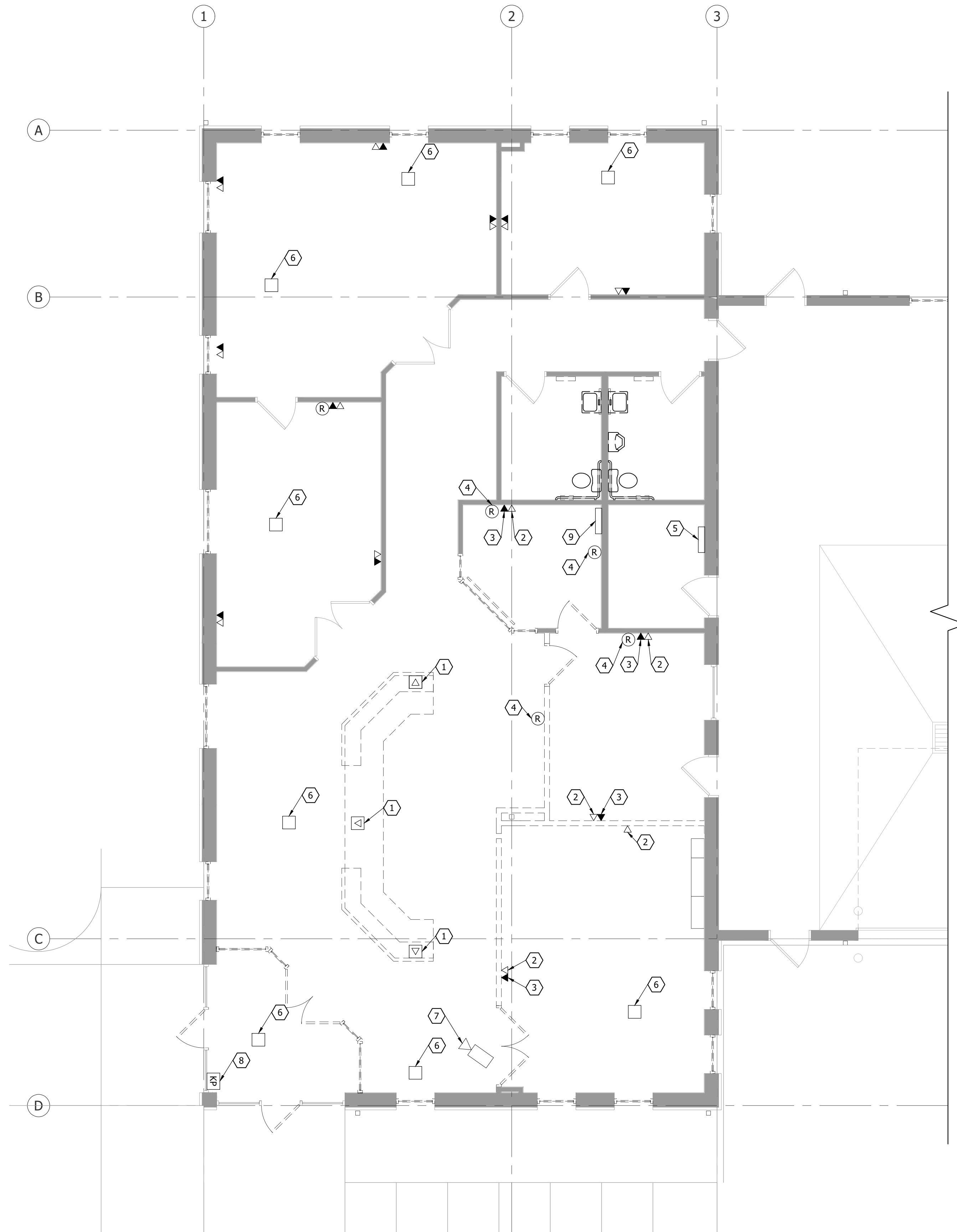


KEY PLAN:	
	

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-103</b>
SHEET NO:	--- of ---

 **FIRE ALARM DEMOLITION PLAN**  
SCALE: 1/8"=1'-0"

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**SPECIAL SYSTEMS DEMOLITION PLAN**  
SCALE: 3/16"=1'-0"

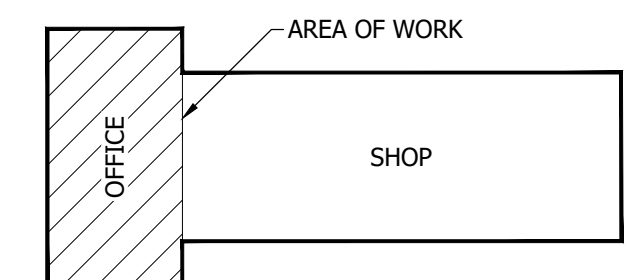
**REFERENCE NOTES:**

- ① EX RECESSED FLOOR MOUNTED DATA BOX, COVER PLATE, AND ALL ASSOCIATED WIRE AND CONDUIT TO BE REMOVED. EX FLOOR OPENING TO BE FILLED IN WITH GROUT LEVEL WITH SLAB ON GRADE.
- ② EX PHONE OUTLET TO BE REMOVED. E/C TO DISCONNECT AND REMOVE ALL ASSOCIATED WIRE AND CONDUIT BACK TO TELECOMMUNICATIONS BACKBOARD.
- ③ EX RJ-45 COMMUNICATION/DATA OUTLET TO BE REMOVED. E/C TO DISCONNECT AND REMOVE ALL ASSOCIATED WIRE AND CONDUIT BACK TO TELECOMMUNICATIONS BACKBOARD.
- ④ EX SINGLE GANG RADIO ROUGH TO BE REMOVED. E/C TO DISCONNECT AND REMOVE ALL ASSOCIATED WIRE AND CONDUIT BACK TO TELECOMMUNICATIONS PANEL BACKBOARD.
- ⑤ EX TELECOMMUNICATIONS BACKBOARD TO REMAIN.
- ⑥ EX GLASS BREAK SECURITY DEVICE TO BE TEMPORARILY REMOVED AND REINSTALLED. REFER TO SPECIAL SYSTEMS IMPROVEMENT PLAN.
- ⑦ EX SECURITY CAMERA TO BE TEMPORARILY REMOVED AND REINSTALLED. REFER TO SPECIAL SYSTEMS IMPROVEMENT PLAN.
- ⑧ EX SECURITY KEYPAD TO BE TEMPORARILY REMOVED AND REINSTALLED. REFER TO SPECIAL SYSTEMS IMPROVEMENT PLAN.
- ⑨ EX SECURITY PANEL BOX TO REMAIN.

**GENERAL NOTES:**

1. ALL SPECIAL SYSTEMS DEVICES TO REMAIN UNLESS OTHERWISE NOTED.
2. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON A CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE TO THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.
3. ALL EX SHOP SECURITY DEVICES TO REMAIN UNLESS NOTED OTHERWISE.
4. E/C TO FIELD COORDINATE WITH OWNER AND THEIR ASSOCIATED SECURITY PROVIDER FOR EXACT REQUIREMENTS.

**KEY PLAN:**

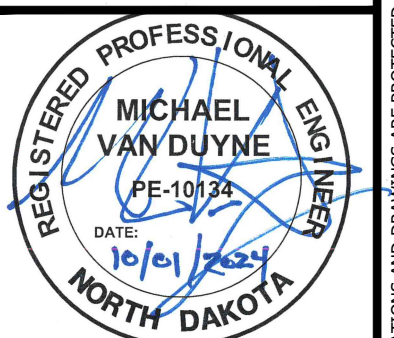


BY	DATE	DESCRIPTION
DWM	10/01/2024	BID SET

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**SPECIAL SYSTEMS DEMOLITION PLAN**

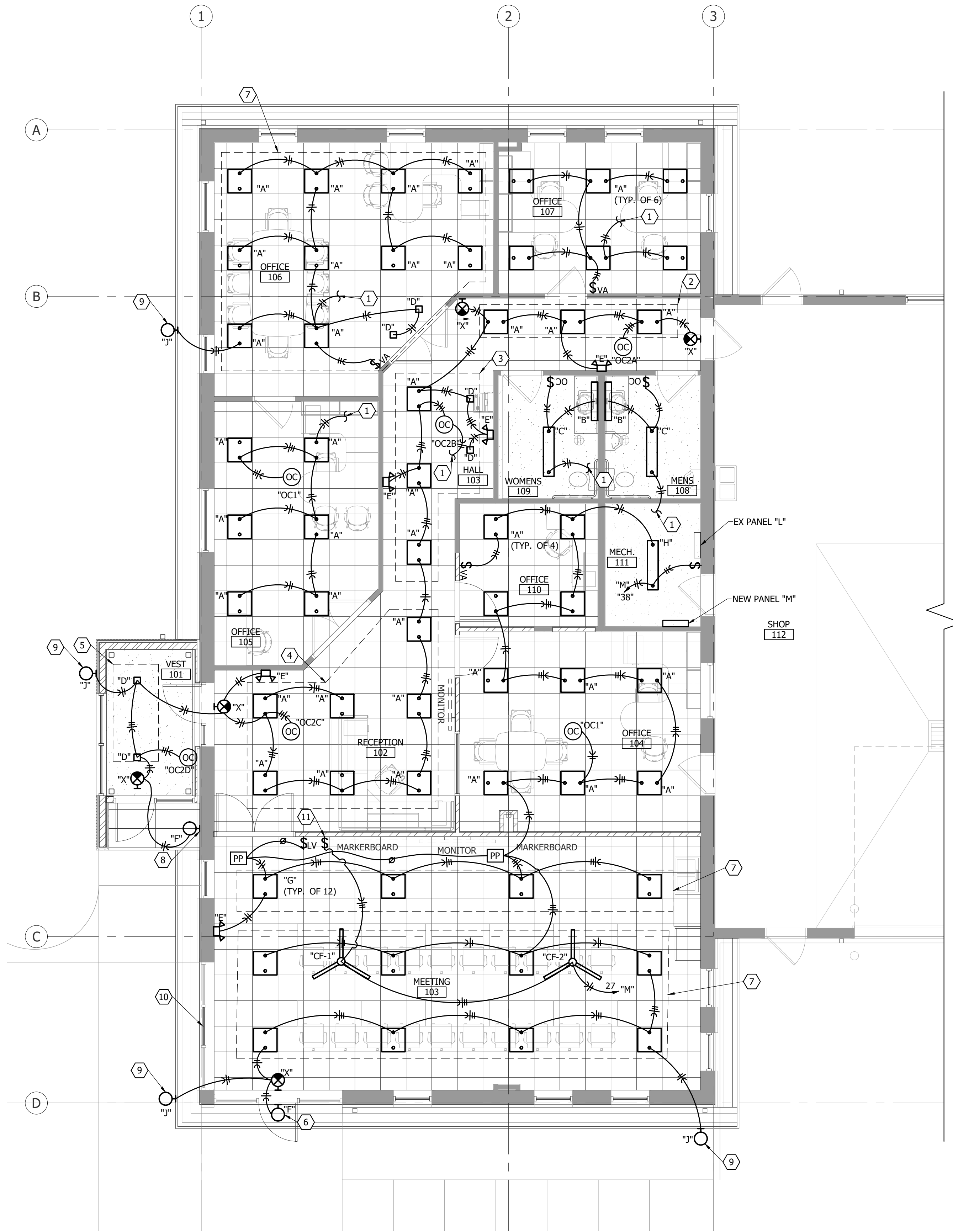
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-104</b>
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Last edit on: 10/17/2024 5:04 PM by: SDW01521 Drawing Name: F:\Proj\12000\12493\12493.700\AutoCad\Plan Set\MEP\12493.700E - LIGHTING IMPROVEMENT PLAN.dwg Layout Name: LIGHTING IMPROVEMENT PLAN Plotted by: SDW01521 Plotted on: 10/17/2024 5:18:05 PM



**LIGHTING IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

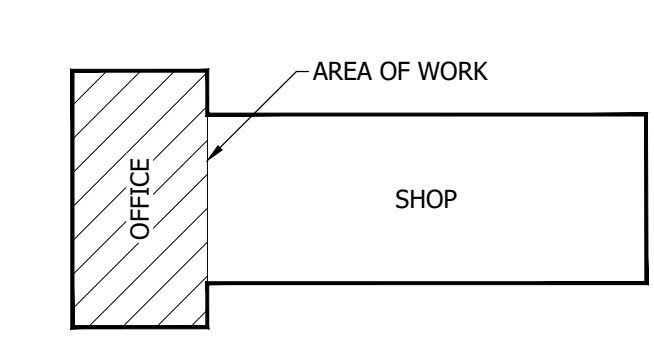
**REFERENCE NOTES:**

- 1 EXTEND AND CONNECT TO EXISTING LIGHTING CIRCUIT RETAINED UNDER DEMOLITION WORK.
- 2 OCCUPANCY SENSOR "OC2A" TO CONTROL LIGHTING IN THIS AREA.
- 3 OCCUPANCY SENSOR "OC2B" TO CONTROL LIGHTS IN THIS AREA.
- 4 OCCUPANCY SENSOR "OC2C" TO CONTROL LIGHTS IN THIS AREA.
- 5 OCCUPANCY SENSOR "OC2D" TO CONTROL LIGHTS IN THIS AREA.
- 6 E/C TO PROVIDE NEW LIGHTING FIXTURE IN THE SAME LOCATION AND HEIGHT AS THE EX REMOVED FIXTURE. FIELD VERIFY EXACT REQUIREMENTS.
- 7 CONTROL LIGHTING FIXTURES IN AREA INDICATED TOGETHER
- 8 MOUNT LIGHTING FIXTURE HEIGHT TO MATCH EX FIXTURE WALL MOUNT HEIGHT. REFER TO REFERENCE NOTE 6.
- 9 E/C TO MOUNT TOP OF FIXTURE 0'-6" BELOW TOP OF PARAPET. E/C TO FIELD VERIFY EXACT MOUNTING REQUIREMENTS.
- 10 E/C TO PATCH AND PAINT EX FIXTURE COVER OPENING. E/C TO FIELD COORDINATE WITH G/C. E/C TO PAINT TO MATCH EX CONDITIONS.
- 11 E/C TO INSTALL FAN CONTROLLER FURNISHED BY E/C. E/C TO PROVIDE ALL WIRE AND CONDUIT.

**GENERAL NOTES:**

1. E/C TO FIELD COORDINATE ALL WORK WITH OTHER TRADES.
2. THE EX CONDITIONS HAVE BEEN SHOWN BASED ON A CASUAL ON-SITE INVESTIGATION WITH NO GUARANTEE TO THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.
3. E/C TO PROVIDE FACTORY TRAINED TECHNICIAN START UP AND COMMISSIONING FOR 103 MEE.

**KEY PLAN:**



BY	DATE	DESCRIPTION
DWM	10/01/2024	BID SET

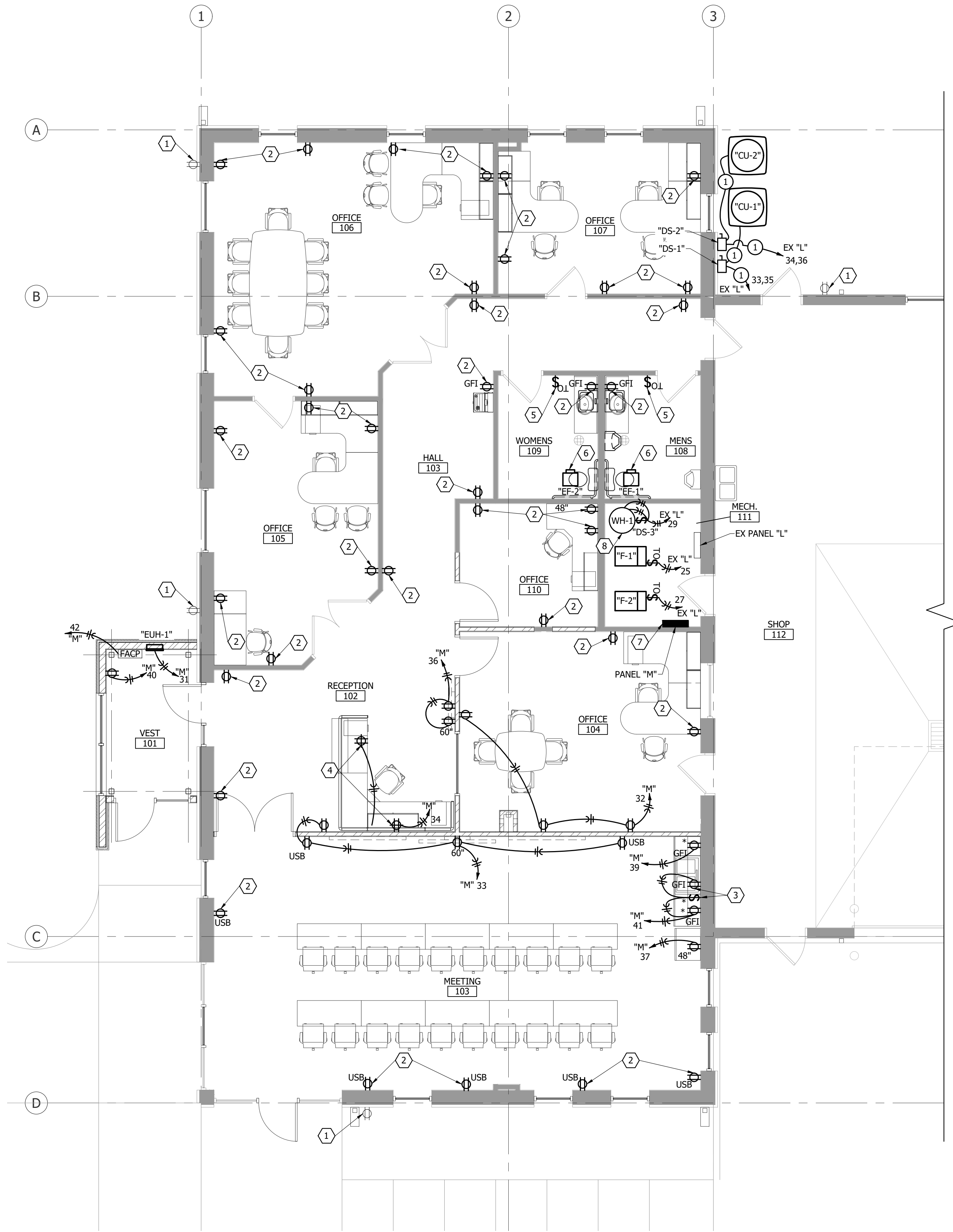
**Bartlett & West**  
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**LIGHTING IMPROVEMENT PLAN**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
MICHAEL VAN DUYN  
FE-10134  
DATE: 10/01/2024  
NORTH DAKOTA

DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
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**POWER IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

**REFERENCE NOTES:**

1	EX EXTERIOR RECEPTACLE, ALL ASSOCIATED WIRE AND CONDUIT TO REMAIN.
2	E/C TO PROVIDE NEW RECEPTACLE, COVER PLATE, AND POWER CONNECTION TO EX WIRE AND CONDUIT CIRCUIT.
3	MOUNT RECEPTACLE UNDER SINK FOR GARBAGE DISPOSAL. PROVIDE SWITCHING AS SHOWN.
4	MOUNT RECEPTACLE UNDER FRONT DESK. FIELD COORDINATE EXACT INSTALLATION REQUIREMENTS.
5	E/C TO PROVIDE NEW EXHAUST FAN SWITCH, COVER PLATE, AND POWER CONNECTION TO EX WIRE AND CONDUIT CIRCUIT.
6	E/C TO PROVIDE EXHAUST FAN POWER CONNECTION TO EX WIRE AND CONDUIT CIRCUIT.
7	E/C TO REPLACE EX PANEL WITH NEW PANEL "M". VERIFY ALL EX CIRCUITS. PROVIDE NEW PANEL SCHEDULE. MAKE ALL FINAL CONNECTIONS.
8	NEW WATER HEATER TO BE RECONNECTED TO "EX L" PANELBOARD. E/C TO REPLACE EX 30A/2P CIRCUIT BREAKER WITH NEW 40A/2P CIRCUIT BREAKER IN "EX L" PANELBOARD. E/C TO PROVIDE NEW POWER CONNECTION, ALL ASSOCIATED WIRE AND CONDUIT.

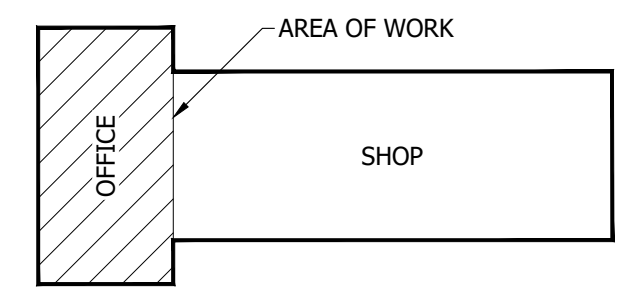
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3456 E CENTURY AVENUE - BISMARCK, ND 58503  
www.bartlettandwest.com

- GENERAL NOTES:**
- E/C TO FIELD COORDINATE ALL WORK WITH OTHER TRADES.
  - THE EX CONDITIONS HAVE BEEN SHOWN ON CAUSAL ON-SITE INVESTIGATION WITH NO GUARANTEE OF THEIR ACCURACY, CONTRACTOR TO BE RESPONSIBLE TO FIELD VERIFY EX CONDITIONS.

**FEEDER SCHEDULE:**

1	2-10 & 1-10G IN 3/4" C.
---	-------------------------

**KEY PLAN:**

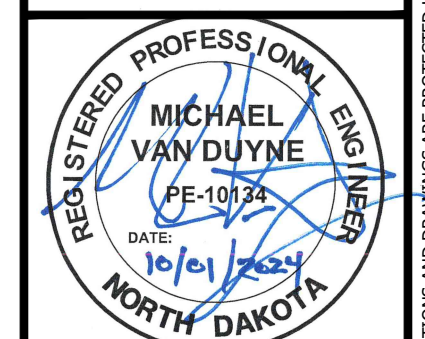


DESIGNED BY: NJG  
DRAWN BY: SDM/NJG  
APPROVED BY: MSV  
DESIGN PROJ: 12493.700  
CONST PROJ: ---  
SCALE: AS NOTED  
DATE: OCTOBER 2024  
DRAWING NO: **E-112**  
SHEET NO: --- of ---

BY	DESCRIPTION
DWM	

DATE	BID SET
10/01/2024	

**POWER IMPROVEMENT PLAN**  
MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

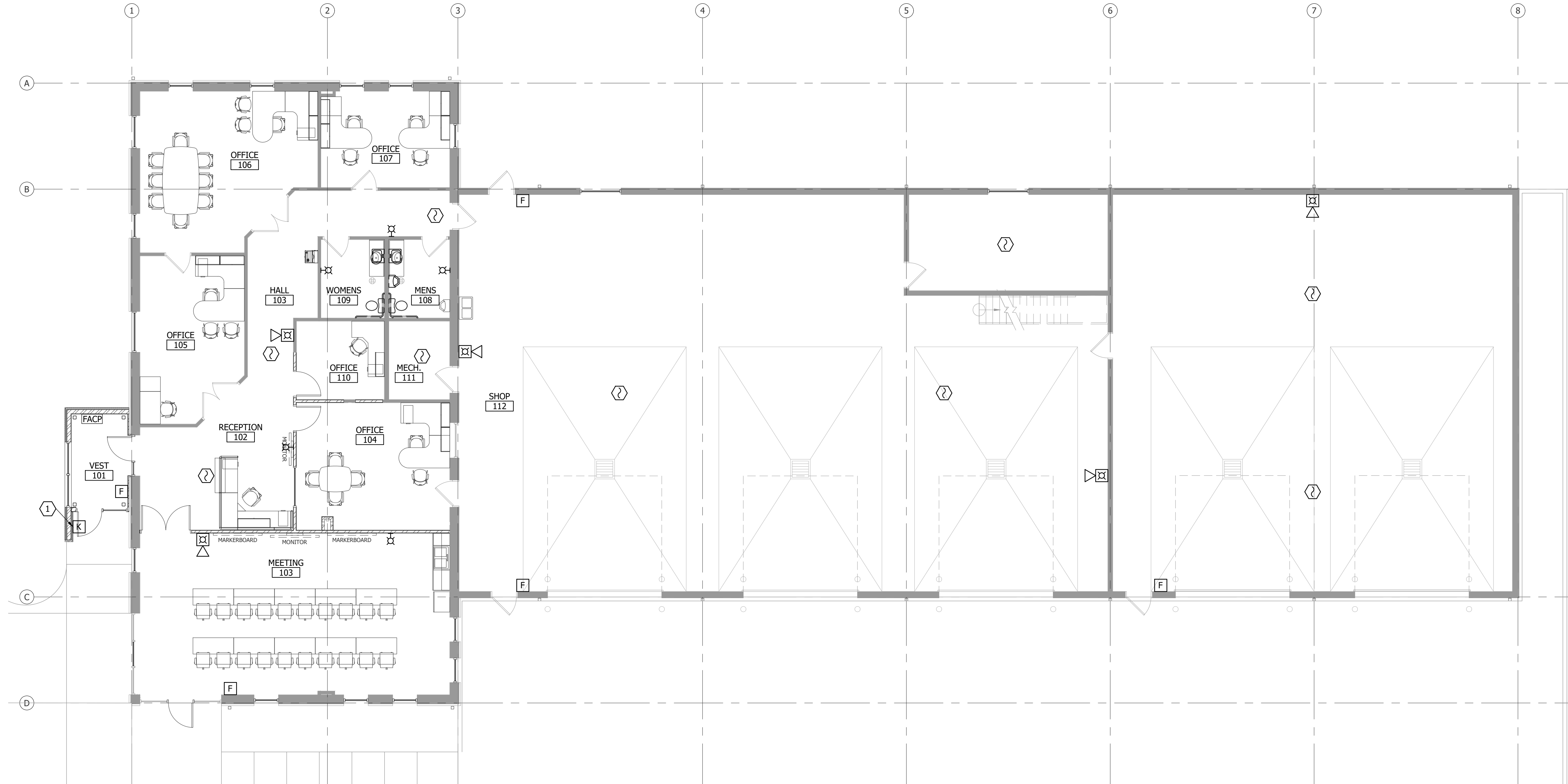


Last edit on: 10/4/2024 4:13 PM by: NRB01926 Drawing Name: F:\Proj\12000\12493\12493.700\AutoCad\Plan Set\MEP\12493.700E - POWER IMPROVEMENT PLAN.dwg Layout Name: POWER IMPROVEMENT PLAN Plotted on: 10/4/2024 5:40:40 PM

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Drawing Name: F:\Proj\12000\12493\12493.700\AutoCad\Plan Set\MEP\12493.700E - FIRE ALARM IMPROVEMENT PLAN.dwg Layout Name: FIRE ALARM IMPROVEMENT PLAN Plotted By: SDM01521 Plotted on: 10/1/2024 5:18:14 PM



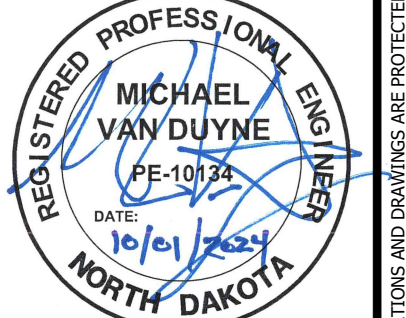
**REFERENCE NOTES:**

① E/C TO PROVIDE KNOX BOX. E/C TO FIELD COORDINATE EXACT INSTALLATION REQUIREMENTS WITH G/C.

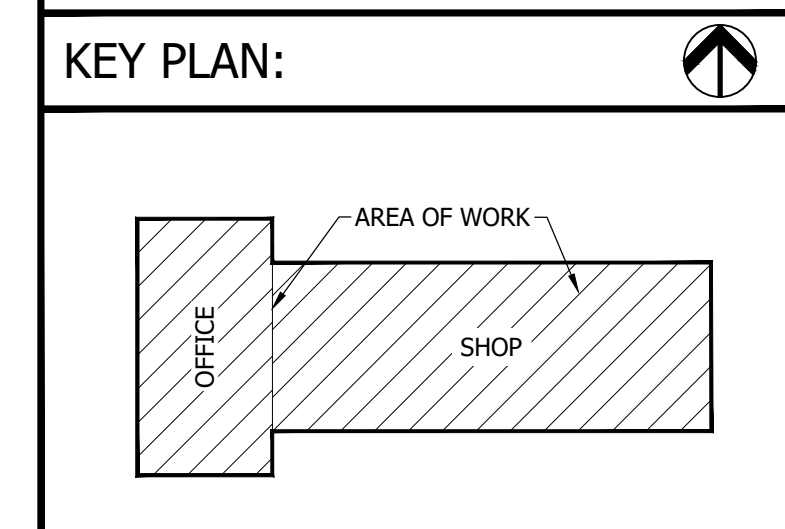
#	DATE	DESCRIPTION
10/01/2024	BID SET	

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**FIRE ALARM IMPROVEMENT PLAN**  
 MR&I OFFICE REMODEL  
 9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



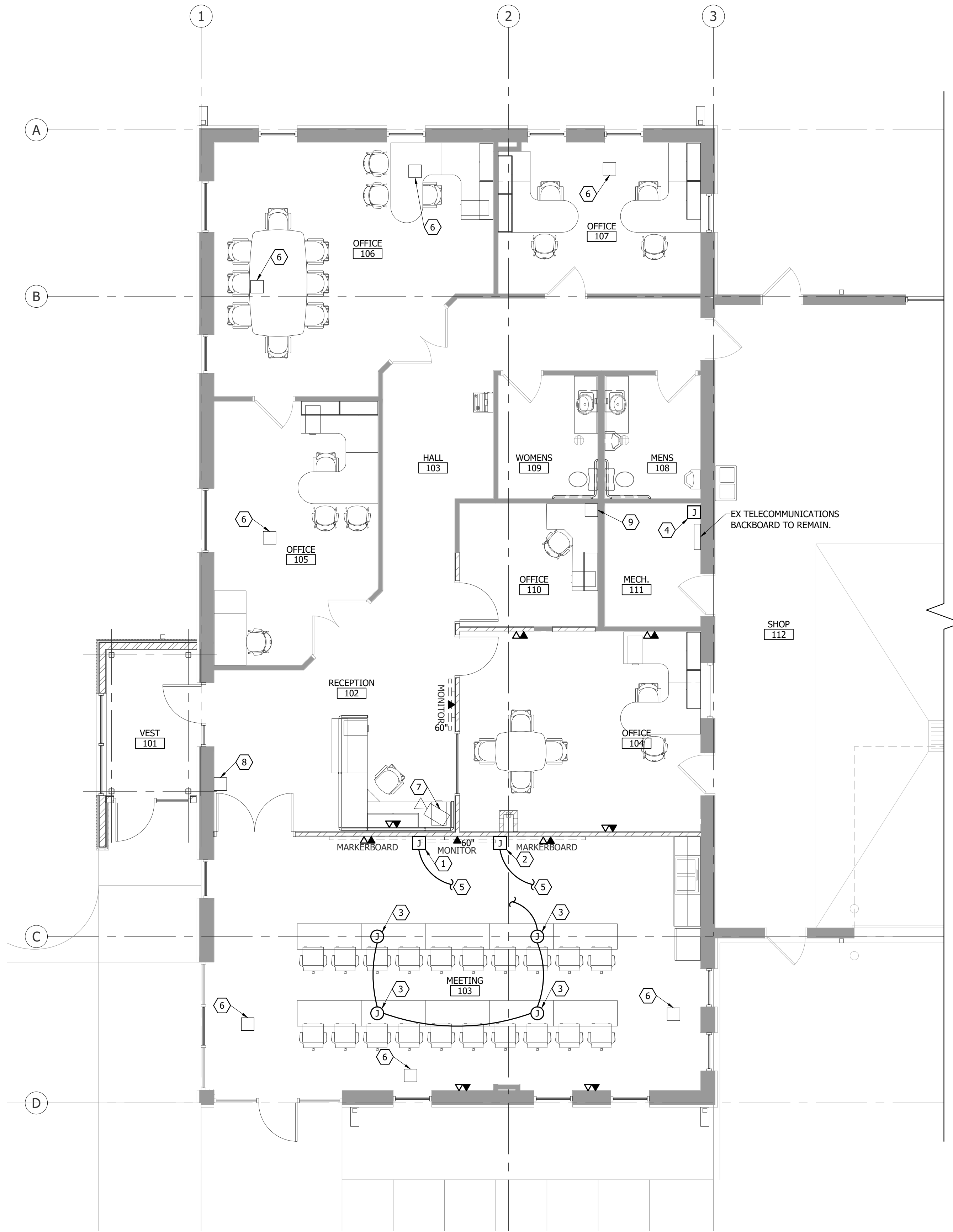
DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-113</b>
SHEET NO:	--- of ---



**FIRE ALARM IMPROVEMENT PLAN**  
 SCALE: 1/8"=1'-0"

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Drawing Name: F:\Proj\12493\12493-700\AutoCad\Plan Set\MEP\12493-700-SPECIAL SYSTEMS IMPROVEMENT PLAN.dwg Layout Name: SPECIAL SYSTEMS IMPROVEMENT PLAN Plotter: NP801926 Plotted on: 10/4/2024 5:40:40 PM  
Last edit on: 10/4/2024 5:33 PM by: NP801926



**SPECIAL SYSTEMS IMPROVEMENT PLAN**  
SCALE: 3/16"=1'-0"

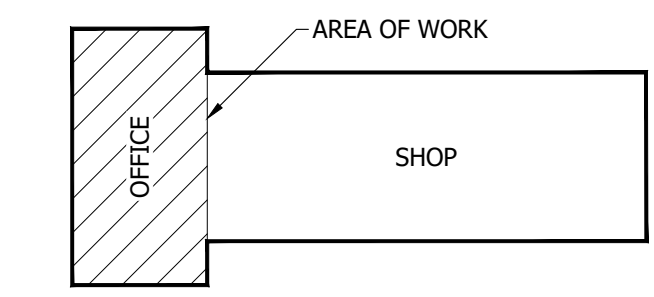
**REFERENCE NOTES:**

- ① E/C TO PROVIDE LOGITECH RALLY BAR ALL-IN-ONE VIDEO BAR FOR MEDIUM TO LARGE ROOMS-GRAPHITE. MOUNT DIRECTLY ABOVE MONITOR.
- ② E/C TO PROVIDE LOGITECH RALLY CAMERA PREMIUM PTZ CAMERA WITH ULTRA-HD IMAGING SYSTEM AND AUTOMATIC CAMERA CONTROL-DARK GREY. MOUNT DIRECTLY UNDER MONITOR.
- ③ E/C TO PROVIDE PENDANT MOUNT RALLY MIC POD MICROPHONES WITH RIGHTSOUND FOR RALLY BAR. MOUNT PENDANT TO CEILING. DAISY-CHAIN MICROPHONE CABLE AS SHOWN AND ROUTE TO RALLY BAR. MOUNT BOTTOM OF MICROPHONE AT 6'-6" AFF.
- ④ E/C TO PROVIDE LOGITECH ROOMMATE AND INTERCONNECT WITH CONFERENCE ROOM AUDIO/VISUAL DEVICES.
- ⑤ E/C TO ROUTE COMMUNICATION WIRE BACK TO LOGITECH ROOMMATE CONTROLLER IN ROOM 111 MECH. E/C TO FIELD VERIFY EXACT CONNECTION REQUIREMENTS WITH MANUFACTURER, REFER TO DETAIL 6/E-501.
- ⑥ EX CEILING MOUNT GLASS BREAK SECURITY DEVICE TO BE REINSTALLED IN CEILING. EXTENT AND MATCH EX WIRE AS REQUIRED.
- ⑦ EX SECURITY CAMERA DEVICE TO BE REINSTALLED IN CEILING. EXTENT AND MATCH EX WIRE AS REQUIRED.
- ⑧ EX SECURITY PAD DEVICE TO BE REINSTALLED IN WALL. EXTENT AND MATCH EX WIRE AS REQUIRED.
- ⑨ EX SECURITY PANEL BOX TO REMAIN.

**GENERAL NOTES:**

- 1. E/C TO PROVIDE LOGITECH STRONG USB EXTENDED-LENGTH SUPERSPEED USB 1-GBPS CABLE-DARK GREY 45 METER.
- 2. E/C TO PROVIDE LOGITECH RALLY MIC EXTENSION CABLE 10 METER (32.8 FT) EXTENSION CABLE-WHITE.
- 3. E/C TO PROVIDE LOGITECH WALL MOUNT FOR VIDEO BARS VESA-COMPATIBLE MOUNTING KIT FOR RALLY BAR AND RALLY BAR MINI-GRAPHITE.
- 4. E/C TO PROVIDE LOGITECH TV MOUNT FOR VIDEO BARS ATTACH RALLY BAR, RALLY BAR MINI, OR RALLY CAMERA TO ALMOST ANY DISPLAY WITH VESA MOUNTING POINTS-GRAPHITE.
- 5. ALL NEW DATA/PHONE J-BOXES TO BE PROVIDED WITH 3/4" CONDUIT UP WALL CAVITY TO ACCESSIBLE PLENUM SPACE AND PROVIDE PULL BUSHING AT CONDUIT END.
- 6. E/C TO PROVIDE LG-86" CLASS UQ75 SERIES LED 4K UHD SMART WEBOs OR PRE-APPROVED EQUAL FOR USE AS MONITOR IN MEETING ROOM 103. BOTTOM OF MONITOR TO BE MOUNTED 60" AFF. E/C TO PROVIDE SANUS PREFERRED 37"-90" FULL MOTION TV MOUNT OF PRE-APPROVED EQUAL.
- 7. E/C TO PROVIDE WIRELESS LOGITECH SIGNATURE K650 KEYBOARD
- 8. E/C TO PROVIDE LOGITECH M510 WIRELESS MOUSE.
- 9. E/C TO PROVIDE ADDITIONAL 15', 4K, HIGH SPEED HDMI CABLE FOR TV MONITOR INTERFACING.
- 10. ALL NEW A/V J-BOXES TO BE PROVIDED WITH 1" CONDUIT UP WALL CAVITY TO ACCESSIBLE PLENUM SPACE AND PROVIDE PULL BUSHING AT CONDUIT END.
- 11. ALL NEW PHONE/DATA JACKS TO BE PROVIDED BY E/C. E/C TO ROUTE NEW DATA/PHONE WIRE BACK TO 111 MECH ROOM AND TERMINATE AT EX SWITCH.
- 12. E/C TO PROVIDE LG-50" CLASS UQ75 SERIES LED 4K UHD SMART WEBOs OR PRE-APPROVED EQUAL FOR USE AS MONITOR IN MEETING ROOM 102. BOTTOM OF MONITOR TO BE MOUNTED 54" AFF. E/C TO PROVIDE SANUS PREFERRED 37"-90" FULL MOTION TV MOUNT OF PRE-APPROVED EQUAL.

**KEY PLAN:**

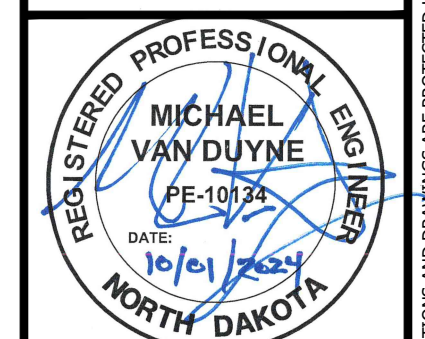


BY	DATE	DESCRIPTION
DWM	10/01/2024	BID SET

**Bartlett & West**  
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**SPECIAL SYSTEMS IMPROVEMENT PLAN**

MR&I OFFICE REMODEL  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538



DESIGNED BY:	NJG
DRAWN BY:	SDM/NJG
APPROVED BY:	MSV
DESIGN PROJ:	12493.700
CONST PROJ:	---
SCALE:	AS NOTED
DATE:	OCTOBER 2024
DRAWING NO:	<b>E-114</b>
SHEET NO:	--- of ---

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FIRE ALARM OPERATING SEQUENCE MATRIX																										
SYSTEM INPUTS	SYSTEM OUTPUTS																									
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
MANUAL PULL STATION	1	•	•	•	•	•																				
MASTER BUILDING WATERFLOW SWITCH	2	•	•	•	•	•																				
SPRINKLER WATERFLOW SWITCH ON FLOOR	3	•	•	•	•	•																				
AREA SMOKE DETECTOR	4	•	•	•	•	•																				
DUCT SMOKE DETECTOR	5	•	•	•	•	•																				
AREA SMOKE DETECTOR (DESIGNATED FOR DOOR HOLD OPEN)	6	•	•	•	•	•																				
HEAT DETECTOR	8	•	•	•	•	•																				
AREA SMOKE DETECTOR FOR ELEVATOR RECALL	9	•	•	•	•	•																				
HEAT DETECTOR IN ELEVATOR MACHINE ROOM	10	•	•	•	•	•																				
VALVE TAMPER SWITCH	11	•	•	•	•	•																				
HEAT DETECTOR IN ELEVATOR SHAFT	12	•	•	•	•	•																				
STANDPIPE SYSTEM MONITOR	13	•	•	•	•	•																				
HVAC SHUTDOWN BYPASS SWITCH	17	•	•	•	•	•																				
ELEVATOR RECALL BYPASS SWITCH	18	•	•	•	•	•																				
MANUAL MICROPHONE SWITCH	19	•	•	•	•	•																				
EVACUATION ALARM SILENCE SWITCH	20	•	•	•	•	•																				
DOOR UNLOCK SWITCH	21	•	•	•	•	•																				
FIRE ALARM CONTROL PANEL TROUBLE	22	•	•	•	•	•																				
FIRE ALARM CONTROL PANEL RESET	23	•	•	•	•	•																				

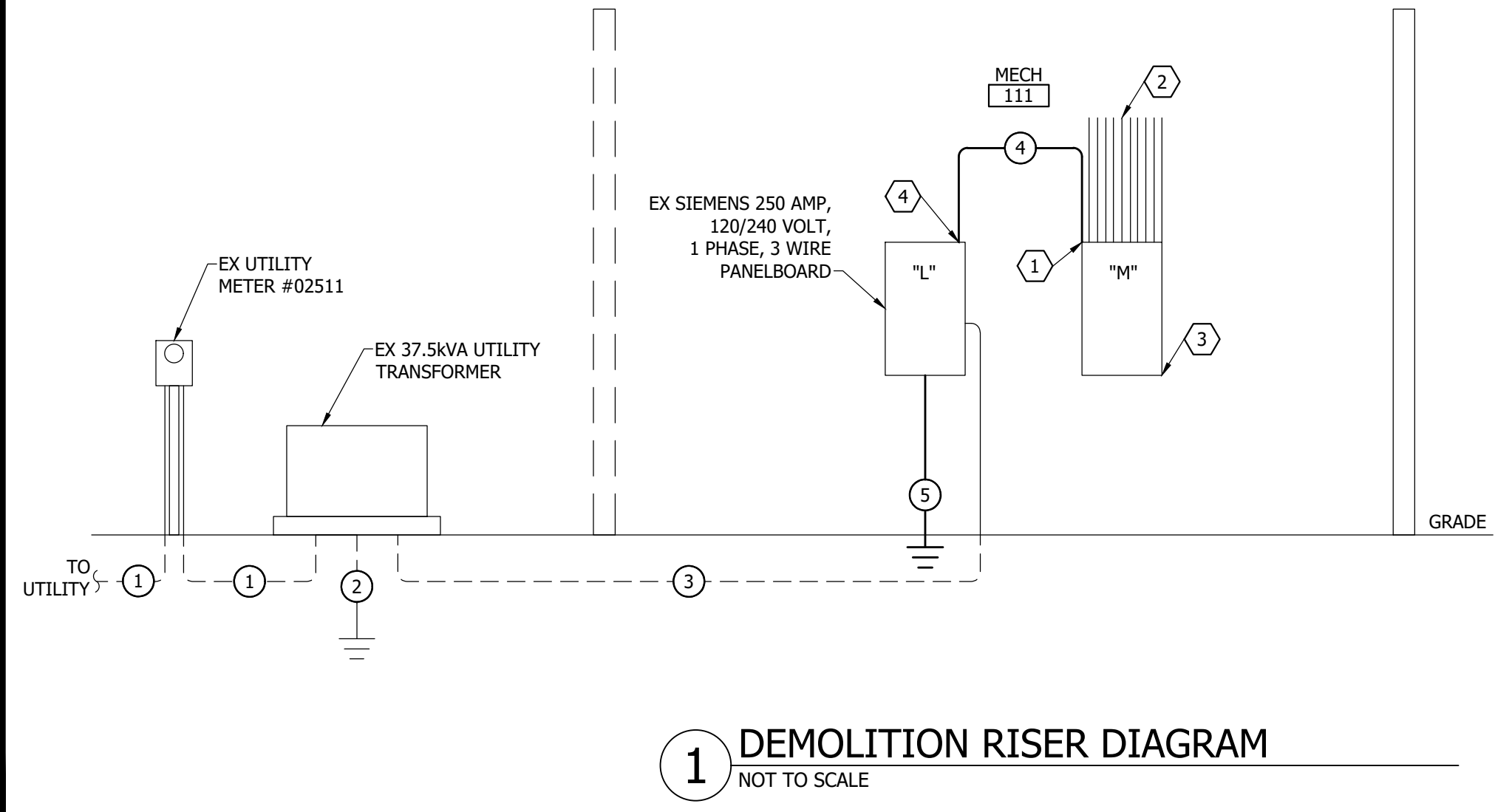
AUDIBLE DEVICES WITHIN THE ELEVATOR CABS SHALL BE ACTIVATED WITH MANUAL SWITCHES ONLY, NO AUTOMATIC OPERATION.

ELEVATOR RECALL SHALL BE INITIATED ONLY BY SMOKE DETECTORS WITHIN ELEVATOR LOBBIES OR THE MACHINE ROOM. NO OTHER INITIATING DEVICE SHALL INITIATE ELEVATOR RECALL.

A SMOKE DETECTOR IN THE LOBBY ON THE PRIMARY DISCHARGE FLOOR SHALL CAUSE THE ELEVATOR TO RECALL TO THE ALTERNATE FLOOR. SMOKE DETECTORS IN ELEVATOR LOBBIES ON ALL OTHER FLOORS, OR IN THE MACHINE ROOM SHALL RECALL THE ELEVATOR TO THE PRIMARY FLOOR.

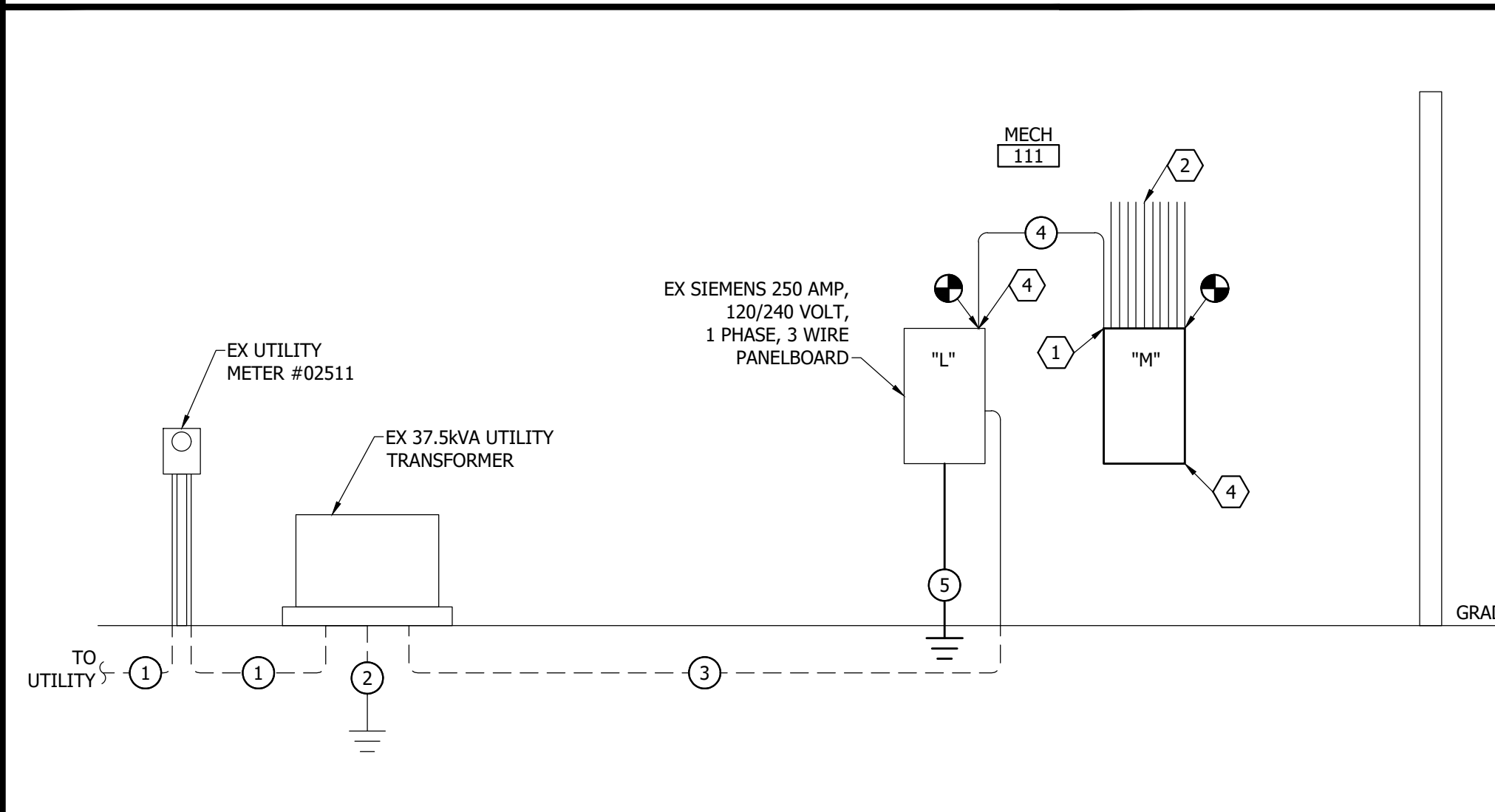
OPERATION OF THE SMOKE DETECTOR IN THE ELEVATOR MACHINE ROOM SHALL CAUSE THE FIREMAN'S WARNING LIGHT IN THE CAB TO BLINK.

**5 FIRE ALARM SYSTEM SEQUENCE OF OPERATIONS**  
NOT TO SCALE



**1 DEMOLITION RISER DIAGRAM**  
NOT TO SCALE

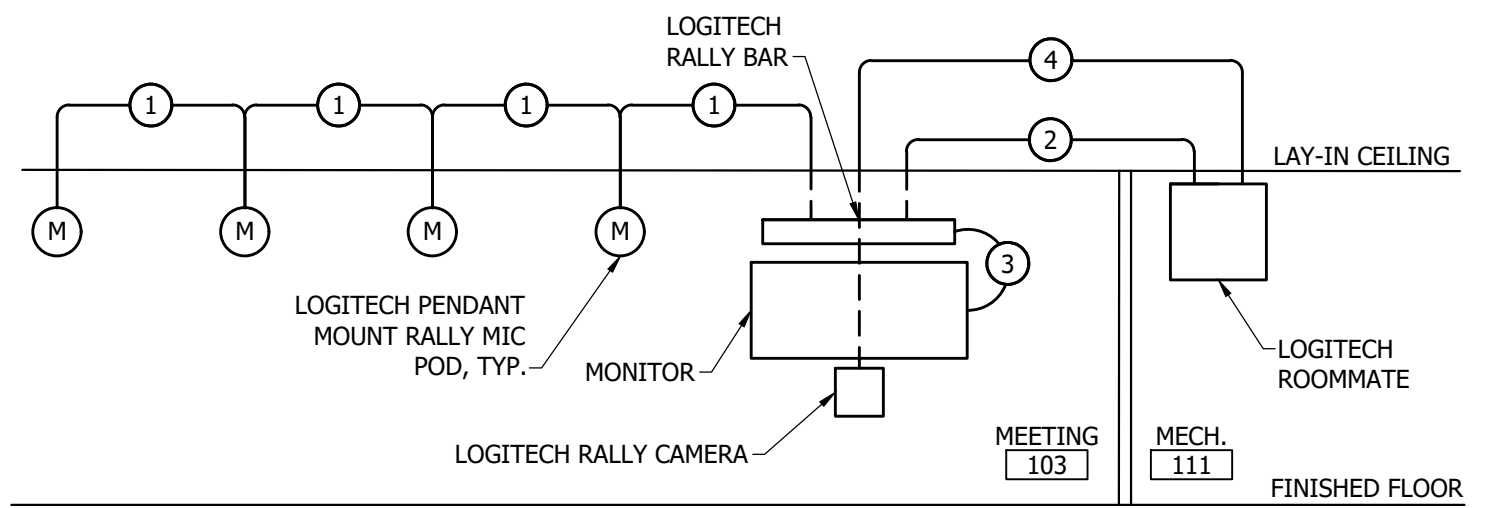
- REFERENCE NOTE:**
- E/C TO TEMPORARILY DISCONNECT EX POWER CONNECTION AND REMOVE EX "M". REFER TO IMPROVEMENT RISER DIAGRAM.
  - EX BRANCH CIRCUITS TO BE TEMPORARILY DISCONNECTED FROM EX PANELBOARD "M".
  - E/C TO REMOVE EX PANEL AND FEED THROUGH POWER CONNECTION. EX BRANCH CIRCUITS TO BE TEMPORARILY DISCONNECTED AND RECONNECTED TO NEW PANEL.
  - E/C TO REMOVE FEED THROUGH LUG POWER CONNECTION.
- GENERAL NOTES:**
- ALL EX ELECTRICAL EQUIPMENT TO REMAIN, UNLESS NOTED OTHERWISE.
  - E/C TO FIELD COORDINATE AND VERIFY ALL EX CIRCUITS IN PANELBOARD "L" AND "M" AND PROVIDE NEW PANELBOARD SCHEDULES.
- FEEDER SCHEDULE:**
- EX UTILITY PRIMARY FEEDER TO REMAIN.
  - EX UTILITY PRIMARY GROUND TO REMAIN.
  - EX MAIN FEEDER TO REMAIN.
  - EX MAIN FEEDER TO BE DISCONNECTED AND REMOVED AT EX PANEL "M".
  - EX SERVICE GROUND FEEDER AND GROUND TO REMAIN.



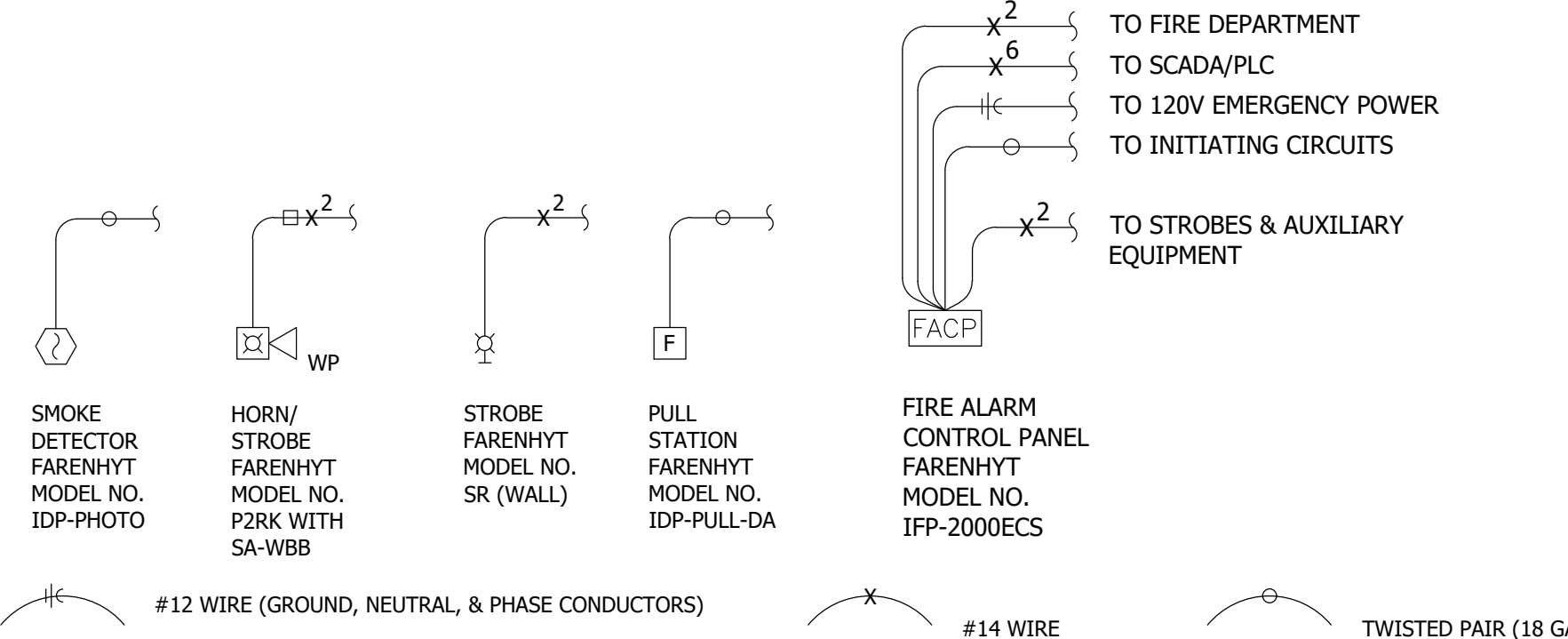
**2 IMPROVEMENT RISER DIAGRAM**  
NOT TO SCALE

- REFERENCE NOTE:**
- E/C TO PROVIDE NEW ELECTRICAL PANEL AND CONNECT EX BRANCH CIRCUITS TO NEW PANEL CIRCUIT BREAKERS. E/C TO EXTEND AND CONNECT NEW POWER CONNECTION TO NEW "M" AS REQUIRED.
  - E/C TO EXTEND AND CONNECT EX BRANCH CIRCUITS TO NEW "M" AS REQUIRED.
  - E/C TO PROVIDE NEW PANEL "M". REFER TO PANEL SCHEDULE. MAKE ALL FINAL CONNECTIONS.
  - E/C TO PROVIDE NEW FEED THROUGH LUG POWER CONNECTION TO EX PANEL "M". LUGS. FIELD VERIFY EXACT CONNECTION REQUIREMENTS.
- GENERAL NOTES:**
- ALL EX ELECTRICAL EQUIPMENT TO REMAIN, UNLESS NOTED OTHERWISE.
  - E/C TO FIELD COORDINATE AND VERIFY ALL EX CIRCUITS IN PANELBOARD "L" AND "M" AND PROVIDE NEW PANELBOARD SCHEDULES.
- FEEDER SCHEDULE:**
- EX UTILITY PRIMARY FEEDER TO REMAIN.
  - EX UTILITY PRIMARY GROUND TO REMAIN.
  - EX MAIN FEEDER TO REMAIN.
  - 3-250 KCMIL & 1-4G IN 2 1/2" C.
  - EX SERVICE GROUND FEEDER AND GROUND TO REMAIN.

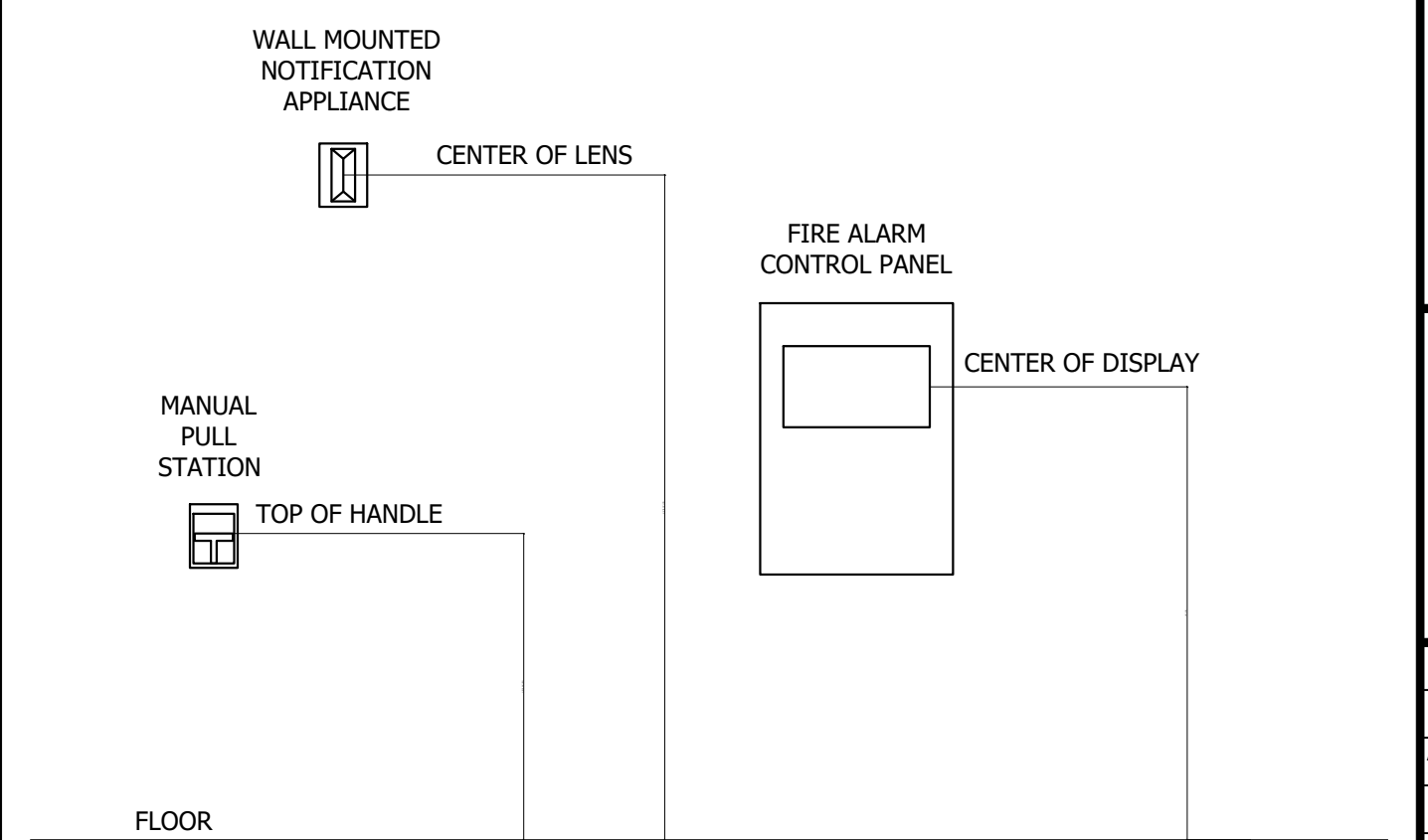
- GENERAL NOTES:**
- E/C TO FIELD VERIFY ALL CABLING LENGTHS PRIOR TO ORDERING A/V CABLE.
  - E/C TO FIELD COORDINATE FIELD CONNECTION REQUIREMENTS WITH LOGITECH MANUFACTURER.
  - E/C TO PROVIDE FIELD COMMISSIONING AND START UP FOR A/V SYSTEM.
- FEEDER SCHEDULE:**
- LOGITECH RALLY MIC POD EXTENSION CABLE PROVIDED BY E/C.
  - USB-A TO USB-C 3.0 PLENUM RATED CABLE PROVIDED BY E/C.
  - HDMI CABLE FURNISHED WITH LOGITECH RALLY BAR. INSTALLED BY E/C.
  - USB TYPE-C TO USB TYPE-C PLENUM RATED CABLE PROVIDED BY E/C.



**6 LOGITECH EQUIPMENT WIRING SCHEMATIC**  
NOT TO SCALE



**4 FIRE ALARM DEVICE WIRING DETAILS**  
NOT TO SCALE



**3 WALL MOUNTED FIRE ALARM EQUIPMENT DETAIL**  
NOT TO SCALE

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**ELECTRICAL DETAILS**

**MR&I OFFICE REMODEL**  
9410 11TH AVE. SLAUGHTER HOUSE BAY RD., FORT YATES, ND 58538

REGISTERED PROFESSIONAL ENGINEER  
MICHAEL VAN DUYN  
FE-10134  
DATE: 10/01/2024  
NORTH DAKOTA

DESIGNED BY: NJG  
DRAWN BY: SDM/NJG  
APPROVED BY: MSV  
DESIGN PROJ: 12493.700  
CONST PROJ: ---  
SCALE: AS NOTED  
DATE: OCTOBER 2024  
DRAWING NO: **E-501**  
SHEET NO: of

Last edit on: 10/17/2024 4:36 PM by: SDM01521  
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Layout Name: ELECTRICAL DETAILS  
Plotter on: 10/17/2024 5:18:30 PM



### LIGHTING FIXTURE SCHEDULE

MARK	MANUFACTURER	CATALOG NUMBER	MOUNTING			FINISH	LAMP		EQUIVALENT MANUFACTURERS	NOTES
			REC	SURF	WALL		TYPE	WATTS		
"A"	H.E. WILLIAMS	LPT-22-L45/935-S-AF12095-UNV	X			WHT	LED	34		
"B"	H.E. WILLIAMS	MX4WUD-400-L15/935UL15/935D-F/F-UNV			X	WHT	LED	28		
"C"	H.E. WILLIAMS	HES-14-L38/935-A-UNV		X		WHT	LED	31		
"D"	H.E. WILLIAMS	4DS-L30/935-UNV-LM-OF-CS-N-F1	X			WHT	LED	36		
"E"	H.E. WILLIAMS	EMER/LED-WHT-D			X	WHT	LED	2		
"F"	COOPER	XTOR1B-W-BK-PC1			X	BLK	LED	12		
"G"	H.E. WILLIAMS	AP-22-L30/835-DIM-UNV	X			WHT	LED	26		
"H"	H.E. WILLIAMS	HES-24-L40/935-A-UNV		X		WHT	LED	33		
"J"	COOPER	XTOR12BRL-W-BK-PC1-WG-XTORMX			X	BLK	LED	102		
"X"	H.E. WILLIAMS	EXIT-R-EM-WHT-D			X	WHT	LED	3		

NOTES:

PEAK DEMAND (FROM UTILITY)	96 A
ADDITIONAL LOAD	83 A
<b>TOTAL</b>	<b>179 A</b>

### LIGHTING CONTROL DEVICE SCHEDULE

MARK	MANUFACTURER	CATALOG NUMBER	DISCRIPTION	NOTES
\$VA	LEGRAND	CS-50-W	PIR WALL SWITCH VACANCY SENSOR	1
\$LV	NLIGHT	nPODM GFX	WALL MOUNT 3.5" FULL-COLOR TOUCHSCREEN CONTROLLER; 16 SCENE	1
\$OC	LEGRAND	PW-100-W	PASSIVE INFRARED WALL SWITCH OCCUPANCY SENSOR	1
OC1*	LEGRAND	DT-355	CEILING MOUNT DUAL TECHNOLOGY LINE VOLTAGE CEILING SENSOR	1
OC2A*	LEGRAND	DT-355	CEILING MOUNT DUAL TECHNOLOGY LINE VOLTAGE CEILING SENSOR	1
OC2B*	LEGRAND	DT-355	CEILING MOUNT DUAL TECHNOLOGY LINE VOLTAGE CEILING SENSOR	1
OC2C*	LEGRAND	DT-355	CEILING MOUNT DUAL TECHNOLOGY LINE VOLTAGE CEILING SENSOR	1
OC2D*	LEGRAND	DT-355	CEILING MOUNT DUAL TECHNOLOGY LINE VOLTAGE CEILING SENSOR	1
PP	NLIGHT	nPP16 D	POWER/RELAY PACK; 0-10V DIMMING OUTPUT	1

NOTES:  
1. EQUIVALENT MANUFACTURERS: ENCELIM BY OSRAM; NX BY HUBBELL; WATTSTOPPER BY LEGRAND

### DISCONNECT SWITCH SCHEDULE

MARK	EQUIPMENT SERVED	SWITCH VOLTAGE	AMP	POLE	FUSE			ENCLOSURE NEMA TYPE	NOTES
					AMP	TYPE			
"DS-1"	CONDENSING UNIT	240	30	2	-	-			
"DS-2"	CONDENSING UNIT	240	30	2	-	-			
"DS-3"	WATER HEATER	240	60	1	-	-			

NOTES:

### NEW PANEL "L" LOADS

LOAD CLASSIFICATION	CONNECTED LOAD	NEC DEMAND FACTOR	DEMAND LOAD	DEMAND AMPS
F-1	1176 VA	100%	1176 VA	5 A
F-2	1176 VA	100%	1176 VA	5 A
WH-1	4500 VA	100%	4500 VA	40 A
CU-1	2364 VA	125%	2364 VA	12.5 A
CU-2	2364 VA	100%	2364 VA	10 A
<b>TOTAL:</b>	<b>11,580 VA</b>		<b>11,580 VA</b>	<b>72.5 A</b>

### NEW PANEL "M" LOADS

LOAD CLASSIFICATION	CONNECTED LOAD	NEC DEMAND FACTOR	DEMAND LOAD	DEMAND AMPS
EF-1	250 VA	100%	250 VA	1 A
EF-2	250 VA	100%	250 VA	1 A
EUH-1	1500 VA	100%	1500 VA	7 A
OFFICE 104 RECEPTACLE	540 VA	100%	540 VA	3 A
MEETING W 103 RECEPTACLE	540 VA	100%	540 VA	3 A
RECEPTION W 102 RECEPTACLE	800 VA	100%	800 VA	4 A
MEETING E 103 RECEPTACLE	540 VA	100%	540 VA	3 A
RECEPTION E 102 RECEPTACLE	800 VA	100%	800 VA	4 A
REFRIGERATOR RECEPTACLE	700 VA	100%	700 VA	3 A
ROOM 110, 111, 104, 103 LIGHTS	800 VA	100%	800 VA	4 A
MICROWAVE RECEPTACLE	700 VA	100%	700 VA	3 A
VESTIBULE RECEPTACLE	180 VA	100%	180 VA	1 A
COUNTER/DISPOSAL RECEPTACLE	1400 VA	100%	1400 VA	6 A
<b>TOTAL</b>	<b>9000 VA</b>		<b>9000 VA</b>	<b>43 A</b>

### CIRCUIT BREAKER PANELBOARD SCHEDULE

MARK:	EX "L"		MOUNTING:			SURFACE		10K AIC RATING (MINIMUM)			
	VOLTAGE:	PHASE:	WIRE:	POLES:	MAIN BUSS:	400 AMP	250 AMP	CIR.	LOAD DESCRIPTION	CIR.	
CIR.	LOAD DESCRIPTION	CIR.	LOAD (VA)	BRKR	PHASE LOAD IN VA		CIR.	LOAD (VA)	BRKR	LOAD DESCRIPTION	CIR.
					A	B					
1	EXIT WALL LIGHTS	20A1P	0		20A1P	OFFICE LIGHTS	2				
3	ENTRY & RECEPT. LIGHTS	20A1P	0		20A1P	OFFICE & HALL LIGHTS	4				
5	RECEPT. LIGHTS	20A1P	0		20A1P	REST., MECH., & MON. LIGHTS	6				
7	OFFICE & CONF. LIGHTS	20A1P	0		20A1P	VALVE & METER LIGHTS	8				
9	W. EXIT OFFICE RECEPT.	20A1P	0		20A1P	EXIT & EMERG. LIGHTS	10				
11	N.W. EXIT OFFICE RECEPT.	20A1P	0		20A1P	S. EXT. OFFICE, CON. & REC RECEPT.	12				
13	RECP. & OFFICE RECEPT.	20A1P	0		20A1P	CONF. RECEPT.	14				
15	OFFICE RECEPT.	20A1P	0		20A1P	OFFICE RECEPT.	16				
17	RECEPTION RECEPT.	20A1P	0		20A1P	OFFICE RECEPT. EF-2	18				
19	REMOTE MON. RECEPT	20A1P	0		20A1P	REST. RECEPT, EF-1, EWC RECEPT.	20				
21	SHOP RECEPT.	20A1P	0		20A1P	SHOP RECEPT.	22				
23	SHOP RECEPT.	20A1P	0		20A1P	SHOP RECEPT.	24				
25	<b>**F-1</b>	<b>20A1P</b>	1176	1176	20A1P	PF-1A & 1B	26				
27	<b>**F-2</b>	<b>20A1P</b>	1176	1176	20A1P	TELEPHONE RECEPT.	28				
29	<b>WH-1</b>	<b>40A2P</b>	4500	4500	20A2P	POLE YARD LIGHTS	30				
31	-	-	4500	4500	-	-	32				
33	<b>**CU-1</b>	<b>30A2P</b>	2364	4728	2364	<b>**CU-2</b>	34				
35	-	-	2364	4728	2364	-	36				
37	SHOP LIGHTS	20A2P	0		20A2P	SHOP LIGHTS	38				
39	-	-	0	0	-	-	40				
41	RH-1A & 1B	20A1P	0		20A1P	SCADA - SECURITY	42				

TOTALS: 10404 10404  
MAX. PHASE VA: 10404 MAX. PHASE AMPS: 87 MAX. PHASE DIVERSIFIED VA: 10404 MAX. PHASE DIVERSIFIED AMPS: 87  
**ITEMS IN BOLD: E/C TO PROVIDE NEW CIRCUIT BREAKER FOR NEW EQUIPMENT.**  
**\*\*ITEMS IN BOLD: E/C TO PROVIDE NEW LABEL FOR NEW EQUIPMENT.**

### CIRCUIT BREAKER PANELBOARD SCHEDULE

MARK:	"M"		MOUNTING:			SURFACE		12K AIC RATING (MINIMUM)			
	VOLTAGE:	PHASE:	WIRE:	POLES:	MAIN BUSS:	400 AMP	250 AMP	CIR.	LOAD DESCRIPTION	CIR.	
CIR.	LOAD DESCRIPTION	CIR.	LOAD (VA)	BRKR	PHASE LOAD IN VA		CIR.	LOAD (VA)	BRKR	LOAD DESCRIPTION	CIR.
					A	B					
1		20A1P	0		20A1P	VALVE METER 113 & 213 RECEPT.	2				
3		20A1P	0		20A1P	VALVE METER 113 & 213 RECEPT.	4				
5	STORAGE 114 RECEPT.	20A1P	0		20A1P	D0-ID & 1E	6				
7	STORAGE 114 RECEPT.	20A1P	0		20A1P	D0-1A-1B & 1C	8				
9	STORAGE 114 LIGHTS	20A2P	0		20A2P	STORAGE 114 LIGHTS	10				
11	STORAGE 114 LIGHTS	-	0		-	STORAGE 114 LIGHTS	12				
13	EUH-1	20A2P	0		50A2P	WELDER RECEPT.	14				
15	-	-	0	0	-	WELDER RECEPT.	16				
17	AIR COMPRESSOR	50A2P	0		50A2P	WELDER RECEPT.	18				
19	-	-	0		-	WELDER RECEPT.	20				
21	<b>**EF-1</b>	20A1P	250	250	20A1P	OUTSIDE GFCI RECEPT.	22				
23	<b>**EF-2</b>	20A1P	250	250	20A1P	OUTSIDE GFCI RECEPT.	24				
25	MD-1	20A1P	0		20A1P	SPARE	26				
27	"CF-1" & "CF-2"	20A1P	250	250	20A1P	SPARE	28				
29	SPARE	20A1P	0		20A1P	SPARE	30				
31	<b>**EUH-1"</b>	20A1P	1500	2040	540	<b>**OFFICE 104 RECEPT.</b>	32				
33	<b>**MEETING W 103 RECEPT.</b>	20A1P	540	1340	800	<b>**RECEPTION W 102 RECEPT.</b>	34				
35	<b>**MEETING E 103 RECEPT.</b>	20A1P	540	1340	800	<b>**RECEPTION E 102 RECEPT.</b>	36				
37	<b>**REFRIGERATOR RECEPT.</b>	20A1P	700	1500	800	<b>**ROOM 110, 111, 104, 103 LIGHTS</b>	38				
39	<b>**MICROWAVE RECEPT.</b>	20A1P	1000	1180	180	<b>**VESTIBULE RECEPT.</b>	40				
41	<b>**COUNTER/DISPOSAL RECEPT.</b>	20A1P	1400	2400	1000	<b>**FACP</b>	42				

TOTALS: 5490 5060  
MAX. PHASE VA: 5490 MAX. PHASE AMPS: 46 MAX. PHASE DIVERSIFIED VA: 5490 MAX. PHASE DIVERSIFIED AMPS: 46  
**ITEMS IN BOLD: E/C TO PROVIDE NEW CIRCUIT BREAKER FOR NEW EQUIPMENT.**  
**\*\*ITEMS IN BOLD: E/C TO PROVIDE NEW LABEL FOR NEW EQUIPMENT.**  
E/C TO PROVIDE NEW CIRCUIT BREAKERS FOR ALL EX CIRCUITS TO BE RECONNECTED.  
E/C TO PROVIDE NEW CIRCUIT BREAKERS FOR CIRCUITS LABELED AS SPARE.

### LOGITECH EQUIPMENT

EQUIPMENT	PART NUMBER	DESCRIPTION
MIC POD PENDANT MOUNT	952-000123	CEILING PENDANT MOUNT FOR RALLY MIC POD MICROPHONES
RALLY MIC POD EXTENTION CABLE	952-000047	ADD 10 METERS OF ADDITIONAL REACH TO THE CABLING OF RALLY MIC POD OR RALLY MIC POD HUB
TV MOUNT FOR VIDEOD BARS	952-000041	FLOAT RALLY BAR MINI OR RALLY BAR ABOVE OR BELOW A TV OR MONITOR FOR A SLEEK INSTALLATION AND MINIMAL FOOTPRINT
RALLY BAR	960-001308	ALL-IN-ONE VIDEO BAR FOR MEDIUM TO LARGE ROOMS
LOGITECH ROOMMATE	950-000081	TURN ANY SPACE INTO AN APPLIANCE-BASED VIDEO CONFERENCE ROOM WITH ROOMMATE, AN APPLIANCE PURPOSE-BUILT FOR VIDEO COLLABORATION
LOGITECH M510 WIRELESS MOUSE	910-001822	FULL-SIZE MOUSE WITH EXTRA CONTROLS
LOGITECH SIGNATURE K650 WIRELESS KEYBOARD	920-010908	WIRELESS KEYBOARD, EQUIPPED FOR EVERYDAY WORK AND COMFORT

NOTE: ALL A/V EQUIPMENT, WIRING, AND TESTING BY E/C