



Turtle Mountain Housing Authority TMHA Maintenance Facility

9818 BIA RD 7
Belcourt, ND 58316

PROJECT MANUAL

08.05.2026 Project #R26165

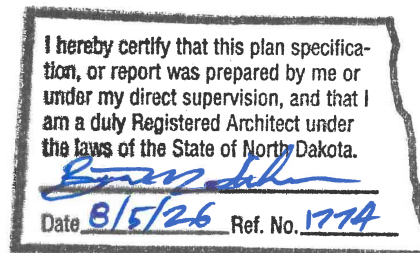
DOCUMENT 00 0107 - SEALS PAGE

PART 1 - GENERAL

1.1 DESIGN PROFESSIONALS OF RECORD

- A. The undersigned do hereby certify that the Plans, Specifications, or Reports contained herein for their area of work were prepared under their direct supervision, and that they are duly Registered Professionals under the laws of the State of North Dakota:

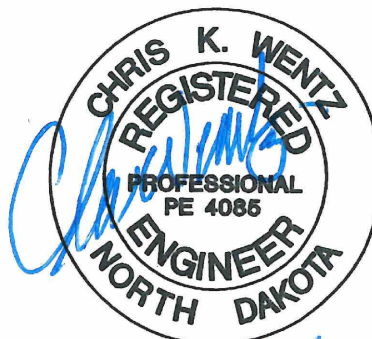
1. Architect:
 - a. Ryan M. Anderson.
 - b. Reg. No. 1774.



2. Civil Engineer:
 - a. Sean Weeks, P.E.
 - b. Reg. No. PE-6897



3. Structural Engineer:
 - a. Chris Wentz, P.E.
 - b. Reg. No. PE-4085



8/5/2026

- 4. Mechanical Engineer:
 - a. Matt Krueger, P.E.
 - b. Reg. No. PE-28898



- 5. Electrical Engineer:
 - a. Jason Hunze, P.E.
 - b. Reg. No. PE-4879.



PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION – Not used.

END OF DOCUMENT 00 0107

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PART 1 - GENERAL

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PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION – Not used.

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DOCUMENT 00 1113 - ADVERTISEMENT FOR BIDS

1.1 PROJECT INFORMATION

- A. Notice to Bidders: Bidders may submit bids for project as described in this Document. Submit bids according to the Instructions to Bidders.
- B. Project Identification: **TMHA Maintenance Facility**
 - 1. Project Location: **9818 BIA Rd 7, Belcourt, ND 58316.**
- C. Owner: **Turtle Mountain Housing Authority.**
 - 1. Owner's Representative: **Rebecca Patnaude-Olander, Executive Director.**
- D. Architect: **Ackerman-Estvold, Engineering & Management Consulting, Inc.**
- E. Project Description: Project is a new construction wood stud building primarily used for maintenance purposes of the local properties and will include multiple offices as well as storage. Project will also include new site construction and a new parking lot. Project also includes removal and replacement of siding on an existing nearby building and the interior demolition of existing walls to return the existing building to a warehouse.
- F. Construction Contract: Bids will be received for Single Prime construction (all trades, excluding the construction of the modular building).

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed lump sum bids until the bid time and date at the location given below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: **August 26, 2026.**
 - 2. Bid Time: **2:00 p.m., local time.**
 - 3. Location: **Kent Addition Admin. Building, 9860 46th Ave NW, Belcourt, ND 58316.**
- B. Bids will be thereafter publicly opened and read aloud.
- C. Owner reserves the right to reject any and all bids.

1.3 CONTRACTOR'S LICENSE AND BID SECURITY

- A. Each bid must be accompanied by a separate envelope containing the Bidder's contractor's license and bid security.

- B. The Bidder must be licensed for the full amount of the bid.
- C. Bid security in the form of a bidder's bond shall be submitted with each bid in the amount of 5 percent of the bid amount. No bids may be withdrawn for a period of 30 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.4 PREBID MEETING

- A. Prebid Meeting: A Prebid meeting for all bidders will be held via Teams video conference or in person at Kent Addition Admin. Building, 9860 46th Ave NW, Belcourt, ND 58316 on **August 19, 2026, 2:00 p.m.**, local time. Prospective bidders interested in attending must contact Sonya Boykin for the meeting link.

1.5 DOCUMENTS

- A. Online Procurement and Contracting Documents: Obtain access after **August 5, 2026**, through Quest CDN (www.questcdn.com) You may download the digital plan documents by inputting **Quest project 10304181** on the website's Project Search page. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, downloading, and working with this digital project information.
- B. Exchanges: Obtain access by contacting any of the following exchanges: Bismarck-Mandan, Bismarck Builders Exchange, Fargo, Grand Forks, Minot, Williston, North Dakota; Midwest Builders Exchange; Construction Industry Center, and Sioux Falls Builders Exchange, South Dakota
- C. All Prime contractors must contact Ackerman-Estvold through Sonya Boykin (sonya.boykin@ackerman-estvold.com) to be added to the Plan Holders list and to receive the links to the Bid Opening and Prebid Meeting video conferences.

1.6 TIME OF COMPLETION AND LIQUIDATED DAMAGES

- A. Successful bidder shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time. Substantial Completion is required by the date indicated in the Bid Documents. Work is subject to liquidated damages.

1.7 BIDDER'S QUALIFICATIONS

- A. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

- B. The Successful Bidder must secure all licensing required by the Tribal Employment Rights Ordinance (TERO) of the Turtle Mountain Band of Chippewa Indians. The Successful Bidder shall comply with the requirements of the Tribal Employment Rights Ordinance (TERO) of the Turtle Mountain Band of Chippewa Indians. This includes, but is not limited to, paying a TERO fee upon mobilization and complying with TERO employment, wage rates, training, and contracting requirements when performing work on the Turtle Mountain Reservation

1.8 INDIAN PREFERENCE

- A. The work to be performed under this Contract is on a project subject to section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e(b) which requires that to the greatest extent feasible: (a) preference and opportunities for training and employment shall be given to Indians; and (b) preferences in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. The parties to this Contract shall comply with the provisions of section 7(b) of this Act. In connection with this Contract, the Contractor shall, to the greatest extent feasible, give preference in the award of any subcontracts to Indian organizations and Indian-owned Economic Enterprises, and preferences and opportunities for training and employment to Indians. The Contractor shall include this section 7(b) clause in every subcontract in connection with the Contract, and shall, at the direction of the Owner, take appropriate action pursuant to the subcontract upon a finding by the Owner or the U.S. Department of Housing and Urban Development (HUD) that the subcontractor has violated the section 7(b) clause of this Act. Furthermore, to the greatest extent feasible preference in the award of contracts and subcontracts shall be given to low income locals in accordance with section 3 of the Housing and Urban Development Act of 1968 but not in derogation of compliance with section 7(b). The section 3 requirements however applies only to projects or activities that exceed \$200,000.

1.9 SPECIFIC PROJECT REQUIREMENTS

- A. This project is subject to the following requirements as detailed in the procurement documents.
 - 1. Building America, Buy America Act (BABA)
 - 2. Davis-Bacon Act of 1931

1.10 NOTIFICATION

- A. This Advertisement for Bids document is issued by Rebecca Patnaude-Olander, Executive Director, Turtle Mountain Housing Authority.

END OF DOCUMENT 00 1113

DOCUMENT 00 2113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.

- 1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

END OF DOCUMENT 00 2113

DOCUMENT 002600 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 2500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.

2. Submittal Format: Submit Procurement Substitution Request, using CSI Substitution Request Form 1.5C bound in Project Manual.
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by Architect.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
 - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.**

END OF DOCUMENT 00 2600

CSI Form 1.5C

SUBSTITUTION REQUEST (During the Bid Period)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

A/E's REVIEW AND ACTION

- ☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____

Date: _____

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

DOCUMENT 00 3119 - EXISTING CONDITION INFORMATION

1.1 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Relating to existing buildings on the Project site that were previously demolished and the possibility of foundations still remaining, existing drawings that include information on existing conditions including previous construction at the Project site are available for viewing on Project Website.
- C. Related Requirements:
 - 1. Document 00 2113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Document 00 3132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

END OF DOCUMENT 00 3119

DOCUMENT 00 3132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. A geotechnical investigation report for Project, prepared by Material Testing Services, LLC dated January 29, 2026 is available for viewing by request from Owner / Architect.
- C. Related Requirements:
 - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Document 003119 "Existing Condition Information" for information about existing conditions that is made available to bidders.
 - 3. Document 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.

END OF SECTION 00-3132

DOCUMENT 00 4100 - BID FORM - STIPULATED SUM

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Project Name: **TMHA Maintenance Facility**
- C. Project Location: **9818 BIA Rd 7, Belcourt, ND 58316.**
- D. Owner: **Turtle Mountain Housing Authority.**
- E. Architect: **Ackerman-Estvold, Engineering & Management Consulting, Inc.**
- F. Architect Project Number: **R26165.**

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Ackerman-Estvold and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of all Construction Work under a Single Prime Contract for the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

BASE BID \$ _____
(Numeric amount of Base Bid)

TERO FEES \$ _____
(Numeric amount of TERO Fees)

EXIST. BLDG RESIDING \$ _____
(Numeric amount of Total Bid Price)

TOTAL BID PRICE \$ _____
(Numeric amount of Total Bid Price)

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within 30 days after a written Notice of Award, if offered within 30 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

1. \$ _____
(Numeric amount of Bid Guarantee)

- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the bid bond.

1.4 TIME OF COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and shall fully complete the Work as indicated in the Contract Documents.

1.5 SUBCONTRACTORS AND SUPPLIERS

- A. The Bidder agrees to submit a list of subcontractors and suppliers within 48 hours of the Bid opening.
1. Form of Subcontractor and Supplier List: List of Subcontractors (AIA Document G705).

1.6 TIME OF COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and agrees to reach Substantial Completion as stipulated in the Contract Documents.

1.7 ACKNOWLEDGMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:
1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.

4. Addendum No. 4, dated _____.

5. Addendum No. 5, dated _____.

1.8 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in North Dakota, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.9 SUBMISSION OF BID

- A. Respectfully submitted this _____ day of _____, 2024.
- B. Submitted By: _____ (Name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).
- E. Title: _____ (Owner/Partner/President/Vice President).
- F. Street Address: _____.
- G. City, State, Zip: _____.
- H. Phone: _____.
- I. North Dakota License No.: _____.

END OF DOCUMENT 00 4100

DOCUMENT 00 5200 – FORM OF AGREEMENT

1.1 FORM OF AGREEMENT

- A. AIA Document A101, "Standard Form of Agreement Between Owner and Contractor," is hereby incorporated into the Procurement and Contracting Requirements by reference.
 - 1. A draft copy of AIA Document A101, "Standard Form of Agreement Between Owner and Contractor," is bound in this Project Manual.

END OF DOCUMENT 00 5200

DRAFT AIA® Document A101® – 2017

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

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«Turtle Mountain Housing Authority»«»
«PO Box 620
Belcourt, ND 58316»
«Telephone Number: 701-477-5673»
«»

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«TMHA Maintenance Facility»
« »
« Project is a new construction wood stud building primarily used for maintenance purposes of the local properties and will include multiple offices as well as storage. Project will also include new site construction and a new parking lot. Project also includes removal and replacement of siding on an existing nearby building and the interior demolition of existing walls to return the existing building to a warehouse.»

The Architect:
(Name, legal status, address and other information)

«Ackerman-Estvold, Engineering and Management Consulting, Inc.»«»
«1907 17th St SE
Minot, ND 58701»
«Telephone Number: 701-837-8737»
«Fax Number: 701-837-1990»

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

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- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
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- 8 MISCELLANEOUS PROVISIONS
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EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

☐ [« »] The date of this Agreement.

☐ [« »] A date set forth in a notice to proceed issued by the Owner.

☐ [« »] Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

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

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

§ 3.3 Substantial Completion

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

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

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

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

Portion of Work	Substantial Completion Date

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

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price

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

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

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

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

« »

§ 5.1.3 The Owner shall make payment of the amount certified to the Contractor not later than thirty (30) days after the Architect's receipt and certification of the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™-2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201-2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201-2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

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

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

« »

§ 5.1.7.1.1 The following items are not subject to retainage:

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

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

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

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, or as follows:

« »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Owner will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017. The Owner may consult with the Architect on any disputed matters.

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

« Rebecca Patnaude-Olander»

«PO Box 620

Belcourt, ND 58316»

«Telephone Number: 701-477-5673»

«»

«Mobile Number: 701-871-2421»

«Email Address: phelps_58316@yahoo.com»

»

« »

« »

« »

§ 6.2 Binding Dispute Resolution

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

(Check the appropriate box.)

☒ [**X**] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ [**»**] Litigation in the court of The Turtle Mountain Band of Chippewa Indians.

☐ [**»**] Other (Specify)

« »

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

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

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

« N/A, no termination fee will be paid for termination of convenience. »

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner’s representative:

(Name, address, email address, and other information)

«Rebecca Patnaude-Olander»

«PO Box 620

Belcourt, ND 58316»

«Telephone Number: 701-477-5673»

«»

«Mobile Number: 701-871-2421»

«Email Address: phelps_58316@yahoo.com»

§ 8.3 The Contractor’s representative:

(Name, address, email address, and other information)

« »

« »

« »

« »

« »

« »

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

§ 8.5 Insurance and Bonds

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

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

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

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

« »

§ 8.7 Other provisions:

« The federal requirements of the Native American Housing Assistance and Self-Determination Act of 1996 (NAHASDA), 25 U.S.C. 4101 and its implementing regulations at 24 C.F.R. 1000 et seq. apply. Additional federal requirements are set out in Attachment As»

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

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

- .8 Other Exhibits:

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

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

« ☐ »

[☐ »] The Sustainability Plan:

Title	Date	Pages

[☒ »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

«Attachment A, Other Federal Requirements
Attachment B, Turtle Mountain Band of Chippewa Indian TERO Ordinance »

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

OWNER (Signature)

«Rebecca Patnaude-Olander»«, Executive
Director»

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DOCUMENT 00 7200 – GENERAL CONDITIONS

1.1 GENERAL CONDITIONS

- A. AIA Document A201, "General Conditions of the Contract for Construction," is hereby incorporated into the Procurement and Contracting Requirements by reference.
 - 1. A copy of AIA Document A201, " General Conditions of the Contract for Construction," is bound in this Project Manual.

END OF DOCUMENT 00 7200

DRAFT AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«TMHA Maintenance Facility»
«9818 BIA Rd 7
Belcourt, ND 58316»

THE OWNER:

(Name, legal status and address)

«Turtle Mountain Housing Authority»« »
«PO Box 620
Belcourt, ND 58316»

THE ARCHITECT:

(Name, legal status and address)

«Ackerman-Estvold, Engineering and Management Consulting, Inc.»« »
«1907 17th St SE
Minot, ND 58701»

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- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.3.1 The term "provide" shall mean furnish and install in place.

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.5.1 The general character and scope of the Work is shown by the Drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar parts of the Work.

§ 1.1.5.2 Figured dimensions on the Drawings shall be followed in preference to scaled measurements on the Drawings.

§ 1.1.6 The Specifications

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

§ 1.1.6.1 Where Specifications are abbreviated type, they indicate complete sentences in the same manner as when a note occurs in the Drawings. Omissions of words such as "the Contractor shall" and "as shown on the Drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference.

§ 1.1.6.2 Where a number is listed in the Specifications (as for gauges, weights, temperatures, amounts of time, etc.), the number shall be interpreted as that or better.

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

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

§ 1.2.4 In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided.

§ 1.2.5 As experienced Contractors and Subcontractors, it is assumed each Contractor and Subcontractor understands not all components may be shown on the Drawings including, but not limited to, fasteners, connectors and incidental supports. This shall not relieve the Contractors or Subcontractors from providing all materials, equipment, fasteners, and incidental components as required or a complete installation in accordance with the design intent.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

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

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™-2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Intentionally Left Blank

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

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

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These

obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

§ 3.3 Supervision and Construction Procedures

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

§ 3.3.1.1 The Contractor's schedule, prepared in accordance with § 3.10.1, and progress of the Work shall govern the Work of the Contractor. The Contractor shall be responsible for the general coordination of the Work of all contractors with respect to the current construction schedule in order to maintain the progress of the Work and to ensure the progress remains on schedule. Each Contractor shall notify the other contractors, within a reasonable time, of phases or items of the Work requiring incorporation of Work by the other contractors. The other contractors shall, after such notification and within a reasonable time, proceed with furnishing, installing, laying out or incorporating their Work so as not to delay or impede the progress of the other contractors and the Work. Neither the Owner nor the Architect shall be responsible for the coordination of the Work between the Contractors.

§ 3.3.1.2 Each Contractor shall be responsible for the regular and on-going coordination of their Work with the affected Work of other Contractors, and for maintaining and coordinating the progress of the Work in accordance with the construction schedule, prepared in accordance with § 3.10.1 for schedule requirements.

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

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

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other

facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

§ 3.4.2.1 After the Contract has been executed, the Owner and Architect may consider requests for the substitution of products in place of those specified. The Owner and Architect may, but are not obligated to, consider only those substitution requests that are in full conformance with the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

- .1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to the product specified;
- .2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;
- .3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be performed or changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent;
- .4 agrees that any cost savings from an approved substitution shall be shared between the Owner and the Contractor;
- .5 agrees that it shall, if the substitution is approved, coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects; and
- .6 represents that the request includes a written representation identifying any potential effect the substitution may have on the Project's achievement of a Sustainable Measure or the Sustainable Objective.

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

§ 3.4.4 No trade shall commence Work until conditions are satisfactory for carrying out the Work properly, and surfaces to be covered are suitable.

§ 3.4.5 Manufacturer's printed instructions covering details of installation shall be followed where not in conflict with these Specifications. If there is a conflict, notify the Architect and obtain Architect's determination of the best option for installation, and approval before proceeding. Architect's decision and approval should in no way conflict with manufacturer's instructions in cases where incorrect installation would result in voiding manufacturers' warranties of the product.

§ 3.4.6 Completed Work shall be left plumb, level, true to line or plane, anchored securely in place, and free from damage.

§ 3.4.7 Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade.

§ 3.4.8 Except where in conflict with the Specifications, current manufacturer's printed instructions of herein specified proprietary products are made part of the Specifications.

§ 3.4.9 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§ 3.4.10 The Contractor shall provide all incidental materials and components including, but not limited to, fasteners, connectors, incidental supports and other components of construction as required for complete installation in accordance with the design intent.

§ 3.5 Warranty

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

§ 3.5.1.1 The Contractor further warrants that all products, materials and equipment provided under the Contract are asbestos-free as defined under current EPA Guidelines, and that they do not contain any other materials currently known to be hazardous.

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

§ 3.5.3 The Contractor shall guarantee and maintain the stability of all work and materials and keep same in reasonable repair and condition for the period of one (1) year from the date of final acceptance of the Work but with respect to any part of the Work which the Owner takes possession of prior to final acceptance, the guarantee shall continue for a period of one year from the date the Owner takes possession. This is in addition to any manufacturer's warranty specified.

§ 3.5.4 Defects of any kind, due to faulty work or materials appearing during the above-mentioned period must be promptly made good by the Contractor at his own expense to the entire satisfaction of the Owner and Architect. Any such construction and repairs shall include the costs of all damages to the finish or furnishings of the building resulting from the original defect or repairs to the building. Where equipment is required to be replaced, the one-year warranty shall be reinstated for that piece of equipment from the date of replacement.

§ 3.5.5 The guarantee, as provided in paragraph 3.5.4, does not apply to injuries or damages occurring after final acceptance due to "acts of God," fire, violence, abuse, or carelessness of other Contractors or agents of the Owner; however, the Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the Contractor's guarantee nor relieving the Contractor of the Contractor's responsibilities during the guarantee period.

§ 3.5.6 The guarantee, as provided in paragraph 3.5.4, shall be extended if other guarantees for different lengths of time are specifically called for in the Contract Documents or if manufacturer's standard warranties extend for a longer period.

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

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

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

§ 3.7.2.1 The Contractor shall comply with the requirements of the Tribal Employment Rights Ordinance (TERO) of the Turtle Mountain Band of Chippewa Indians. This includes, but is not limited to, paying a TERO fee, complying with TERO employment, wage rates, training, and contracting requirements when performing work on the Turtle

Mountain Reservation.

§ 3.7.2.2 The requirements of the Native American Housing Assistance and Self-Determination Act of 1996 (NAHASDA), 25 U.S.C. 4101 and its implementing regulations at 24 C.F.R. 1000 et seq. apply. Additional federal requirements are set out in Contract Attachment A. __

§ 3.7.2.3 When work of superior quality or higher standard than required by statute is required by the Contract Documents, the Contract Documents shall govern.

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

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 Superintendent

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

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project. Submit in accordance with Section 01 3300 "Submittal Procedures". The first payment will not be certified by the Architect until the construction schedule has been received by the Architect and Owner.

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

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

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed

in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

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

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

§ 3.12.6.1 If the Contractor or any Subcontractor uses a material, product or piece of equipment which requires modification(s) to any other portion of the Work, including mechanical and electrical Work, the Contractor or Subcontractor using that material, product or piece of equipment shall be responsible for obtaining the approval of the Owner and coordinating all required modifications and shall bear the full cost of such modifications.

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

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

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

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

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

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

§ 3.13 Use of Site

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

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

§ 3.15.1.1 The Contractor and Subcontractors shall clean all portions of the Work in accordance with Section 01 7700 "Closeout Procedures" and as indicated on any punch lists. Final payment shall not be made until all cleaning has been accepted by the Architect and Owner.

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract . The Architect will administer the contract in conjunction with the Owner.

§ 4.2.1 The Architect and Owner will provide administration of the Contract as described in the Contract Documents until the date the final Certificate for Payment is issued.

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

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

§ 4.2.3.1 The Architect and Contractor shall include the Owner in all communications, including but not limited to, phone, email and text messages.

§ 4.2.4 Communications

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

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

§ 4.2.6 The Architect has the authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or

not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

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

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

§ 4.2.12 Interpretations and decisions of the Architect and Owner will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings.

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

§ 5.1.3 All Subcontractors are bound to the terms of the General, and Special Conditions.

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

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

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

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

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

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 Mutual Responsibility

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

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. The Owner's approval is required for all changes in the Work, including minor changes.

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

§ 7.1.4 All proposals shall, at a minimum, include detailed breakdown and indicate the terms enumerated below. Item (a) constitutes the cost of labor, and items (a), (b), and (c) constitute the basic costs referred to under this Article 7.

- (a) Labor costs, itemized by each trade involved, showing the hourly rates for each, and the hours required for the change. Labor rates shall be the same for extra and credit computations and shall be the actual rate paid the workmen, plus contractor's burden on labor, which shall be only the actual costs of fringe benefits, taxes on labor, worker's or workmen's compensation, insurance on labor as affected by payroll, unemployment taxes and insurance, including FICA and FUTA.
- (b) Quantities of materials, equipment and supplies, at their actual cost, with unit costs indicated, plus applicable sales tax.
- (c) The cost of subcontracted work, computed in the same way as provided for under this subparagraph.
- (d) Overhead, profit or commission added after the above computations are complete. Such overhead, profit or commission shall be computed in accordance with the provisions of subparagraph 7.1.5.

§ 7.1.5 See Section 01 2600 "Contract Modification Procedures" for maximum allowances for Contractor's and Subcontractor's overhead and profit.

§ 7.1.6 For proposed changes in the Work on the lump sum or time and material methods, the costs shall be determined as provided in this subparagraph. The Contractor shall submit an itemized list of quantities with the applicable unit costs and extended price for each, in such form and detail as required by the Architect.

§ 7.2 Change Orders

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

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

§ 7.2.2 Neither the Owner nor the Architect are responsible to give Notice of Change Orders to the surety.

§ 7.3 Construction Change Directives

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

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order or as deemed necessary by the Owner and Architect.

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

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

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect and Owner shall confer to determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum allowances for overhead and profit as indicated at Section 7.1.5. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect and Owner may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

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

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

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

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

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

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

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect and Owner concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such

agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8 and Section 9.10.2.

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

§ 8.2 Progress and Completion

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

§ 8.2.1.1 The Date of Substantial Completion, the Date of Final Completion, and associated Liquidated Damages and Penalties are as specified in Section 00 7400 "Special Conditions".

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

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

§ 8.3 Delays and Extensions of Time

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

§ 8.3.1.1 The following will not be considered justifications for extension of time unless due to one of the causes stated within this Article 8:

- .1 Delay caused by Subcontractors or Supplier except if the Supplier goes out of business and another Supplier cannot be found in time to meet the schedule.
- .2 Shortage of workmen.

§ 8.3.1.2 Change Orders for extension of Contract Time shall be considered only under the following conditions or circumstances:

- .1 As indicated in Section 8.3.1. The burden of proof to substantiate the extension of time shall rest with the

Contractor, including evidence that the cause was beyond his control. The Contractor shall be deemed to have had control of the supply of labor (except in the case of organized labor disputes), materials, equipment, methods, and techniques, and of the Subcontractors.

.2 A delay in the progress of the Work actually occurred as a result of one of the valid causes for time extension.

.3 Unusual delay in delivery solely due to a delay in transportation. An extension of time shall not be considered when delay in delivery is due to improperly scheduled delivery, or when an order has not been promptly and properly placed.

.4 Abnormal weather conditions. The Contractor shall consider the location of the Project, and shall recognize the existence of variations from average climatic conditions. Foul weather in and of itself shall not be a valid cause for a time extension. Time extensions resulting from abnormal weather shall not be considered unless a significant deviation from average seasonal climatic conditions occurred for an extended period of time, and the progress of the Work was delayed to a significant extent. The climatic conditions before and after the period for which the delay is sought shall be evaluated.

.5 Changes in the Work which significantly affect the progress of the Work. When the anticipated delay can be determined the extension will be made when the Change in Work is authorized by the Owner. When the anticipated delay cannot be determined, the Contractor shall estimate the additional time required, and a mechanism for all parties to determine the allowable delay. In such a case, the Architect and Owner will determine the time extension and the Contract Time adjusted accordingly by Change Order. For changes in the Work which affect only a portion or Phase of the entire project, the Owner reserves the right to grant a time extension only for that portion or Phase affected by the Change.

.6 Labor disputes except for lockouts over which the Contractor has control. The amount of time extension shall not be longer than the actual dispute period plus a reasonable time for mobilization, and such extension may be less than the actual dispute period depending on the effect the dispute had upon the progress of the Work.

.7 Unavoidable delays such as damage caused by severe weather, fire or other casualty to the Work; remediation of contaminants, pollutants, or hazardous materials or substances discovered after award of the Contract; litigation including without limitation bankruptcy proceedings; the acts of any federal, state or local government unit that directly result in delays; and other delays outside the control of the Party claiming the delay.

.8 Delays caused by Subcontractors shall be considered only under the conditions noted above.

§ 8.3.1.3. Time extensions shall not be granted as a result of delays caused by improper scheduling, or by failure of the Contractor to have Shop Drawings or other required submittals submitted in sufficient time for review.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted. The costs for overhead, profit and commission shall be determined in accordance with the provisions of subparagraph 7.1.5.

§ 9.2 Schedule of Values

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

unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

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

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

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered to and suitably stored at the site for subsequent incorporation into the Work. Contractor shall not receive payment for materials and equipment stored off site. Payment for materials and equipment stored on the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment, or otherwise protect the Owner's interest, including applicable insurance.

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

§ 9.3.4 Applications for progress payments shall be submitted by the Contractor monthly for all work in place less applicable retainage.

§ 9.4 Certificates for Payment

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

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

§ 9.4.3 When work in place is 50% or more completed, the Contractor may request a reduction in retainage withheld to 5%, providing progress on the Work is in accordance with, or ahead of, the Contractor's construction schedule. Work must be satisfactory and accepted by the Owner and Architect, and the Contractor must have filed a Consent of Surety for the modification with the Architect. Owner's consent prior to the execution of a retainage reduction on a subsequent progress application is required.

§ 9.5 Decisions to Withhold Certification

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

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

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

§ 9.6 Progress Payments

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

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

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an

obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

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

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

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

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

§ 9.7 Intentionally Left Blank

§ 9.8 Substantial Completion

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

§ 9.8.2 Minor punch list items that do not interfere with using the Work as intended may be corrected between Substantial Completion and Final Completion.

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

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

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

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if

any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

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

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

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

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Owner and Architect will promptly make such inspection, and advertise project notice of final payment. In the event the Owner becomes aware of a claim by a subcontractor or supplier or other party, the final payment may be delayed. When the Owner and Architect find the Work acceptable under the Contract Documents and the Contract fully performed, and there has been no notification of claims, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner and Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) written certification from Contractor in accordance with Final Inspection requirements of and all Contract Closeout submittals required by section 01 7700 "Closeout Procedures," each submittal having been approved by the Architect, and (7) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the

Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

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

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

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

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.2.9 The General Contractor shall be responsible for overall security on the project site, including securing fencing required by Section 01 5000 "Temporary Facilities and Controls", and securing doors, windows and other access points to the building at the end of each work day. Any Work being performed during nights or on weekends shall be coordinated with the General Contractor so that the General Contractor may take any steps he deems necessary to ensure the site is secure when that Work is suspended for the day and that it remains secured until work commences again.

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

§ 11.1.2 The Contractor shall provide security for its performance of the Contract and payment of suppliers and Contractors. Such security shall be a Payment and Performance Bond from a bonding company acceptable to the Owner in the amount of 100% of the total Contract price in the exact form specified in Contract Attachment # issued by a surety company listed in the current U.S. Treasury Circular 570 Surety Companies, acceptable on Federal Bonds.

§ 11.1.3 The Contract will not be executed by the Owner until the Owner has received the properly executed surety bonds specified in AIA A101-2017 Exhibit A Insurance and Bonds from the Contractor.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

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

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

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the

Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

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

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

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the laws of the Turtle Mountain Band of Chippewa Indians. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

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

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

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

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

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

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers or in accordance with the Contract Documents;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority;
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents;
- .5 files a bankruptcy petition or has a bankruptcy action commenced against it that is not discharged within 30 days of commencement of same, makes an assignment for the benefit of its creditors, has a receiver appointed to manage the Contractor's assets or otherwise becomes insolvent; or
- .6 fails to maintain schedules as required by the Contract Documents, or fails to comply in a material way with design requirements of the Contract Documents, or persistently fails to perform the Work in accordance with the Contract Documents.

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

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and

- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds the direct and indirect consequential costs of completing the Work, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs), and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. Such costs incurred by the Owner will be approved as to reasonableness by the Architect, but when exercising any rights or remedies under this paragraph, the Owner shall not be required to obtain the lowest price for the Work performed. This obligation to payment shall survive the termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work, and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§ 15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

§ 15.1.7 Waiver of Claims for Consequential Damages

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

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

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

§ 15.2 Initial Decision

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

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

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

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

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

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

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

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

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

§ 15.3 Mediation

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

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

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

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined

consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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

§ 15.5 Sovereign Immunity. In the event that a claim(s) remain unresolved after the above steps have been followed,, the Turtle Mountain Band of Chippewa Indian Tribal Court shall have sole jurisdiction over legal claims under this Contract and subject to the Owner's limited waiver of sovereign immunity described in this section. The Owner hereby expressly waives its sovereign immunity only regarding disputes with the Contractor that arise under this Contract and only when the Contractor follows the requirements of this section. The Owner makes no other implied or express waiver of immunity to the Contractor or to any other party to this project and this partial waiver shall not constitute any waiver of sovereign immunity on behalf of the Tribe.

SECTION 00 7400 - SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 SPECIAL CONIDITIONS

- A. "Build America, Buy America" (BABA)
 - 1. This project and the contract documents are subject to compliance with the Build America, Buy America Act and must meet all requirements & submit all documentation indicated in the attached NDHFA compliance plan
 - a. Build America, Buy America (BABA) compliance plan is appended to this section
 - b. BABA certification is appended to this section.
- B. Regulations
 - 1. Requirements imposed by federal funding sources as set forth in the General Conditions and Attachment A, as appended to this section, shall be complied with the Contractor and subcontractors. All Contractors and subcontractors shall also comply with any applicable tribal, local, federal, or state requirements. Regulations of all tribal, federal, and state authorities having jurisdiction over construction of the project shall apply to the contracts throughout, and they will be deemed to be included in the contract the same as though herein written out in full. Permits to do work shall be purchased and paid for by the Contractor doing such work.
 - 2. Sales & Use Tax: This project is exempt from Sales & Use Tax; documentation is attached following this Section.
- C. Tribal Employment Rights Ordinance (TERO)
 - 1. The Contractor shall comply with the requirements of the Tribal Employment Rights Ordinance (TERO) of the Turtle Mountain Band of Chippewa Indians. This includes, but is not limited to, securing licensing, paying a TERO fee, and complying with TERO employment, wage rates, training, and contracting requirements when performing work on the Turtle Mountain Reservation.
 - 2. The Contractor, subcontractors, sub-subcontractors, and suppliers are solely responsible for becoming familiar with and complying with the entirety of the requirements of the ordinance and the TERO office. Each shall establish necessary communication with the TERO office prior to bidding and during construction in order to ensure full compliance with tribal laws and regulations.
 - 3. TERO website, <https://tmchippewa.com/tero/>
- D. Labor Laws
 - 1. The Contractor shall strictly observe all laws, ordinances, official rules and regulations concerning the hours of work, age, compensation, working conditions, and protection of employees. All payroll taxes, etc., shall be paid by the Contractor. One copy of the

Contractor's current certificate of worker's compensation insurance shall be submitted to the Architect upon notice of award of the contract.

E. Bonding

1. Bid Bond in the amount of five percent (5%) of the bid amount is required.
2. Performance Bond in the amount of one hundred percent (100%) of the Contract amount is required, executed on AIA form A312 Performance Bond.
3. Payment Bond in the amount of one hundred percent (100%) of the Contract amount is required, executed on AIA form A312 Labor and Material Payment Bond.
4. The Contractor shall require the attorney-in-fact who executes the required bond or bonds on behalf of the surety to affix thereto a certified and correct copy of the power of attorney.
5. Bond amounts shall not exceed the single bond limit of the Contractor's bonding company as set forth in the Federal Register current as of the bid date.

F. Insurance Requirements

1. Each Contractor shall provide the following insurance unless noted otherwise:
 - a. Builder's Risk: The General Contractor shall provide Builder's Risk insurance for all trades for one-hundred percent (100%) of the full value.
 - b. Worker's Compensation: Statutory.
 - c. General Liability:
 - 1) Bodily Injury - \$1,000,000 per occurrence; \$1,000,000 aggregate.
 - 2) Property Damage - \$1,000,000 per occurrence; \$1,000,000 aggregate.
 - d. Automobile Liability:
 - 1) \$1,000,000 combined single limit; or
 - 2) Bodily Injury - \$1,000,000 per occurrence; \$1,000,000 aggregate; and Property Damage - \$1,000,000.
 - e. The Contractor shall provide a \$2,000,000 Umbrella Policy or the above coverage.

G. Intent of Drawings and Specifications

1. Reference must be made to the drawings for all measurements. The measurements given on the plans shall be checked by the Contractor before proceeding with work, and any discrepancy shall be reported at once to the Architect.
2. Should it appear that the work intended to be described, or any of the matter relative thereto, are not sufficiently detailed or explained on the drawings or in the specifications, the Contractor shall apply to the Architect for further drawings or explanations as may be necessary and shall conform to the same as far as they shall be consistent with original drawings and in the event of any question arising with respect to the true meaning of the drawings and specifications. The Architect's supplemental information shall be final and conclusive. In no case shall a bid be submitted or any work proceed with uncertainty.
3. It is the intention of this specification and the accompanying drawings to provide a job complete in every respect. Contractors are to be responsible for this result and to turn over the project in complete operating condition irrespective of whether the plans and specifications cover every individual item in minute detail.

H. Completion and Delays

1. Construction is to start as soon as possible after the NOTICE TO PROCEED is given. The work of each of the various Contractors is to be started as soon as the conditions of the building will permit and shall be executed with all speed consistent with good workmanship and shall be completed in its various stages and its entirety in such manner and at such a time that the work of other contractors will not be delayed.
2. The following will not be considered justification for extension of time:
 - a. Improper scheduling, whether construction means and methods or administrative management such as submittals, RFI's, or other documents not submitted in a timely manner per the Contract Documents.
 - b. Delay caused by Subcontractors or Suppliers, except if either goes out of business and another cannot be found in time to meet the schedule.
 - c. Shortage of workmen.
3. Extension of Contract Time shall be considered only under the following conditions or circumstances:
 - a. Unusual delay in delivery solely due to a delay in transportation. An extension of time shall not be considered when delay in delivery is due to improperly scheduled delivery, or when an order has not been promptly and properly placed.
 - b. Abnormal weather conditions. The Contractor shall consider the location of the Work, and shall recognize the existence of variations from severe deviations from average climatic conditions. Foul weather in and of itself shall not be a valid cause for a time extension. Time extensions resulting from abnormal weather shall not be considered unless a significant deviation from average seasonal climatic conditions occurred for an extended period of time, and the progress of the Work was delayed to a significant extent. The climatic conditions before and after the period for which the delay is sought shall be evaluated.
 - c. Changes in the Work which significantly affect the progress of the Work. When the anticipated delay can be determined the extension will be made when the change in Work is authorized by the Owner. When the anticipated delay cannot be determined, the Contractor shall estimate the additional time required, and a mechanism for all parties to determine the allowable delay. In such a case, the Architect will determine the time extension and the Contract time adjusted accordingly by Change Order. For changes in the Work which affect only a portion or Phase of the entire project, the Owner reserves the right to grant a time extension only for that portion or Phase affected by the Change.
 - d. Labor disputes except for lockouts over which the Contractor has control. The amount of time extension shall not be longer than the actual dispute period plus a reasonable time for mobilization, and such extension may be less than the actual dispute period depending on the effect the dispute had upon the progress of the Work.
 - e. Unavoidable delays such as damage caused by severe weather, fire or other casualty to the Work; remediation of contaminants, pollutants, or hazardous materials or substances discovered after award of the Contract; litigation including without limitation bankruptcy proceedings; the acts of any federal, state or local government unit that directly result in delays; and other delays outside the control of the Party claiming the delay.

- f. Delays caused by Subcontractors shall be considered only under the conditions noted above.
- I. Measurements and Acceptance of Preceding Work
 - 1. Before ordering any material or doing any work, each Contractor shall verify all measurements of the building and shall be responsible for the same.
 - 2. No extra charge or compensation will be allowed on account of difference between actual dimensions and measurements indicated on the drawings, any difference which may be found shall be submitted to the Architect for consideration before proceeding with the work.
 - 3. Before starting any operation, each Contractor shall examine work performed by others to which their work adjoins or is applied and will report to the Architect any conditions that will prevent satisfactory accomplishment of their contract.
 - 4. Failure to notify the Architect of deficiencies or faults in preceding work will constitute acceptance thereof and waiver of any claim of its unsuitability.
- J. Labor and Materials
 - 1. **Contractor, suppliers, and subcontractors are explicitly responsible for ordering quantities of materials necessary for the Work, assessing market conditions and effects on lead times for those materials, and ordering them in a timely manner to arrive on site at a time consistent with the necessary sequencing of the project established by the Contractor to fulfill the Contract obligations.**
 - a. At no time will the Architect or Owner be responsible for the Contractor, supplier, or subcontractor's failure to order material in a timely manner or enough material.
 - 1) Any costs related to this failure or necessity to change products or manufacturer as a result of this failure will not be borne by the Architect or Owner.
 - 2) Any alternative product or materials necessitated by this failure must be approved by the Architect and be of equal or greater quality than that specified.
 - 3) Costs of Architect's services to the Owner made necessary by this failure will be deducted by Change Order from the Contractor's contract.
 - 2. No trade shall commence Work until conditions are satisfactory for carrying out the Work properly and surfaces to be covered are suitable.
 - 3. Manufacturer's printed instructions covering details of installation shall be followed where not in conflict with these Specifications. If there is a conflict, notify the Architect and obtain Architect's approval before proceeding.
 - 4. Completed Work shall be left plumb, level, true to line or plane, anchored securely in place, and free from damage.
 - 5. Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade.
- K. Conditions of Work
 - 1. The Contractor should consider, with caution, any equipment that may be used in the project that may cause vibration or impact loads that could cause damage. The Contractor shall repair any and all damage caused by their work.

L. Location

1. The General Contractor shall lay out all partitions and openings in partitions, etc., all of which shall be for the use of all trades. Each Contractor shall lay out their work and be responsible for any damage to their own work or that of other Contractors occasioned by their errors or failure to check properly and verify measurements.

M. Subcontractor and Supplier Selections and Due Diligence

1. All Contractors shall select only reputable subcontractors and suppliers. Any doubt to quality of work, grade of materials to be used, financial stability, bonding capacity, etc., shall be brought to the attention of the Architect and their decisions shall be followed by all concerned upon notification.
2. **It is incumbent on the Contractor, subcontractors, and suppliers to fully understand the full scope, detailing, and material parts, pieces, trims, miscellaneous materials, and quantities required for a complete installation for their portion of work prior to submitting a bid for their work.**
 - a. All Contractors, subcontractors, and suppliers are responsible for familiarizing themselves with the Construction Documents, their related scope of work, and the scope of related work prior to submitting bids and the Contractor attests to this by submitting their Bid.
 - b. The Contractor, subcontractors, and suppliers shall fully review the Construction Documents in a timely manner prior to submitting bids and notify the Architect within the time limits defined for issuing addenda of any errors, omissions, inconsistencies, or ambiguities in the documents.
 - c. Any claim by the Contractor, subcontractors, or suppliers as to not adequately understanding their scope or their failure to fully review, understand, and verify the full extents of their scope in the Construction Documents and any such additional costs arising out of this failure is not the responsibility of the Architect or Owner.

N. Cooperation

1. It shall be the duty of each Contractor to cooperate with the Architect, the Owner, and all other Contractors engaged upon the work to the end that the entire work may be carried forward harmoniously and erected in the proper sequence and without unnecessary interfacing with or delaying the work of any other Contractor, and that the work of each Contractor shall properly member with and conform to the work of other contractors. To this end, each Contractor shall consult with the Architect, and other Contractors and advise and assist them in checking and verifying measurements, correcting errors, and reconciling working drawings and erection plans.
2. So far as practical, the work of each Contractor shall be erected in its various stages with due respect to the convenience of other Contractors under the direction of the Prime Contractor where work must be erected first or carried forward simultaneously.

O. Preparation for Pipe, Hangers, Etc.

1. Each Contractor shall make suitable preparation for the installation of all piping, conduit, hangers, inserts, anchors, grounds, supports, etc., that are to be embedded in concrete, or masonry walls, floors, partitions, or attached thereto. Proper sleeves, boxes, receptacles, or chases shall be provided for all openings or recesses occurring in or passing through any

of such members, all of which shall be accurately located and firmly secured in place before any such masonry has been erected or concrete poured. Each contractor shall have men and material on hand so that all of their work can be made and all piping, conduits, etc., can be installed and tested before or during the erection of such masonry or pouring of such concrete.

P. Cutting and Patching

1. Each Contractor shall do all cutting and patching of their work required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon or reasonably implied by drawings and specifications and he shall make good after them as the Architect may direct.
2. Any cost caused by defective or ill-timed work shall be borne by the party responsible thereof.
3. A Contractor shall not endanger any work by cutting, digging or otherwise and shall not alter the work of any other Contractor without the consent of the Architect.
4. Cutting required by other Contractors and not shown on the Drawings shall be done by said Contractor; patching shall be done by the General Contractor.

Q. Protection Against the Elements

1. The Contractors shall at all times take reasonable and adequate precautions to protect their work from damage by the elements and shall not expose the Work of any other Contractor to such damages. Should the Contractor elect to prepare or erect any material during any season of the year when freezing weather may be anticipated, he shall employ such methods as may be necessary to render such work equal in every respect to similar work done under the most favorable conditions and he shall exercise extraordinary care and diligence to prevent its damage or deterioration.
2. Where tying in to existing construction, the Contractors shall at all times take reasonable and adequate precautions to protect their Work or existing construction from damage by the elements and shall not expose the work of any other Contractor or existing construction to such damages.
3. Contractors who do not take reasonable and adequate precautions for protection against the elements shall bear the resulting costs for any corrective, reconstructive, or repair work, action, or remedy.

R. Pumping and Bailing

1. If, during the progress of the work, water shall be found or water fills the trenches or bottom of the excavations by reason of rain, or any other cause, the same shall be pumped or bailed out by the General Contractor and the excavation kept free from water until the completion of the work without expense to the Owner.

S. Cleaning Up

1. The General Contractor shall be responsible for cleaning up the construction area, and leave the same free of rubbish, building materials, and debris, before final acceptance of the work.

T. Application for Payment – Retainage

1. Retainage on applications for payment shall be as follows:
 - a. **Ten percent (10%) of the "Total Completed and Stored to Date" indicated on the Application for Payment.**
 - b. At 50 percent completion of the Work, Contractor may request and Owner will consider reducing retainage, contingent on satisfactory progress and quality of work by the Contractor, as follows:
 - 1) **Five percent (5%) of the "Contract Sum to Date" indicated on the Application for Payment.**
2. All retainage shall be payable to the Contractor upon receipt of all required documentation pursuant to the General Conditions, Section 01 2900, "Payment Procedures", and certification by Architect of Final Payment Application.

U. Substantial Completion and Liquidated Damages

1. If the Sub-phase 1a has not reached Substantial Completion by the date indicated in Section 01 1000 "Summary", Liquidated Damages shall be assessed for each calendar day construction of the Work exceeds the required Substantial Completion date as follows:
 - a. For Single Prime contracts, Liquidated Damages shall be assessed in the amount of **Two-Thousand dollars (\$2,000.00)** per calendar day.
2. If Sub-phase 1b (all remaining Work) has not reached Substantial Completion by the date indicated in Section 01 1000 "Summary", Liquidated Damages shall be assessed for each calendar day construction of the Work exceeds the required Substantial Completion date as follows:
 - a. For Single Prime contracts, Liquidated Damages shall be assessed in the amount of **Two-Thousand dollars (\$2,000.00)** per calendar day.
3. Liquidated Damages assessed for the Project, if incurred, will be deducted from the Contract by subsequent Change Order or adjustment to Contractor's final pay application by Architect.

V. General Guarantee

1. Neither the final certificate of payment nor any provision in the contract documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the contract documents or relieve the Contractor of liability in respect to any expressed warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for damage to other work resulting therefrom, which shall appear within a period of one year from the date of Substantial Completion of the work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness.

W. Waiver of Lien

1. Coincident with submittal of final certificate of payment, all Prime Contractors shall submit an executed conditional final waiver of lien stating that all of their suppliers, subcontractors and all other bills are paid to ensure that legal action will not be taken against the Owner, the form of which shall be provided by Architect.
2. In addition to the above lien waiver, the following documentation may be required as allowed by the General Conditions at the discretion of the Architect:
 - a. Affidavit of Payment (AIA Document G706).

- b. Affidavit of Release of Liens (AIA Document G706A).
- c. Subcontractor and supplier final lien waivers.
- d. Consent of Surety to Final Payment (AIA Document G707).
- e. Any other information as may be required to substantiate Contractor's fulfillment of Contract requirements.

PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION – Not used.

END OF SECTION 00 7400

ATTACHMENT B Quote/Bid Solicitation

Buy America Preference (BAP) CONTRACTOR REQUIREMENTS

Under the **Build America Buy America Act (BABA)**, the Turtle Mountain Housing Authority (TMHA) is required to apply the **Buy America Preference (BAP)** for infrastructure projects, including products supplied, and paid for by certain Federal Financial Assistance (FFA) funds. TMHA is further required to include terms in its contracts and subcontracts requiring BAP compliance, and that such compliance terms and conditions are communicated to its Contractors prior to the Contractor purchasing Covered Materials with Federal Funds subject to the BAP. The terms and conditions must also specify the Federal Funds expender's record-keeping requirements.

TMHA Responsibility for ensuring BABA Compliance of Contractors and Sub-recipients

If covered materials are purchased by Contractors, TMHA, as the recipient of the applicable Federal Funds (FFA) is responsible for maintaining documentation of BABA compliance. TMHA is required to ensure that contractors engaged by TMHA comply with the BAP and provide sufficient purchase information demonstrating compliance to TMHA.

Pursuant to the Build America, Buy America Act (BABA), enacted as part of the Infrastructure Investment and Jobs Act. Pub. L. 117-58, 41 U.S.C. § 8301 note, the Tribal Recipient of the Federal Financial Assistance used to fund this infrastructure project is required to apply a domestic content procurement preference (the "Buy America Preference" or "BAP") for all construction, alteration, maintenance, or repair of public infrastructure, including buildings and real property, unless application of the BAP has been waived by HUD. Accordingly, this procurement and any resulting contract/agreement shall be carried out in accordance with BABA.

Contractors and Suppliers on this project **will sign contracts requiring them to comply with the following BAP provisions:**

- **Incorporate BABA requirements** into the project design
- **Conduct market research** to find U.S.-made materials (see internet resources, below)
- **Identify** any covered materials that are not domestically available
- **Identify** time-sensitive project deadlines that could be impacted if a product is not available domestically
- **Evaluate** the suitability of U.S.-produced alternatives if only foreign-sourced materials are available
- **Estimate costs** using U.S.-made materials, highlighting cases in which using U.S.-made materials will increase the overall project cost by more than 25%; if so, **create a cost comparison** between U.S.-made and foreign-sourced materials
- **Identify** instances in which **non-availability or unreasonable cost waivers** may be needed and provide TMHA with the information required to draft such waivers
- **Notify** TMHA when materials have arrived on site
- **Inspect all covered materials** prior to installation, to confirm BAP compliance
- **Provide all manufacturers' certifications** to TMHA
- **Only install BAP-compliant** materials

- **Reject shipments** of any BAP non-compliant materials and ensure that a subcontractor **does not invoice** TMHA for non-compliant items
- **Report any non-BABA compliant materials** or subcontractors to TMHA
- **Sign a BABA certification** upon completion of the project
- **Create and maintain** thorough records of BABA compliance
- **Ensure** that all **subcontractors** comply with BABA
- **Include** a provision in every **subcontract or purchase order** that requires the subcontractor or vendor to comply with BABA
- **Incorporate** BABA requirements into **subcontracts**, and ensure that BABA requirements are implemented during all phases of the project

HOW TO IDENTIFY BAP - COMPLIANT MATERIALS For Use In this Project

To find BAP-compliant materials suppliers, use the Hollings Manufacturing Extension Partnership supplier scouting federal website: <https://www.nist.gov/mep/supply-chain/supplier-scouting>

Check the OMB website for **existing materials waivers**: <https://www.madeinamerica.gov/waivers/>
These are already approved waivers for specific materials that OMB has determined are not available in the U.S.

Examples of acceptable documentation showing that materials were made in America:

- A Made in America label
- Materials specifications that provide sufficient detail to conclude that the materials were made in the U.S.
- A manufacture/supplier certificate or other documentation demonstrating or certifying that the materials were made in the U.S.
- A signed certification by the contractor/vendor/manufacturer certifying that to the best of their knowledge, all Iron, Steel, Manufactured Products, and Construction Materials installed on the project comply with BABA

Covered Materials subject to the BAP include the following when used in connection with a public infrastructure project:

- **All Iron and Steel:** *Iron or steel products* means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.
- **All Manufactured Products:** *Manufactured products* mean:
 - (1) Articles, materials, or supplies that have been:
 - (i) Processed into a specific form and shape; or
 - (ii) Combined with other articles, materials, or supplies to create a product with different properties than the individual articles, materials, or supplies.
 - (2) If an item is classified as an iron or steel product, a construction material, or a section 70917(c) material under [§ 184.4\(e\)](#) and the definitions set forth in this section, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under [§ 184.4\(e\)](#)

and paragraph (1) of this definition may include components that are construction materials, iron or steel products, or section 70917(c) materials.

- **All Construction Materials:** *Construction materials* mean articles, materials, or supplies that consist of only one of the items listed in paragraph (1) of this definition, except as provided in paragraph (2) of this definition. To the extent one of the items listed in paragraph (1) contains as inputs other items listed in paragraph (1), it is nonetheless a construction material.

(1) The listed items are:

- (i) Non-ferrous metals;
- (ii) Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
- (iii) Glass (including optic glass);
- (iv) Fiber optic cable (including drop cable);
- (v) Optical fiber;
- (vi) Lumber;
- (vii) Engineered wood; and
- (viii) Drywall.

The compliance documentation must support the following:

- ✓ The project for which the covered materials are being procured is a Public Infrastructure project subject to BABA.
- ✓ All iron and steel used in the project are produced in the United States. This means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.
- ✓ All manufactured products used in the project are produced in the United States. This means the manufactured product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product.
- ✓ All construction materials used in the project are manufactured in the United States. This means that all manufacturing processes for the construction material occurred in the United States.

Contractor

(Date)

ATTEST: _____

DOCUMENT 00 7450 – TRIBAL EMPLOYMENT RIGHTS ORDINANCE

PART 1 - GENERAL

1.1 AGREEMENT FORM

- A. Turtle Mountain Band of Chippewa Indians, "Tribal Employment Rights Ordinance," dated April 30, 2023, is hereby incorporated into the Procurement and Contracting Requirements by reference and is title Attachment B.

- 1. A copy of "Tribal Employment Rights Ordinance," is bound in this Project Manual.

PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION – Not used.

END OF DOCUMENT 00 7450

ATTACHMENT B

PUBLIC NOTICE (April, 2019)

The Tribe is proposing to amend Title 32, the Tribal TERO Ordinance and is placing the following proposed amendments, additions or deletions to TERO Ordinance Sections 32.0403, 32.0408-A, 32.0408-B, 32.0408-C, 32.0501, 32.0502, 32.0503, 32.0201 out for public comment, with a proposal to exclude geographical limitation of Rolette County.

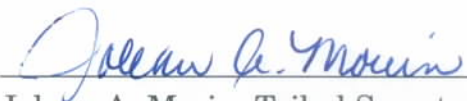
Copies of the proposed amendments are available on the Tribal Records Dept Facebook page, at the Tribal Records Dept located in the Tribal Headquarters, in the TM Times, on the website at: www.tmchippewa.com, or can be obtained in writing by request. Written comments are to be submitted by mail to PO Box 900, Belcourt, ND 58316, by fax to 701-477-0916 or by email to: tribalrecordsdept@yahoo.com. Please contact the Tribal Records Dept at 477-2600, 477-2602, 477-2677, 477-2664 or 477-2616 if there are any questions.

RESOLUTION NUMBER **TMBC235-04-19** OF THE DULY ELECTED AND CERTIFIED
GOVERNING BODY OF THE TURTLE MOUNTAIN BAND OF CHIPPEWA INDIANS

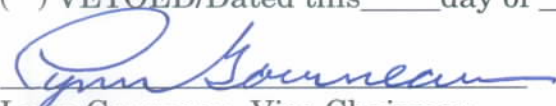
- WHEREAS, the Turtle Mountain Band of Chippewa Indians, hereinafter referred to as the Tribe, is an unincorporated Band acting under a revised Constitution and By-Laws approved by the Secretary of the Interior on June 16th, 1959 and amendments thereto approved; and
- WHEREAS, Article IX (a) Section 1 of the Turtle Mountain Constitution and By-Laws empowers the Tribal Council with the authority to represent the Band and to negotiate with Federal, State, and Local Governments and with private persons; and
- WHEREAS, Article IX (a) Section 1 of the Turtle Mountain Constitution and Bylaws requires a 30-day comment period prior to the adoption of any ordinances or amendments to the Tribal Code, whether proposed by resolution or otherwise. Adoption must occur through a roll call vote of the Tribal Council at a publicly held meeting; and
- WHEREAS, the Tribe is proposing to amend, add or delete various revisions to Title 32, the TERO Ordinance Sections 32.0403, 32.0408-A, 32.0408-B, 32.0408-C, 32.0501, 32.0502, 32.0503, 32.0201 and is placing said proposed amendments out for public comment; now
- THEREFORE BE IT RESOLVED that the Tribe is placing the following proposed amendments, additions or deletions to Title 32, TERO Ordinance Sections 32.0403, 32.0408-A, 32.0408-B, 32.0408-C, 32.0501, 32.0502, 32.0503, 32.0201 out for public comment, with a proposal to exclude geographical limitation of Rolette County.

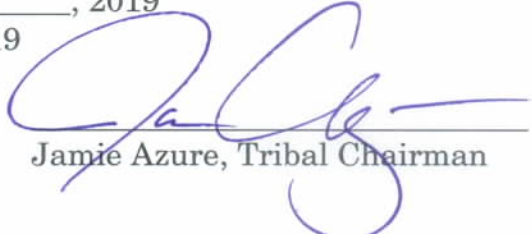
C E R T I F I C A T I O N

I, the undersigned Tribal Secretary of the Turtle Mountain Band of Chippewa Indians, do hereby certify that the Tribal Council is composed of **nine (9) members** of whom **six (6)** constituting a quorum were present at a meeting duly called, convened and held on the **10th day of April, 2019** that the foregoing resolution was adopted by an affirmative vote of **five (5) in favor** – Representatives Stuart LaFountain, Ron Trottier, Sr., Jim Baker, LoAnn Jerome and Chad Counts; **three (3) absent** – Representative Nathan Davis, Carson Belgarde and Chairman Jamie Azure; with the Vice-Chairman not voting.


Joleen A. Morin, Tribal Secretary 4/30/19

(✓) SIGNED INTO LAW/Dated this 30th day of April, 2019
() VETOED/Dated this _____ day of _____, 2019


Lynn Gourneau, Vice-Chairman


Jamie Azure, Tribal Chairman

TITLE 32
TRIBAL EMPLOYMENT RIGHTS ORDINANCE

CHAPTER 32.01
General Provisions and Purpose

32.0101 Name.
This Ordinance shall be known as the Turtle Mountain Band of Chippewa Indians Tribal Employment Rights Ordinance.

32.0102 Findings.
It is the policy of the Turtle Mountain Tribal Council to promote employment opportunities for Indians and business opportunities for Indian firms and contractors, and to provide direction, management and business standards for the Turtle Mountain Indian Reservation. The work force of the Tribe must be given an opportunity to gain employment on or off the reservation and the Tribal council will promote that preference in harmony with congressional enactments giving Indians special employment rights. It is also the Council's responsibility to monitor Indian preference along with collecting from those doing business on the Turtle Mountain Indian Reservation a fair fee for that privilege. Thus, the Tribal Council has enacted and hereby amends an ordinance called "Tribal Employment Rights Ordinance (TERO)."

CHAPTER 32.02
Definitions

32.0201 Definitions.
Employers/contractors may seek clarification as to all TERO requirements and definitions at the pre-bid conference for any on-reservation construction project, or otherwise by directing inquiries to the Tribal TERO Commission.

1. "CHAIRMAN" shall mean the chairman of the Turtle Mountain Chippewa Tribal Employment Rights Commission.
2. "COMMISSION" shall mean the Turtle Mountain Chippewa Tribal Employment Rights Commission.
3. "COMMISSIONER" shall mean a Commissioner of the Turtle Mountain Chippewa Tribal Employment Rights Commission
4. "UNION" shall mean duly organized workers as recognized by any labor organization recognized as such under the national Labor Relations Act.
5. "COUNCIL" shall mean the Tribal Council of the Turtle Mountain Band of Chippewa Indians.
6. "TERO DIRECTOR" shall mean the individual hired by the Tribal Council to keep the Council, Commission, employees and employers informed of this Ordinance and its violations. The Director has authority to resolve informal disputes on behalf of the Commission.
7. "TERO" shall mean the Tribal Employment Rights Ordinance.
8. "EEOC" shall mean the Equal Employment Opportunities Commission of the United States.
9. "EMPLOYER" shall mean any person, business, company, contractor, subcontractor, or other entity located or engaged in work on the reservation, ~~or other tribal land owned by the Tribe,~~ employing one or more persons, and without regard for whether the employer or its owner is Indian or Non-Indian or a member of the Turtle Mountain Band of Chippewa Indians or not. The term "Employer" excludes federal, state, county and tribal government, ~~only if these employers do the work in house using their regular company employees and using their own company equipment without contracting any portion out.~~ Tribally-owned or tribally-chartered private, for profit corporations are employers under this definition. Tribally owned or tribally chartered, non-profit corporations are employers under this definition. Tribally chartered or state chartered non-profit corporations authorized by the Tribe to contract with any federal agency pursuant to P.L. 93-638 or to enter into a grant agreement

- pursuant to P.L. 100-297 are employers under this definition. Tribally owned corporations are employers under this definition.
10. An employer is "ENGAGED IN BUSINESS ON THE RESERVATION" if in connection with any portion of a business enterprise or specific project, contract or subcontract, the employer or any of its employees or agents performing work within the exterior boundaries of the reservation. Employers who have both on-reservation and off-reservation business locations shall also be subject to the TERO in their off-reservation locations if those off-reservation locations are on lands adjacent to the reservation.
 11. "Indian" shall mean any person recognized as an Indian by the United States Government pursuant to its trust responsibility. In complying with and implementing the TERO, following additional preferences shall be recognized and enforced.
 12. Indians residing in Rolette County, North Dakota. Indians residing in other counties in the State of North Dakota.
 13. Any Indian recognized by the U.S. Government pursuant to its trust responsibility wherever residing.
 14. The terms "RESIDENCE" or "RESIDING" shall mean the place of domicile of an applicant on the date the applicant seeks employment or contracting preference under the TERO and resides within 90 days prior to such application. Domicile shall mean the place where an individual Indian has his true, fixed, and permanent home and principal establishment, and to which whenever he is absent he has the intention of returning;
 15. The term "INDIAN-OWNED BUSINESS" shall mean a business entity (in whatever form) of which at least 51% is owned by any federally recognized Indian Tribe or by Indians and which has been screened and certified as an "Indian-owned business" by the MBE/WBE office in Bismarck, North Dakota or the Indian Business Development Center in Bismarck. A copy of MBE/WBE certification will be furnished to the TERO Office.
 16. The term "JOINT VENTURE" shall require that any Tribal member (s) or Tribe who enters a Joint Venture contract must control at least 51% of the Joint Venture and receive at least 51% of profits of the Joint venture. The Joint Venture shall show proof of Joint Venture to the TERO office by providing copies of ownership, state contractors license, bond and liability insurance. The Joint Venture must be certified and screened by the MBE/WBE office in Bismarck, North Dakota.
 17. Any employer is "LOCATED ON THE RESERVATION" if in connection with any portion of a business enterprise or specific project contract or subcontract, he/she is doing business or performing work within the exterior boundaries of the reservation.
 18. The term "OFCCP" shall mean the Office of Federal Contract Compliance Programs of the United States.
 19. The term "RESERVATION" shall mean the Turtle Mountain Indian Reservation proper and all tribal land and trust property held by the U.S. Government for the Tribe in Rolette County, North Dakota, including all land within the exterior boundaries of said reservation proper and said tribal land and trust property.
 20. The term "SECRETARY" shall mean the Secretary of the Interior or his duly authorized representative.
 21. The term "TRIBE" shall mean the Turtle Mountain Band of Chippewa Indians.
 22. "KEY POSITION" means an ongoing position where a person is a permanent employee for a period of one year prior to the contract and it is vital to the contractor's ability to perform the contract as he bid it or to the special operation of a crew familiar with each other in their duties to perform, that said person or persons be used on the project in said position(s).
 23. MBE means "MINORITY BUSINESS ENTERPRISES". WBE means "WOMEN'S BUSINESS ENTERPRISE".
 24. "INFORMAL DISPUTE RESOLUTION"; Clarifying and trying to remedy a situation without a hearing. (See 32.0702, 32.0703 and 32.0704)

CHAPTER 32.03

Turtle Mountain Chippewa Tribal Employment Rights Commission.

32.0301 Appointment.

The Turtle Mountain Chippewa Tribal Employment Rights Commission shall consist of one council member (and one alternate council member) appointed by the Tribal Council, four members appointed by the Tribal Council at large from the reservation community. Chairman of the board will be appointed by the Tribal Council. The alternate council member may vote in place of the appointed council member in the absence of that member.

32.0302 Term of office.

Commissioners shall hold office for a period of two years. Commissioners shall hold office after expiration of their terms of office until their successors are duly appointed and approved.

32.0303 Removal from office.

A Commissioner may be removed from office by the Tribal Council upon conviction of a crime, or for gross neglect of duty, misfeasance of malfeasance in office, or ineligibility to serve as a Commissioner or where the Commissioner misses three consecutive meeting without good cause. Specific written charges shall be prepared and served upon the Commissioner by the Tribal council at least ten days before a Council hearing upon the matter, and he shall be given an opportunity to answer to the charges at the hearing, before Tribal Council action. If the Commissioner refuses to appear before the Tribal Council, the Council shall nonetheless proceed to vote upon his removal. The decision of the Council shall be final.

32.0304 Vacancy and interim appointment.

If a Commissioner shall die, resign, be incapacitated or leave the reservation or be removed from office, the Tribal Council shall appoint an eligible person to fill the vacant position for the remainder of the term of the office of the Commissioner whose position it has to fill.

32.0305 Chairman.

The Chairman of the Commissioner shall be appointed by the Tribal Council and will be liaison between the Council and the Commission when needed.

32.0306 Duties of commission.

The Commission shall administer the employment rights program of the Turtle Mountain Band of Chippewa Indians in accordance with this Ordinance.

32.0307 Powers of commission.

The Commission shall have the power:

1. To establish rules and regulations governing all activities of the Commission, subject to prior approval of the Tribal Council.
2. To set minimum wage scale for construction employment at the beginning of each calendar year (see Section 32.014), subject to prior approval of the Tribal Council.
3. To expend operating funds appropriated by the Council for the use of the Turtle Mountain Chippewa Tribal Employment Rights Program.
4. To obtain funding from federal, state or other sources to supplement Council appropriations, subject to prior approval of the Tribal Council.
5. To impose numerical hiring goals and timetables, specifying the fair minimum number of Indians an employer may hire by craft or skill level.
6. To promote employers to establish or participate in such training programs as the Commission deems appropriate to increase the pool of Indian eligible for employment on the reservation.
7. To assist the TERO Director in administering a tribal hiring hall.

8. To require that employers may hire non-Indians for non-key positions only after the tribal hiring hall has certified that qualified Indians are unavailable to fill vacant job positions.
9. To prohibit employers from using job qualifications criteria a personnel requirement that bar Indians from employment unless such criteria or requirements are required by business necessity. Commission regulations may adopt EEOC guidelines or may adopt additional requirements to eliminate employment barriers unique to Indians and the reservation, subject to prior approval of the Tribal Council.
10. To enter into agreements with the unions to insure union compliance with the Ordinance.
11. To give preference to Tribal and other Indian-owned business in the award of contracts or subcontractors.
12. To establish counseling programs to assist Indians to retail employment.
13. To hold hearings and to subpoena witnesses and documents in accordance with this Ordinance.
14. To require employers to submit reports and take all actions deemed necessary by the Commission for the fair and vigorous implementation of this Ordinance.
15. To enter into cooperative agreements with federal employments rights agencies such as EEOC and OFCCP to eliminate discrimination against Indians both on and off the Reservation.
16. To take such other actions as deemed necessary to achieve the purpose and objectives of the Turtle Mountain Chippewa Tribal Employment Rights Program established in this Ordinance.

In exercising the above-specified powers, the Commission shall have the discretion to implement certain powers only or to apply one or more such powers to limited classes or numbers of employers.

CHAPTER 32.04

Turtle Mountain Chippewa Tribal Employment Rights Program

32.0401

Coverage.

All employers are required to give preference to equally qualified Indians and non-members married to an enrolled tribal member of one-quarter (1/4) or more degree of Indian blood ~~and who resides in Rolette County~~, in hiring, promotion, training, and all other aspects of employment, contracting and subcontracting, and must comply with this Ordinance and the rules, regulations and orders of the Commission. The above requirements shall apply only to facilities or components or divisions of an employer located on or engaged in business on the reservation, or for employers who have both on-reservation and off-reservation business locations, the employer shall also be subject to this TERO in their off-reservation locations, if those off-reservation locations are on lands adjacent to the reservation.

32.0402

Contractors, subcontractors, and minority businesses.

The Indian preference requirements contained in the Ordinance shall be binding on all contractors, subcontractors, and minority businesses of employers, regardless of tier, shall be deemed a part of all resulting contract and specifications. The TERO Commission shall have the initial and primary responsibility for insuring that all contractors, subcontractors, and minority businesses comply with these requirements and contractors, subcontractors, and minority businesses shall be subject to penalties provided herein for violation of this Ordinance if the contractor or subcontractor, subcontractors, and minority businesses fails to comply.

32.0403

Minimum numerical goals and timetables for Indian employment.

The Commission will establish the minimum number of Indians, ~~which which is set at seventy five (75%) percent~~ each employer should employ on his work force during any year that he or any of his employees are located or engaged

in work on the reservation ~~or Tribal adjacent land~~. Noncompliance will require rational between employer and Commission. Numerical goals shall be set for each craft, skill area, classification, etc., used by the employer and shall include, but not be limited to, administrators, supervisory, and professional categories. The goals shall be expressed in terms of number of Indian employment as a percentage of the total man hours worked by the employer's workforce in the job classification involved. Numerical goals shall be based upon surveys of the available Indian manpower pool and of projected employment opportunities. Both the TERO Director and the License Compliance/Employment Officer shall be involved in the formation of hiring goals for each employer.

1. For new employer, the goals shall meet with the Commission or Director as long before he actually begins work as possible and shall furnish the Commission with a precise list of the number, the kind of employees he expects to employ. The Commission or Director shall then set specific goals and timetables for the employer after considering any special factors or goals into his plan for complying with this Ordinance and shall agree in writing to meet these goals. Any employer who fails to provide such a written agreement to the TERO Commission shall not be permitted to commence work on the reservation.
2. For an existing employer on the reservation, the goals shall be a percentage of the new employees expected to be employed during the ensuing year. The employer shall incorporate the goals into his plan for complying with this Ordinance and shall agree in writing to meet these goals. Any employer who fails to provide such a written statement will not be permitted to commence work on the reservation. The TERO Commission shall maintain on file the current plan of each employer authorized to undertake work on the reservation.
3. For both new and existing employers, the goals shall be reviewed by the Commission at least annually and shall be revised as necessary to reflect changes in the number of Indians available or changes in employer hiring plans. Each employer shall submit a monthly report to the Director on a form provided by the employer, indicating the number of Indians in his work force, how close he is to meeting his goals, all persons hired or fired during the month, the job positions involved and other information required by the Commission.
4. Each employer shall meet his minimum goals for the employment of Indians. Whenever the Commission or Director has reason to believe that an employer is violating this Ordinance by not meeting his goals, the Commission or Director may file a complaint and notify the employer of the alleged violation pursuant to Chapter 32.07 of this Ordinance. The Commission shall bear the initial burden of providing that an employer has failed to or is failing to meet its goals. Upon a prima facie proof of such failure, the employer shall then bear the burden of proving that it has met or is meeting its goals or has made a good faith effort to meet its goals. It shall not be an excuse for such failure that the union with which the employer has a collective bargaining agreement providing for exclusive referral failed to refer Indians.

32.0404

Training.

Every employer shall be required by the Commission to participate in training programs to assist Indians to become qualified in the various job classifications used by the employer. Every employer shall employ the maximum number of Indian trainees or apprentices possible. The ratio of Indian trainees to fully qualified workers shall be set by the Commission after consultation with employer. For construction projects, the number of Indian trainees shall be no less than the minimum ratio established by the Department of Labor (one trainee for every four journeyman). Every employer with a collective bargaining agreement with a union shall be required to obtain agreement from the union to establish an advanced journeyman upgrade and apprenticeship program.

32.0405

Qualified and personnel requirements.

Every employer is prohibited for using job qualification criteria or personnel requirements which bar Indians from employment. The Commission shall bear the initial burden of proving that a job qualification criterion or personnel requirements is not required by business necessity. Upon a prima facie proof that a job qualification or personnel criterion is not required necessity, employer shall then bear the burden of proving that it is. If that burden is not met, the employer will be required to eliminate the job qualification criterion or personnel acquisitions at issue. In implementing this section, the Commission shall be guided by principles established in the EEOC in order to eliminate employment barriers unique to Indians and the reservation. If the employer and the Commission or Director is unable to agree upon any matter in this section, the Commission may invoke the hearing procedure provided in Chapter 32.07 of this Ordinance.

32.0406

Tribal hiring hall.

The Commission shall establish and administer a tribal hiring hall to assist employers in identifying and hiring qualified Indians in job positions, employ and supervise a License Compliance/Employment Officer to oversee the hiring hall, labor survey, and employee referral functions under this ordinance. An employer may recruit and hire workers from whatever sources are available to it and by whatever process it chooses, provided that it may not hire a non-Indian until it has given the Commission or Director a reasonable time to locate a qualified Indian and the tribal hiring hall has certified that a qualified Indian is unavailable to fill the vacant job position.

For purpose of this Ordinance, "reasonable time" shall be defined as follows: Three (3) working days to locate and refer a qualified Indian. The Commission may grant a waiver of these time periods upon a showing by the employer that such time periods impose an undue burden upon it. An employer subject to a collective bargaining agreement with the union shall be exempt from this procedure if the union agrees to refer Indians from a listing supplied by the Commission or Director. However, if any union fails to meet this obligation to refer Indians to an employer, the Commission or Director may require the employer to accept Indian referrals from sources other than the union.

In administering a tribal hiring hall, a hiring list may be maintained by the License Compliance/Employment Officer. Individuals who desire to obtain employment in areas within the scope of this TERO Ordinance may enter their names on this hiring list. Names shall be entered in chronological order by the date and time of sign-up. The list may be utilized by the License Compliance/Employment Officer on a first come, first served basis in placing individuals of comparable skills in various crafts with various employers: Comparably skilled individuals shall be referred for placement in the order their names appear on the list.

If any non-Indian worker is found to be employed in a job in violation of this section, the employer shall be required by the Commission or Director to remove employee immediately and said employer shall be subject to the penalties in Chapter 32.08 of this Ordinance.

32.0407

Counseling and support programs.

The Commission will establish counseling and other support programs to assist Indians to retain employment. Every employee shall be required to cooperate with the Commission regarding such counseling and support programs.

32.0408

Preference in contracting and subcontracting.

~~Every employer that is soliciting for bids or quotes in the Turtle Mountain Jurisdiction and Tribal adjacent land in an open market advertisement shall be awarded to the low responsible bidder with a percentage preference given to Indian Owned firm. 5% preference for Indian Owned Prime contractor and 10%~~

~~for Indian Owned Subcontractors and suppliers~~ Every employer shall give preference in the award of any contract or subcontract to Indian-Owned businesses, the names of which shall be supplied to the employer for their use. Employers shall be required to take every step feasible to identify or locate Indian-owned businesses. 10% preference will be given to qualified Indian-owned businesses ~~located in Relette County~~. These businesses then must assume the responsibility of submitting timely bids or otherwise lose the right of being considered.

~~32.0408.01 Every prime contractor must list their subcontractors and suppliers for each contract to prevent bid shopping. Each contractor must have a valid Tribal License up to date through TERO in order for their bid to be considered.~~

~~32.0408.02 Every employer must provide a copy of current Liability Insurance to the TERO office before a TERO license is issued.~~

32.0409 Lay-offs.

In all lay-offs and reduction in force, no Indian worker shall be terminated if a non-Indian worker in the same job classification is still employed unless the termination is pursuant to a prior lay-off procedure agreed to by the Commission in writing. Unless otherwise agreed in advance per such lay-off procedure, the non-Indian must first be terminated if the Indian possesses the minimum qualifications for the job classification.

32.0410 Promotion.

Every employer shall give Indians preferential consideration for all promotion opportunities and shall encourage Indians to seek such opportunities. For every supervisory position filled by a non-Indian, the employer shall file a report with the Commission stating what efforts were made to inform Indian workers about the position, what Indians, if any, applied for the position, and the reasons why each Indian was not hired for the position.

32.0411 Summer students.

Every employer shall give Indian students preferential consideration for summer student employment. The employer shall make every effort to promote after school, summer and vacation employment for Indian students.

CHAPTER 32.05
Fee Assessment

32.0500 Fee assessment.

Fee Assessment to Provide Tribal Revenue and Operation of the Commission Pursuant to Article 9, Sections 3 and 4 of the Turtle Mountain Band of Chippewa Indian Constitution.

32.0501 Contractors, subcontractors and minority businesses.

Every contractor, subcontractor or business entity with a negotiated contract of \$10,000 including all change orders or more shall pay a one-time fee of 3% 4% of the total amount of the contract. The fee will be paid in full when receiving first progress payment of within 45 days from date of award, or whichever comes later. This Ordinance shall apply, but not be limited to, the following categories of contractors, subcontractors or employers, Construction Contractors, Manufacturers, Materialmen and Suppliers. 4% 3% will also apply to Professional Services, ~~such as A/E Firms, Consultants and Legal Services, regardless of dollar amount. attorneys, and all educational purchases and contracted purposes, except for computers, reading books, classroom desks and classroom supplies and materials.~~

32.0502 Accounting.

~~Four (4%) percent TERO fees collected shall be paid to the TERO Office and deposited in a special account. One (1%) percent EPA fee collected will be transferred to the tribal landfill account and the remaining 3% percent will remain in the special account and will be used to support the TERO Program. Fees shall be paid to the TERO Office and placed in the general account, and the council shall appropriate funds for use by the commission.~~

32.0503 Tribal business license.

Any person, employer, or vendor doing business in the reservation shall be required to obtain and maintain in force a tribal business license before any work will commence. All licenses are issued annually, and must be renewed before due date of each calendar year. Tribal business license applications will be obtained at the TERO Office. Fees will not apply for educational purposes, except for new construction, remodeling and demolition. ~~Fees will apply to all educational purchases and contracted purposes, except computers, books, classroom desk and classroom supplies and materials.~~ (This last sentence was proposed to be moved to Section 32.0500 Fee assessment.)

**CHAPTER 32.06
Compliance by Unions**

32.0600 Notice.

Every union with a collective bargaining agreement with an employer must file a written agreement stating that the union will comply with this Ordinance and the rules, regulations and orders of the Commission. Until such agreement is filed with the Commission or Director, the employer may not commence work on the reservation.

32.0601 Contents of union agreements.

Every union agreement with an employer or filed with the Commission or Director must provide:

1. Indian Preference. The union will give absolute preference to Indian residents in job referrals regardless of which union referral list they are on.
2. Cooperation with Commission. The union will cooperate with the Commission or Director in all respects.
3. Registration. The union will establish a mechanism allowing Indians to register for job referral lists by telephone or mail.
4. Training Programs. The union will establish a journeyman upgrade and advanced apprenticeship program.
5. Include all Indians. The union will "include" all Indians who qualify for journeyman or apprenticeship status and wish to join the union.
6. Temporary Work Permits. The union will grant temporary work permits to Indians who do not wish to join the union.

32.0602 Model union agreement.

The employer will provide a model union agreement for use by all unions who have collective bargaining agreements with any employer.

32.0603 Recognition of unions.

Nothing herein or any activity by the Commission authorized hereby shall constitute official tribal recognition of any union or tribal endorsement of any union activities on the reservation. No union activities shall take place without prior approval of the Turtle Mountain Chippewa Tribal Council.

32.0604 No waiver of sovereign immunity.

Nothing in this Ordinance is a waiver of the Turtle Mountain Band of Chippewa Indian's sovereign immunity as against any person, agency or governmental entity including, but not limited to, the National Labor Relations Board and the Federal Office of Contract Compliance. Nothing in this Ordinance is a "consent to be sued" as defined by the Turtle Mountain Chippewa Tribal Code,

Section. The Tribe's sovereign immunity also extends to members of the TERO Commission and Staff.

CHAPTER 32.07
Complaints and Hearings

32.0701 Notice.

If a hearing is requested by the Commission or Director, an individual employee, or union pursuant to this section, a written notice of hearing shall be given to all parties concerned of the nature, time and place of the hearing and the evidence to be presented, and shall advise such parties of their rights to be present at the hearing, to present any testimony of witness and other evidence to be represented by counsel at their own expense, and that the Commission may be represented by general counsel for the Turtle Mountain Chippewa Tribe.

32.0702 Commission complaint and procedure.

If the Commission or Director believes that an employer, contractor, subcontractor, or union has failed to comply with the Ordinance or any rules, regulations or orders of the Commission, it may file a complaint and notify such party of the alleged violations. The Commission or Director will attempt to achieve an informal settlement of the matter, but if an informal settlement cannot be achieved, the Commission or Director may request a hearing upon the matter pursuant Section 32.0701

32.0703 Individual complaint procedure.

If an Indian believes that an employer has failed to comply with this Ordinance or rules, regulation or orders of the Commission, or believes he/she has been discriminated against by an employer because he/she is an Indian, he/she may file a complaint in writing with the Director specifying the alleged violation. Upon receipt of the complaint, the Director shall investigate and attempt to achieve an informal settlement of the matter. If an informal settlement cannot be achieved, the individual or Director may request a hearing upon the matter pursuant to Section 32.0701.

If an employer fires, lays off, or penalizes in any manner, an Indian employee who utilizes the individual complaint procedure provided herein or exercises any right provided herein, the employer shall be subject to the penalties in Chapter 32.08 of this Ordinance.

32.0704 Employer or union complaint procedure.

If an employer or union believes that any provision of this Ordinance or any rule, regulations or order of the Commission or Director is illegal or unclear, it may file a complaint in writing with the Director specifying the alleged illegality or error. Upon receipt of the complaint, the Director shall investigate and attempt to achieve an informal settlement of the matter. If an informal settlement cannot be achieved, the employer, union or Commission may request a hearing upon the matter pursuant to Section 32.0701.

32.0705 Hearing procedure.

Hearing before the Commission shall be governed by the following rules of procedure:

1. All parties may present testimony of witnesses and other evidence and may be represented by counsel at their own expense.
2. The Commission shall be responsible for taping the proceedings and preserving such tapes and all pleading and physical evidence submitted at the hearing. These items shall constitute the record on appeal if any appeal should be taken after the hearing.
3. The Commission may have the advice and assistance at the hearing of general counsel for the Tribe.
4. The Chairman of the Commission or the Vice Chairman may preside. No formal rules of evidence of procedure need to be followed, but the

- Commission shall proceed to ascertain the facts in a reasonable and orderly fashion.
5. Any matter to be proven must be proven to the satisfaction of the Commission or by the preponderance of the evidence.
 6. The hearing may be continued at the discretion of the Commission or Director.
 7. At the final close of the hearing, the Commission may take immediate action or take the matter under advisement.
 8. The Commission or Director shall notify all parties within 30 days after its decision in the matter.
 9. The Commission may require the presence of persons and documents at the hearing by service of subpoena(s) issued by the Commission.
 10. Any party leaving a scheduled meeting will be subject to entry of an adverse finding by default, unless authorized by the Commission.
 11. Any party not appearing for a scheduled meeting will be subject to an adverse finding by default unless prior written approval must be submitted in writing to the Director.
 12. Complaints must be filed within 30 days of incident with the TERO Office otherwise complaint will not be processed.

CHAPTER 32.08 Penalties for Violation

32.0801 Penalties for violation.

Any employer, contractor, subcontractor or union who violates this Ordinance or rules, regulations or orders of this Commission shall be subject to penalties for such violations, including, but not limited to:

1. Denial of right to commence or continue business inside the reservation or Adjacent Tribal Land.
2. Suspension of all operations inside the reservation.
3. Payment of back pay and damages to compensate any injured party.
4. An order to summarily remove employees hired in violation of this Ordinance or rules, regulations and orders of the Commission.
5. Imposition of monetary civil penalties.
6. Prohibition from engaging in any future operations on the reservation.
7. An order requiring employment, promotion and training of Indians injured by the violation.
8. An order requiring changes in procedures and policies necessary to eliminate the violation.
9. An order making any other provision deemed by the Commission necessary to eliminate violations.
10. The maximum civil penalty, which may be imposed, is \$500.00 for each violation. Each day during which a violation exists shall constitute a separate violation.
11. The Commission or Director may apply to the Tribal Court of the Turtle Mountain Band of Chippewa Indians for a judicial order or decree after notice and hearing to the other party or parties to enforce any final ruling or order of the Commission. The Tribal Court shall act on such requests on an expedited basis. The Tribal Court shall not have jurisdiction to re-examine the merits of any such Commission determination, but may grant, deny, or modify the relief sought as applicable law and equitable circumstances warrant.

CHAPTER 32.09 Appeals

32.0901 Appeals.

Any party to a Commission hearing shall have the right to appeal any decision, ruling or order of the Commission to the Tribal Court of Appeals of the Turtle Mountain Chippewa Tribe of the Turtle Mountain Indian Reservation, North Dakota. The Court of Appeals (with a law trained judge presiding)

shall have jurisdiction to reverse, affirm or modify any Commission decision, order or ruling if such Court determines on the basis of the record made at the Commission hearing that the Commission action was (a) not supported by substantial evidence: or, (b) was clearly erroneous as a matter of law. Otherwise, the Commission decisions shall be affirmed.

CHAPTER 32.10 Tribal Training Program

32.1001 Tribal training program.

The Tribe shall appropriate such tribal funds necessary and available to establish training programs to prepare the tribal members for job opportunities developed pursuant to the Turtle Mountain Chippewa Tribal Employment Rights Ordinance. The Commission shall negotiate a training program in cooperation with employers, state, federal and tribal officials. Such programs shall follow applicable federal standards (if any).

CHAPTER 32.11 Publication of Ordinance

32.1101 Publication of ordinance.

The Commission or Director shall notify all employers of this Ordinance and their obligations to comply. All bid announcements issued by any tribal, federal, state or private or public entities shall contain a statement that the successful bidder will be obligated to comply with this Ordinance and all rules, regulations and orders of the Commission.

The Tribal Council may issue business licenses to prospective employers planning to work on the reservation upon review and approval of the prospective employers business license application in conformity with applicable tribal law and procedure. The TERO office shall make available to the Council the name of each business to whom a tribal business license has been issued. The Commission shall advise such employer or prospective employers of their obligations under this Ordinance, rules, regulations and order of the Commission.

The Director shall send a copy of this Ordinance to every employer operating on the reservation and any amendments or revisions thereto. A small fee may be charged for this service.

CHAPTER 32.12 Compliance Plan

32.1201 Compliance plan.

As of the effective date of this Ordinance, no new employer may commence work on the reservation until it has been issued a license from the Tribe and consulted with the Commission or Director and developed a plan occupied by the Commission for meeting its obligations under this Ordinance.

CHAPTER 32.13 Reporting and On-Site Inspection

32.1301 Reporting and on-site inspection.

Employers shall submit reports and other information requested by the Director or Commission. The Director or his designee shall have the right to make on-site inspections during regular working hours in order to monitor any employer's compliance with this Ordinance and rules, regulations and orders of the Commission. The Director or his Designee shall have the right to inspect and copy all relevant records of any employer, of any signatory union or subcontractor of any employer and shall have a right to speak to workers and conduct an investigation on the job site. All information collected by the Director or his Designee shall be kept confidential unless disclosure is

required during a hearing or appeal as provided in Chapter 32.07, 32.08 and 32.09.

CHAPTER 32.14
Tribal Minimum Wage Scale

Apprentice Bricklayer	17.00
Apprentice Electrician	16.00
Apprentice Plumber	16.00
Apprentice Sheet Metal	17.00
Asbestos Removal	16.00
Bricklayer	22.00
Carpet & Floor Tile Layer	16.00
Carpenter	18.00
Cement Finisher	19.00
Cleaning/Janitorial	12.50
Construction Foreman	20.00
Construction Worker/Labor	14.00
Drywall Hanger	17.00
Diesel Mechanic	20.00
Finish Carpenter	20.00
Flag Person	13.00
Foreman	19.00
Form Setter	18.00
Glazier	19.00
Heavy Equipment Operator (Heavy)	21.00
Heavy Equipment Operator (Light)	16.00
Heating/Air Conditioning	22.00
Inspector	22.00
Insulator	16.00
Journeyman Electrician	19.00
Journeyman Plumber	18.00
Journeyman Sheet Metal	19.00
Master Electrician	22.00
Master Plumber	22.00
Painter-brush-roller	16.00
Perfa-Taper	17.00
Pilot Car Driver	14.00
Pipe Fitter/Steam Sprinkler	18.00
Pipe Layer-Underground	16.00
Project Manager	25.00
Roofer-Asphalt/Shingles	16.00
Secretary	12.00
Security Guard	14.00
Spray Painter	18.00
Steel or Rod Buster	16.00
Structural Ironworker	22.00
Surveyor (Certified)	19.00
Surveyor Helper/Rodman	15.00
Tractor-Trailer Truck Driver (Diesel)	19.00
Truck Driver-Light	16.00
Welder-Light/Cutting Torch	16.00
Welder-Pipe/Heavy Iron	17.00

This is the most current Tribal minimum wage rates as of July 30, 2013. The tribal wage scale is subject to revision on an annual or other periodic basis by the Tribe. Employers may secure the most current rates from the TERO Director.

CHAPTER 32.15
Severeability

32.1501

Severability.

If any provision of this Ordinance, or its application to any person or circumstances is held invalid, the remainder of the Ordinance, or the application of the provision to other persons or circumstances is not affected.

CHAPTER 32.16

Relation to Federal Indian Preference Requirements

32.1601

Relation to Federal Indian Preference Requirements.

The Tribal Indian preference requirements imposed by this Ordinance is separate from the supplemental to any and all applicable federal Indian preference requirements.

CHAPTER 32.17

Special TERO Rules for Large Tribal Construction Projects

32.1701

Special TERO rules for large Tribal construction projects.

For construction projects in amounts over \$500,000, where the Tribe, the Turtle Mountain Housing Authority or any other tribal agency or instrumentality solicits bids for section of one or more prime contractors, the following special TERO rules shall apply:

1. For all such projects which the entity soliciting bids for one or more prime construction contractors has appointed a project team to oversee the project the TERO Director shall serve as a non-voting member of the project team during the pre-bid and construction phases of the project.
2. For all such projects, the minimum numerical goals and timetables for Indian employment under Section 32.0403 for the prime contractor(s) and all subcontractors and the approved plan for how the contractor or subcontractors are to meet these goals under this ordinance shall not be finalized by the TERO Director or Commission or become legally effective until approved by the project team for that project, and no TERO enforcement proceedings (including the conduct of hearings under Section 32.0705 and the imposition of penalties under Chapter 32.08 or application for tribal court action there under) shall be initiated by the TERO Director or Commission as to said projects until cleared by the project team.
3. All written requests for pre-bid interpretations of TERO requirements received by the TERO office on such projects shall be answered in writing by the TERO office or the Tribe's legal counsel for the project after clearance of said answers by the tribal project manager for the project.
4. All day-to-day TERO office functions including, but not limited to, compliance review, hiring hall, labor survey, employee referral, hiring plan negotiations and other TERO efforts to secure TERO compliance through informal means, shall continue to apply to such projects as otherwise set out in this ordinance.

CHAPTER 32.18

Effective Date

32.1801

Effective date.

This Ordinance is a revision of Tribal Ordinance No. 32 approved July, 28, 1981. Provisions in this Ordinance regarding Indian Preference are continuous. This Ordinance as hereby amended supersedes any all prior resolutions and ordinances of the Turtle Mountain Band of Chippewa Indians to the extent of any conflict or inconsistency.

SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Contractor's use of site and premises.
 - 4. Work restrictions.
 - 5. Specification and Drawing conventions.
- B. Related Requirements:
 - 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

- A. Project Identification: TMHA Maintenance Facility
 - 1. Project Location: 9818 BIA Rd 7, Belcourt, ND 58316.
- B. Owner: Turtle Mountain Housing Authority.
 - 1. Owner's Representative: Rebecca Patnaude-Olander, Executive Director.
- C. Architect: Ackerman-Estvold, Engineering & Management Consulting, Inc.
 - 1. Architect's Representative: Ryan Anderson.
- D. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 01 3100 "Project Management and Coordination." for requirements for using web-based Project software.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Project is a new construction wood stud building primarily used for maintenance purposes of the local properties and will include multiple offices as well as storage.

Project will also include new site construction and a new parking lot. Project also includes removal and replacement of siding on an existing nearby building and the interior demolition of existing walls to return the existing building to a warehouse.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Driveways, Walkways, and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy existing adjacent site and building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1.6 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 1000

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 00 2600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
 - 2. Section 01 6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Substitution form bound into the Project Manual as appended to this Section.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

From: _____
To: _____ Date: _____

A/E Project Number: _____
Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
Manufacturer: _____ Address: _____ Phone: _____
Trade Name: _____ Model No.: _____
Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ days.

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include an itemized list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Include an itemized list of hours for labor directly attributable to the change and unit costs with total amount of labor cost required.
 - c. Include itemized subcontractor, sub-subcontractor, and supplier quotes with the same substantiating documentation where changes involve such parties.
 - d. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - e. Include overhead and profit as a separate line item with the percentage indicated. Deduct cost changes shall include deduct of overhead and profit.
 - f. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- g. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" or forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include an itemized list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Include an itemized list of hours for labor directly attributable to the change and unit costs with total amount of labor cost required.
 - 4. Include itemized subcontractor, sub-subcontractor, and supplier quotes with the same substantiating documentation where changes involve such parties.
 - 5. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - a. Shipping and delivery: Additional costs for alternative shipping or expedited delivery in order for the Contractor to meet the contract Substantial Completion date will not be an additional cost to the Owner.
 - 6. Include overhead and profit as a separate line item with the percentage indicated. Deduct cost changes shall include deduct of overhead and profit.
 - 7. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 8. Comply with requirements in Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 9. Work Change Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" or form acceptable to Architect.
- C. Material costs shall be actual costs to the contractor, obtaining the materials through normal supply channels, including trade and quantity discounts. Utilizing "suggested pricing" from national pricing organizations for unit costs shall not be accepted. Upon request, the contractor or subcontractor shall submit evidence to substantiate the costs.
- D. Labor units shall be industry accepted standard labor hours to perform one unit of work. If the work is being performed in a location that is not considered to be standard working conditions for that specific task, additional labor shall be itemized.
- E. Labor rates shall be the actual rate paid for the workman category along with associated labor burden. Labor burden shall consist only of the mandatory fringe benefits, labor taxes, and labor insurances as affected by payroll. The owner reserves the right to reject any labor burden which is inconsistent with other similar contractors or where the fringe benefit cost is in excess of established labor agreements.

- F. Allowable markups for contractor and subcontractors include:
 - 1. Overhead on work performed by own forces: **10% maximum.**
 - 2. Profit on work performed by own forces: **5% maximum.**
 - 3. Commission on work performed by Subcontractors: **5% maximum.**
 - 4. Sales tax.
 - 5. Bond and permit costs where applicable.
 - 6. Overhead and profit markup will not be allowed on labor costs if overhead and profit is already included in hourly billing rates.
- G. No additional costs shall be allowed for:
 - 1. Field supervision, office supervision, administration time, or project management time.
 - 2. Tool burden.
 - 3. Shop burden.
 - 4. Overhead/Profit applied to work performed by others.
 - 5. Overhead/Profit on aforementioned commission on work performed by Subcontractors.
 - 6. Cost adds that do not involve additional labor or additional material, such as, but not limited to, upgrades in shipping.
- H. Additional costs for travel and subsistence shall only be allowed if the proposal includes a request for extension of the completion date. Furthermore, those costs shall be proportional to the number of working days of the extension.
- I. Subcontractors shall compute their costs in the same manner as the contractor. Subcontractors are subject to the same markup constraints as described herein.
- J. For changes resulting in credit to the costs, no restocking fees for materials shall be applied by the contractor or subcontractors.
- K. Pricing submitted for any change proposal must be all-inclusive of all necessary and associated costs for the change at the time it is submitted. Once pricing is submitted, the price may not be rescinded, revised, or amended in any way thereafter. Contractor shall bear any additional cost associated with the change if it was not included in the change proposal pricing.

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2600

SECTION 01 2900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Arrange schedule of values consistent with format of AIA Document G703.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - 4. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 - 5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
 - 6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
 - 7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit one signed and notarized original of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706.
 5. AIA Document G706A.
 6. AIA Document G707.
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. RFIs.
 - 3. Digital project management procedures.
 - 4. Project meetings.
- B. Related Requirements:
 - 1. Section 01 7300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.3 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.4 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Owner name.
 - 2. Owner's Project number.
 - 3. Name of Architect.
 - 4. Architect's Project number.
 - 5. Date.
 - 6. Name of Contractor.
 - 7. RFI number, numbered sequentially.
 - 8. RFI subject.
 - 9. Specification Section number and title and related paragraphs, as appropriate.
 - 10. Drawing number and detail references, as appropriate.
 - 11. Field dimensions and conditions, as appropriate.
 - 12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 13. Contractor's signature.
 - 14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

- C. RFI Forms: AIA Document G716 or software-generated form with substantially the same content as indicated above, acceptable to Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 - 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 - 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Use software log that is part of web-based Project management software. Include the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect.
 - 4. RFI number including RFIs that were returned without action or withdrawn.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

1.5 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
 - 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 - 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 - 3. Contractor shall execute a data licensing agreement in the form of AIA Document C106 Digital Data Licensing Agreement.
 - a. Architect shall be paid a service fee as described in AIA Document C106-2022, "Digital Data Licensing Agreement" for each request by the Contractor or Subcontractor in accordance with this Agreement. Electronic files of these sheets will be released upon receipt of the payment and the signed Agreement for electronic data
 - b. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of AIA Document C106.
- B. Web-Based Project Management Software Package: Provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
 - 1. Web-based Project management software includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.

- k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.
 - 2. Provide up to seven web-based Project management software user licenses for use of Owner, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
 - 3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
 - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 - 1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.

- m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.

- p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly or biweekly intervals as dictated by the amount of activity happening during the course of the Project.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Resolution of BIM component conflicts.

- 4) Status of submittals.
 - 5) Status of sustainable design documentation.
 - 6) Deliveries.
 - 7) Off-site fabrication.
 - 8) Access.
 - 9) Site use.
 - 10) Temporary facilities and controls.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFIs.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3100

SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
 - 3. Site condition reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF file.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports to contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
 - 3. Total Float Report: List of activities sorted in ascending order of total float.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that is capable of managing construction schedules.

- B. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
 - 1. Contract completion date to not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 3300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 5. Commissioning Time: Include no fewer than 15 days for commissioning.
 - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 1000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.
- G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- I. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.7 CPM SCHEDULE REQUIREMENTS

- A. Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract must not excuse Contractor from completing all work within applicable completion dates.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and inspection.
 - j. Commissioning.
 - k. Punch list and final completion.
 - l. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates to be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

1.8 REPORTS

- A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for

Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3200

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Architect.
 - 4. Name of Construction Manager.
 - 5. Name of Contractor.
 - 6. Name of firm or entity that prepared submittal.
 - 7. Names of subcontractor, manufacturer, and supplier.

8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 9. Category and type of submittal.
 10. Submittal purpose and description.
 11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 12. Drawing number and detail references, as appropriate.
 13. Indication of full or partial submittal.
 14. Location(s) where product is to be installed, as appropriate.
 15. Other necessary identification.
 16. Remarks.
 17. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Submittals for Utilizing Web-Based Project Management Software: Prepare submittals as PDF files, or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

- A. Submittal Assembly: **Provide all product data, shop drawings, qualification data, design data, certificates, and test and research reports in one submittal file.**
1. Samples: Sample submittals for specifications requiring samples shall be a separate submittal accompanied by physical samples – digital samples will not be accepted.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- G. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- H. Certificates:
 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- I. Test and Research Reports:
 1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.

2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.7 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 - 1. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will discard submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

PART 4 - PRODUCTS (Not Used)

PART 5 - EXECUTION (Not Used)

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.
 - 1. Mockups are used for one or more of the following:
 - a. Verify selections made under Sample submittals.
 - b. Demonstrate aesthetic effects.

- c. Demonstrate the qualities of products and workmanship.
 - d. Demonstrate successful installation of interfaces between components and systems.
 - e. Perform preconstruction testing to determine system performance.
- 2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
- 3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) in accordance with 29 CFR 1910.7, by a testing agency accredited in accordance with NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be

designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Mockup Shop Drawings:
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Statement on condition of substrates and their acceptability for installation of product.
 - 2. Statement that products at Project site comply with requirements.
 - 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 5. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 - 1. Statement that equipment complies with requirements.
 - 2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 3. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
 - 1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor Responsibilities:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 10. Demolish and remove mockups when directed unless otherwise indicated.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including

service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures."

- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
 - 1)

END OF SECTION 01 4000

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. Installation, removal, and use charges for temporary facilities to be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.
- B. Temporary Service and Utility Costs and Charges
 - 1. General Contractor shall bear the following costs:
 - a. Equipment, installation thereof, maintenance, and repair for:
 - 1) Sewers and Drainage
 - 2) Water Service
 - 3) Sanitary Facilities
 - b. Utility usage for:
 - 1) Water
 - 2) All power and fuel for Heating, Ventilation, and Humidity, Power, and Lighting
 - 2. Mechanical Contractor shall bear the following costs:
 - a. Equipment, installation thereof, maintenance, and repair for:
 - 1) Heating, Ventilation, and Humidity equipment.
 - 3. Electrical Contractor shall bear the following costs:
 - a. Equipment, installation thereof, maintenance, and repair for:
 - 1) Service for Heating, Ventilation, and Humidity equipment.
 - 2) Electric Power Service and Lighting

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.

1.4 QUALITY ASSURANCE

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

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 7700 "Closeout Procedures."
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
 - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.

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

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
 - 2. Utilize designated area within existing building for temporary field offices.
 - 3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
 - 1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- E. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

- a. Provide temporary, directional signs for construction personnel and visitors.
- 3. Maintain and touch up signs so they are legible at all times.
- H. Waste Disposal Facilities: Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 7300 "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, in accordance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
 - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
 - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.
- G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- K. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard and replace stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

END OF SECTION 01 5000

SECTION 01 5813 – TEMPORARY PROJECT SIGNAGE

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Project identification sign.
- B. Project informational signs.

1.2 RELATED REQUIREMENTS

- A. Contract Documents - Uniform General Conditions and Supplemental General Conditions for the State of Texas; and Special Conditions: Requirements for this Section, in addition to requirements herein.

1.3 QUALITY ASSURANCE

- A. Design sign and structure to withstand 90 miles/hr wind velocity.
- B. Sign Manufacturer to have experience in manufacturing signage with references on similar projects.
- C. Finishes, Vinyl: Adequate to withstand weathering, fading, and chipping for duration of construction.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizes and grades of members.

PART 2 - PRODUCTS

2.0 GENERAL

- A. Temporary Project Signage: printed UV-resistant vinyl graphics applied to wood base material and mounted to temporary wood posts.

2.1 SIGN MATERIALS

- A. Structure and Framing: New, wood, structurally adequate; install on pressured treated posts set in ground to depth adequate to resist overturning.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Vinyl: Exterior quality; sign background of color as selected.
- E. Lettering: Vinyl or digitally printed, colors as selected.

2.2 PROJECT IDENTIFICATION SIGN

- A. One vinyl graphic sign, 32 sq ft area, bottom 4 feet above ground.
- B. Graphic Design, Colors, Style of Lettering: Designated by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install project identification sign within 14 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level. Anchor securely.
- E. Exposed surfaces of sign, supports, and framing to be treated lumber.

3.2 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.3 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION 01 5813

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of This Section Includes: Administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 01 2500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products unless otherwise indicated.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluating Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-

design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 3300 "Submittal Procedures."
- F. Substitution: Refer to Section 01 2500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

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

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1.5 PRODUCT WARRANTIES

- A. Warranties specified in other Sections are to be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of Owner or endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

Comparable products or substitutions for Contractor's convenience will not be considered.

- a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in

"Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 2500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

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

- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for a comparable product. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - 1. Architect's Approval of Submittal: Marked with approval notation from Architect's action stamp. See Section 01 3300 "Submittal Procedures."
 - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 7300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Installation.
 - 3. Cutting and patching.
 - 4. Coordination of Owner's portion of the Work.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for coordination of, Owner's separate contracts, and limits on use of Project site.
 - 2. Section 01 7700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 3. Section 02 4119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.2 DEFINITIONS

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

1.3 QUALITY ASSURANCE

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

- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 1. Before construction, verify the location, direction, and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 01 3100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. General: Contractor shall engage and pay for all costs for Ackerman Surveying (1907 17th St SE, Minot, ND 58701, 701-838-0786) to lay out the Work using the following accepted surveying practices:
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and

electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

3.5 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 01 1000 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to **[minimize] [prevent]** interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
 - 1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
 - 2. Refer to Section 01 1000 "Summary" for other requirements for Owner-furnished, Contractor-installed products
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

3.7 PROGRESS CLEANING

- A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, in accordance with regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces in accordance with written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning

materials that are not hazardous to health or property and that will not damage exposed surfaces.

- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 5000 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Mechanical and Electrical Specifications.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 7300

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final Completion procedures.
 - 3. List of incomplete items.
 - 4. Submittal of Project warranties.
 - 5. Final cleaning.
- B. Related Requirements:
 - 1. Section 01 7823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 2. Section 01 7839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after

inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1.5 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 01 2900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list will state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.6 LIST OF INCOMPLETE ITEMS

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order,, listed by room or space number.
 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in one of the following formats:
 - a. PDF Electronic File: Architect will return annotated file.
 - b. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.7 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit on digital media acceptable to Architect or by uploading to web-based project software site.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.

- b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
 - e. Vacuum and mop concrete.
 - f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.
 - i. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR.
 - m. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - n. Clean strainers.
 - o. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 5000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 5000 "Temporary Facilities and Controls."

3.2 CORRECTION OF THE WORK

- A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 01 7300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 01 7700

SECTION 01 7823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Systems and equipment operation manuals.
 - 3. Systems and equipment maintenance manuals.
 - 4. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
 - 2. Submit three paper copies.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - 2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual to contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.

5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."
- 1.

1.5 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:

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

1.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.
- C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component

incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

- a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- H. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1.7 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 7823

SECTION 01 7839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.

- h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.4 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 7839

SECTION 02-4113 SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Removal of structures, obstructions, surfacing, and miscellaneous items.

1.02 RELATED REQUIREMENTS

- A. Section 31-2500 – Erosion and Sedimentation Controls.
- B. Section 31-2213 – Earthwork- Rough Grading.
- C. Section 1500 of the City of Minot Standard Specifications and Details, 2025 edition.
- D. Sections 107.10 and 202 of the NDDOT Standard Specifications for Road and Bridge Construction 2014 edition.

1.03 DEFINITIONS

- A. Remove: To eliminate or take away from the Project Site.
- B. Salvage: To save from loss or destruction so the item can be used again in a workable condition equal to the existing condition before removal.
- C. Abandon: To fill, bulkhead, or close off pipes and structures so no sediment or flow can occur.

1.04 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to be salvaged or to remain Owner's property, removed materials shall become the Contractor's property and shall be removed from the Project Site.

1.05 PROJECT CONDITIONS

- A. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during demolition and construction operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required.
- B. Utility Locator Service: Contractor to notify North Dakota One Call prior start of construction/demolition work.
- C. Do not commence Demolition work until temporary erosion and sediment control measures and in place.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. Execution shall be in accordance with Section 1500, Part 3 of the City of Minot Standard Specifications and Details except as herein modified.

3.03 REMOVE UTILITIES

- A. Locate, identify, disconnect and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut of indicated utilities.
 - 2. Contact utilities 48 hours before any work is completed on existing water mains or sanitary sewers.
 - 3. Contractor shall remove and/or abandon all utilities in a manor approved by the utility companies.
- B. Excavate for and remove underground utilities indicated to be removed.
- C. Remove water and sewer service lines to a point at least 5 feet outside of the proposed building perimeter line. Permanently cap utilities and abandon in place.

3.04 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation is full for all work necessary to complete the Bid Item including removal, salvage, storage, disposal, and stockpiling.
- B. Measurement shall conform to Section 1500, Part 3.14 of the City of Minot Standard Specifications and Details and as herein noted.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 02 4113

SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete for composite floor construction.
- C. Floors and slabs on grade.
- D. Concrete foundation walls.
- E. Concrete reinforcement.
- F. Joint devices associated with concrete work.
- G. Miscellaneous concrete elements, including equipment pads.
- H. Concrete curing.

1.2 RELATED REQUIREMENTS

- A. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.
- B. Section 07 9200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
- C. Section 07 9513 - Expansion Joint Cover Assemblies.
- D. Section 10 7113 - Pergola pier foundation design by Pergola Supplier.
- E. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

1.3 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- F. ACI 305R - Hot Weather Concreting; 2010.
- G. ACI 306R - Cold Weather Concreting; 2010.
- H. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2016).
- J. ACI 347R - Guide to Formwork for Concrete; 2014.
- K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.
- L. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.
- M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2016b.
- N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- O. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2016a.
- P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- Q. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.
- R. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2016.
- S. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- T. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- U. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- V. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2014.
- W. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2016.

- 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 C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2016.
- AA. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2015.
- BB. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.
- CC. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.
- DD. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014a.
- EE. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2015.
- FF. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.
- GG. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2018.
- HH. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting; 2015.
- II. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).
- JJ. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 2014.
- KK. ASTM E1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers (Metric); 2014.
- LL. 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.
- MM. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

NN. ASTM E1993/E1993M - Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs; 1998 (Reapproved 2013).

OO. COE CRD-C 513 - COE Specifications for Rubber Waterstops; 1974.

1.4 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- 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 requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing and General Structural Notes
 - 2. Indicate proposed mix design complies with admixture manufacturer's written recommendations.
- D. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.
- E. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.
- F. Samples: Submit samples of underslab vapor retarder to be used.
- G. Test Reports: Submit report for each test or series of tests specified.
- H. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- I. 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.
- J. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
 - 1. Maintain one copy of each document on site.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Footing Formwork
 - 1. Provide prefabricated PVC formwork constructed with integral drainage system to be left in place. Provide all necessary components for a complete installation, including prefabricated corners. Install on both sides of footings at all locations. Exterior side formwork to be connected to common sump pit for drainage of ground water per Drawings. Interior side to be connected to unit sump pits and vent pipe for radon exhaust per Drawings.
 - 2. Product: Form-A-Drain Plus, or equal as approved by Architect.
www.formadrainsolutions.com
 - 3. Accessories
 - a. Silt Sock – Wrap all Form-A-Drain Plus with drain-sleeve filter sock.
- B. All Other Formwork
 - 1. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
 - 2. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 3. Preformed Plastic Forms: For the Monument sign, the form liner is to consist of thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
 - a. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

- b. 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.
- c. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
- d. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.2 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Unfinished, unless otherwise indicated.
- B. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - 3. Provide stainless steel or galvanized components for placement within 1-1/2 inches of weathering surfaces.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I/II Portland type.
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 - 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- F. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.

1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
2. Color(s): As selected by Architect from manufacturer's full range.
3. Products:
 - a. BRICKFORM; BRICKFORM Liquid Integral Color: www.brickform.com/#sle.
 - b. Butterfield Color; ____: www.butterfieldcolor.com/#sle.
 - c. Davis Colors; ____: www.daviscolors.com/#sle.
 - d. Lambert Corporation; ____: www.lambertusa.com/#sle.
 - e. L.M. Scofield Company; CHROMIX® Admixtures for Color-Conditioned® Concrete: www.scofield.com/#sle.
 - f. Solomon Colors; Solomon ColorFlo Liquid Colors: www.solomoncolors.com/#sle.
 - g. Substitutions: See Section 01 6000 - Product Requirements.
- G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 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. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
 1. Provide pigmented type, with ASTM C979/C979M inorganic pigments.
- G. Accelerating Admixture: ASTM C494/C494M Type C.
- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

- A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 - 1. Grout: Comply with ASTM C1107/C1107M.
 - 2. Minimum Compressive Strength at 48 Hours, ASTM C109/C109M: 2,400 pounds per square inch.
 - 3. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 5,000 pounds per square inch.

2.6 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. Waterstops: Rubber, complying with COE CRD-C 513.
 - 1. Configuration: As indicated on drawings.
 - 2. Size: As indicated on drawings.
- D. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
- E. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
 - 1. Products:
 - a. W.R. Meadows, Inc; Speed-E-Joint: www.wrmeadows.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- 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 on center; ribbed steel stakes for setting.

2.7 CURING MATERIALS

- A. Non-Exposed Concrete Slab Surfaces: Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
 - 1. Product dissipates within 4 to 6 weeks.
 - 2. Products:
 - a. Dayton Superior Corporation; Resin Cure with Dye J11WD: www.daytonsuperior.com/#sle.
 - b. SpecChem, LLC; SpecRez: www.specchemllc.com/#sle.
 - c. W.R. Meadows, Inc; 1100-Clear: www.wrmeadows.com/#sle.
- B. Exposed Concrete Slab Surfaces: Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.
 - 1. Vehicle: Water-based.
 - 2. Solids by Mass: 25 percent, minimum.
 - 3. VOC Content: OTC compliant.
 - 4. Products:
 - a. L&M Construction Chemicals, Inc., a subsidiary of Laticrete International, Inc.; DRESS & SEAL WB: www.laticrete.com/our-products/concrete-construction-chemicals/#sle.
 - b. L&M Construction Chemicals, Inc., a subsidiary of Laticrete International, Inc.; DRESS & SEAL WB 30: www.laticrete.com/our-products/concrete-construction-chemicals/#sle.
 - c. SpecChem, LLC; Cure and Seal WB 25: www.specchemllc.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Exposed Polished Concrete Surfaces: Moisture-Retaining Sheet: ASTM C171.
 - 1. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.
- D. Polyethylene Film: ASTM D2103, 4 mil, 0.004 inch thick, clear.
- E. Water: Potable, not detrimental to concrete.

2.8 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. Maximum replacement percentage noted in mix designs listed in general structural notes is not to be exceeded.
- 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 in General Structural Notes.
 - 2. Fly Ash Content: Maximum percent of cementitious materials by weight as indicated in General Structural Notes.
 - 3. Water-Cement Ratio: Maximum percent by weight as indicated in General Structural Notes.
 - 4. Total Air Content: percent, determined in accordance with ASTM C173/C173M and as indicated in General Structural Notes.
 - 5. Maximum Slump: in inches, as indicated in General Structural Notes.
 - 6. Maximum Aggregate Size: in inches, as indicated in General Structural Notes.

2.9 CONCRETE STAINING

- A. Where indicated to receive concrete stain, provide Brickform, Blush-Tone Acid Stain, or equal as approved by Architect. www.brickform.com
 - 1. Install per manufacturer's instructions.
 - 2. Color: As selected by Architect from manufacturer's standard colors.
 - 3. Sealer: Brickform, Gem-Guard SB, or equal as approved by Architect. www.brickform.com
 - 4. Mock-Up: Provide 2-foot by 2-foot mockup of proposed concrete, stain, and sealer for Owner approval prior to placement and finishing of stained concrete.

2.10 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.
 - 1. Colored Concrete: Add pigments in strict accordance with manufacturer's instructions to achieve consistent color from batch to batch.
- B. Transit Mixers: Comply with ASTM C94/C94M.
- C. 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.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.2 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 according to 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 doveled to existing work, drill holes in existing concrete, insert steel dowels using an epoxy-set anchoring system.
- G. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. 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.

3.3 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. 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.
- B. 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.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

- F. 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.
- G. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.5 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 thick blade and cut at least 1 inch 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.

3.6 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.
- B. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
 - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
 - 3. Under Carpeting: 1/4 inch in 10 feet.
- C. Correct the slab surface if tolerances are less than specified.
- D. 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.

3.7 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 or more in height.
- C. Exposed Form Finish – including, but not limited to monument sign: Rub down or chip off and smooth fins or other raised areas 1/4 inch 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.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
 - 2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.8 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.
 - 1. Normal concrete: Not less than seven days.
 - 2. High early strength concrete: Not less than four days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. 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 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.

3.9 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - 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 four concrete test cylinders. Obtain test samples for every 50 cubic yards 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.

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

SECTION 03 4816 - PRECAST CONCRETE SPLASH BLOCKS

PART 1 - GENERAL

1.1 SUMMARY

- a. All products and materials must comply with BABA. See Project Requirements in Section 00 7400
- B. Section Includes:
 - 1. Precast concrete splash blocks for downspouts.

1.2 SUBMITTALS

- A. Submittals for Review:
 - 1. Product Data: Provide unit configuration and dimensions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Mix:
 - 1. Minimum 5000 psi compressive strength at 28 days, air entrained to 5 to 7 percent.

2.2 FABRICATION

- A. Use rigid molds, constructed to maintain precast units uniform in shape, size and finish. Maintain consistent quality during manufacture.
- B. Cure units to develop concrete quality, and to minimize appearance blemishes including non-uniformity, staining, and surface cracking.
- C. Minor patching in plant is acceptable, providing appearance of units is not impaired.
- D. Nominal Size: 3 inches high x 11 inches wide x 36 inches long.
- E. Provide raised lip at sides and rear edge.
- F. Finish: Manufacturer's standard.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Place splash blocks under downspouts discharging onto non-paved surfaces.
- B. Set level, on firm bearing.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

END OF SECTION 03 4816

SECTION 04 2313 - THIN BRICK

PART 1 GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 SECTION INCLUDES

- A. Thin brick veneer.

1.3 RELATED SECTIONS

- A. Section 04 05 13 - Masonry Mortaring.

1.4 REFERENCES

- A. ASTM C 67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- B. ASTM C 1088 - Standard Specification for Thin Veneer Brick Units Made From Clay or Shale.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's catalog data, detail sheets, and printed installation instructions.
- C. Selection Samples: For each product requiring color/texture selection, provide full size samples for final selection.
- D. Verification Samples: For each product, color, and texture selected, provide two full-size units representing actual color and texture of products to be installed.

1.6 SAMPLE PANELS

- A. Construct sample panel at location indicated or directed, and as follows:
 - 1. Size: 4 feet by 4 feet (1.2 m by 1.2 m).
 - 2. Include all unit types and sizes to be used, and mortar joint treatment.
- B. Obtain architect's acceptance of sample panel before beginning construction activities of this section.
- C. Do not remove sample panel until construction activities of this section have been accepted by architect.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products of this section on pallets, with individual faces protected; keep dry.
- B. Store units in protected area or under cover on level ground; keep dry. Do not double-stack pallets.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Hebron Brick Company; or equal as approved by Architect.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MATERIALS

- A. Thin Brick:
 - 1. Size: 3-5/8 inches high, 11-5/8 inches long, 9/16 inch thick.
 - 2. Color: Match existing color of existing building on site. Verify color with Architect.
- B. Trim Units: Matching thinbrick.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install thin brick in accordance with manufacturer's printed instructions, approved submittals and in proper relationship with adjacent construction.

END OF SECTION 04 2313

SECTION 05 5000 - METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 SECTION INCLUDES

- A. Shop fabricated steel items.
- B. Metal bollards

1.3 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

1.4 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- D. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.
- 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 B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- H. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.

- I. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2014.
- J. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2018, with Editorial Revision.
- K. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- N. 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.
- O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015 (Errata 2016).
- Q. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2008.
- R. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.; 2011.
- S. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- T. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- U. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.5 SUBMITTALS

- A. 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.
 - 2. Design data: Submit drawings, signed and sealed by a qualified professional structural engineer.
 - a. Include the following, as applicable:

- 1) Design criteria.
 - 2) Member sizes and gauges.
 - 3) Details of connections.
 - 4) Support reactions.
 - 5) Bracing requirements.
- B. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.6 QUALITY ASSURANCE

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- C. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.2 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.

- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85/B85M.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.3 MATERIALS - PLASTICS

- A. High Density Polyethylene (HDPE): ASTM D2239

2.4 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.

2.5 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, dimensions as detailed or directed by architectural; prime paint prime paint finish. Bollards to have High Density Polyethylene (HDPE) sleeve over steel bollard with size and color as directed by architectural.
 - 1. Performance Requirements
 - a. High molecular weight material. Designed for optimum balance of density, molecular weight and molecular weight distribution demonstrating maximum property advantages for large products that require high impact resistance

- b. Ultraviolet Protection Additive. Five (5) Year UV stabilizer package. Warranty 5 years.
- c. Thickness Nominal wall thickness will be 0.125 inch
- d. Abrasion Resistant
- e. Environmental Stress Cracks Resistant

2.6 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete and items to be imbedded in masonry.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

2.7 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I color anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.

2.8 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.2 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.

3.3 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.

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 1000 - ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Exposed timber structural framing.
- C. Non-structural dimension lumber framing.
- D. Rough opening framing for doors, windows, and roof openings.
- E. Sheathing.
- F. Subflooring.
- G. Wall sheathing with factory applied water-resistive and air barrier sheet.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 3000 - Cast-in-Place Concrete: Setting anchors in concrete.
- C. Section 03 5400 - Cast Underlayment.
- D. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- E. Section 06 0573 - Wood Treatment: Field-applied termiticide and mildicide for wood.
- F. Section 06 1500 - Wood Decking.
- G. Section 06 1753 - Shop-Fabricated Wood Trusses.

1.4 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.

- B. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2015.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012.
- F. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2016.
- G. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2013.
- H. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2016.
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.
- J. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- K. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.
- L. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- M. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies; 2011.
- N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- O. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- P. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- Q. ICC (IBC) - International Building Code; 2015.
- R. ICC (IECC) - International Energy Conservation Code; 2012.
- S. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.
- T. ICC-ES AC310 - Water-resistive Membranes Factory-bonded to Wood-based Structural Sheathing, Used as Water-Resistive Barriers; 2015.

- U. PS 1 - Structural Plywood; 2009.
- V. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.
- W. PS 20 - American Softwood Lumber Standard; 2015.
- X. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2004, and supplements.
- Y. WWPA G-5 - Western Lumber Grading Rules; 2011.

1.5 SUBMITTALS

- A. See Section 01 3000 - 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.
- D. Samples: For rough carpentry members that will be exposed to view, submit two samples, ___by___ inch in size illustrating wood grain, color, and general appearance.
- E. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- F. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- G. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- H. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.
- I. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/sle:

- B. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.7 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, or installation.

1.8 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: As indicated on structural drawings, unless otherwise indicated.
 - 2. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Provide sustainably harvested wood; see Section 01 6000 - Product Requirements for requirements.
- C. Provide wood harvested within a 500 mile radius of the project site.
- D. Provide wood that complies with Build America Buy America Act.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Stud Framing (2 by 2 through 2 by 10):
 - 1. Grade: as indicated on structural drawings (grade varies).
- B. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:

1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.3 EXPOSED DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Surfacing: S4S.
- C. Moisture Content: S-dry or MC19.

2.4 STRUCTURAL COMPOSITE LUMBER

- A. Structural Composite Lumber: Factory fabricated beams, headers, and columns, of sizes and types indicated on drawings; structural capacity as published by manufacturer.
 1. Beam: Use laminated venner lumber, laminated strand lumber, parallel strand lumber, or glued laminated lumber as indicated in general structural notes and structural drawings.
 2. Studs: Use laminated venner lumber, laminated strand lumber, parallel strand lumber, or glued laminated lumber as indicated in general structural notes and structural drawings.

2.5 CONSTRUCTION PANELS

- A. Subfloor/Floor Sheathing: As indicated in General Structural Notes
 1. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
 2. Provide fastening as indicated on structural drawings and in General Structural Notes
 3. Orientated strand board (OSB) panels are **NOT** allowed.
- B. Roof Sheathing: As indicated in General Structural Notes
 1. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
 2. Provide fastening as indicated on structural drawings and in General Structural Notes
 3. Orientated strand board (OSB) panels are **NOT** allowed.
- C. Wall Sheathing: As indicated in General Structural Notes

1. Exposure Time: Sheathing will not delaminate or require sanding due to moisture absorption from exposure to weather for up to 500 days.
2. Warranty: Manufacturer's standard lifetime limited warranty against manufacturing defects and that panels will not delaminate or require sanding due to moisture absorption damage from exposure to weather for up to the stated period.
3. Provide fastening as indicated on structural drawings and in General Structural Notes
4. Orientated strand board (OSB) panels are **NOT** allowed.

2.6 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.

B. Sill-Sealer Gaskets:

1. Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
2. Self-adhering sheet consisting of 64mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side.

2.7 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.

PART 3 EXECUTION

3.1 PREPARATION

- A. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.
- B. Coordinate installation of rough carpentry members specified in other sections.

3.2 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.

3.3 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual, and _____.
- E. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- F. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.4 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 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.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:

1. Cabinets and shelf supports.
 - a. All stud framing behind cabinets and support shelving is to be LVL lumber.
2. Wall brackets.
3. Towel and bath accessories.
 - a. All stud framing behind tub surrounds is to be LVL lumber.
4. Wall-mounted door stops.
5. Wall paneling and trim.

3.5 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.6 INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring: Glue and nail to framing; staples are not permitted.
- B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 1. At long edges provide solid edge blocking where joints occur between roof framing members.
 2. Nail panels to framing; staples are not permitted.
- C. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
 1. Use plywood at building corners, for not less than 96 inches, measured horizontally.

3.7 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.8 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.9 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 SECTION INCLUDES

- A. Shop fabricated wood trusses for roof and floor framing.
- B. Bridging, bracing, and anchorage.

1.3 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 06 1000 - Rough Carpentry: Installation requirements for miscellaneous framing.
- C. Section 06 1000 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.4 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- C. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.
- F. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; 2000.
- G. SPIB (GR) - Grading Rules; 2014.

- H. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction; 2007 and errata.
- I. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; 2011.
- J. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; 1989.
- K. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2004, and supplements.
- L. WWPA G-5 - Western Lumber Grading Rules; 2011.

1.5 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.
- C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
 - 1. Include identification of engineering software used for design.
 - 2. Provide shop drawings stamped or sealed by design engineer.

1.6 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design by or 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. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Handle and erect trusses in accordance with TPI BCSI 1.
- B. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Truss Plate Connectors:
 - 1. Alpine Engineered Products, Inc: www.alpeng.com/#sle
 - 2. MiTek Industries, Inc: www.mii.com/#sle
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Truss Fabricators:

2.2 TRUSSES

- A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
 - 1. Structural Design: Comply with loads indicated on structural drawings and in General Structural Notes
 - 2. Floor Deflection: 1/360, maximum.
 - 3. Roof Deflection: Total Load Deflection = 1/240, maximum.

2.3 MATERIALS

- A. Lumber:
 - 1. Moisture Content: Between 7 and 9 percent.
 - 2. Lumber fabricated from old growth timber is not permitted.
- B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.4 ACCESSORIES

- A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.
- B. Fasteners: Electrogalvanized steel, type to suit application.
- C. Bearing Plates: Electrogalvanized steel.

2.5 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. Refer to Architectural for required wood treatments.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that supports and openings are ready to receive trusses.

3.2 ERECTION

- A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.
- B. Set members level and plumb, in correct position.
- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Do not field cut or alter structural members without approval of Architect.
- E. Install permanent bridging and bracing.
- F. Install headers and supports to frame openings required.
- G. Frame openings between trusses with lumber in accordance with Section 06 1000.
- H. Coordinate placement of decking with work of this section.

3.3 TOLERANCES

- A. Framing Members: 1/2 inch maximum, from true position.

END OF SECTION

SECTION 06 6400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes plastic sheet paneling.
- B. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For plastic paneling.

1.3 QUALITY ASSURANCE

- A. Testing Agency: Acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

- A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.
 - 1. Manufacturer: Subject to compliance with requirements, provide product by the following, or equal as approved by Architect:
 - a. Marlite, Inc.
 - 2. Surface-Burning Characteristics: As follows when tested by a qualified testing agency in accordance with ASTM E84. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 200 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. Nominal Thickness: Not less than 0.09 inch.
 - 4. Product Number: P 100 White.

5. Surface Finish: Pebbled.

2.2 ACCESSORIES

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.
 1. Color: Match panels.
- B. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 07 9200 "Joint Sealants."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.
- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

3.2 INSTALLATION

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 06 6400

SECTION 07 1113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section includes:
 - 1. Cold-applied, emulsified-asphalt dampproofing.
 - 2. Self-Adhering Flexible Flashing

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Trowel Coats: ASTM D4586/D4586M, Type I, Class 1, fibered.
- B. Brush and Spray Coats: ASTM D4479/D4479M, Type 1, fibered.

2.3 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.
- C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

- D. Protection Course: Foundation insulation as specified in Section 07 2100 "Thermal Insulation."
- E. Self-Adhering Flexible Flashing:
 - 1. Rubberized Asphalt Thru-Wall Flashing: 40-mil thick, composite membrane consisting of a 32-mil self-adhering rubberized asphalt membrane laminated to a smooth surface, 8-mil cross-laminated, high density polyethylene film.
 - a. Manufacturers: Subject to compliance with requirements, provide products by the following, or equal as approved by the Architect:
 - 1) Carlisle, CCW-705-TWF.
 - 2) Grace Construction Products, Vycor V40.
 - 3) Henry Company, Blueskin TWF.
 - 4) W.R. Meadows, Air-Shield Thru-Wall Flashing.
 - b. Width: 12-inches.
 - c. Provide at all locations as indicated on Drawings.

PART 3 - EXECUTION

3.1 APPLICATION, GENERAL

- A. Comply with manufacturer's written instructions for substrate preparation, dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
 - 1. Apply dampproofing to provide continuous plane of protection.
 - 2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
 - 1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
 - 2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch-wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

- A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat, one fibered brush or spray coat at not less than 3 gal./100 sq. ft., or one trowel coat at not less than 4 gal./100 sq. ft..

3.3 INSTALLATION OF PROTECTION COURSE

- A. Where indicated, install protection course over completed-and-cured dampproofing. Comply with dampproofing-material and protection-course manufacturers' written instructions for attaching protection course.

END OF SECTION 07 1113

SECTION 07 2100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Polyisocyanurate foam-plastic board insulation.
 - 3. Glass-fiber blanket insulation.
 - 4. Blown Insulation.
 - 5. Closed-Cell Spray Polyurethane Foam

1.2 ACTION SUBMITTALS

- A. Product data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than Class A, 25 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- E. Thermal-Resistance Value (R-Value): R-value as indicated on Drawings, unless otherwise noted in this Section, in accordance with ASTM C518.

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION (XPS)

- A. Extruded Polystyrene Board Insulation, Type IV: ASTM C578, Type IV, 25 psi minimum compressive strength; unfaced.
 - 1. For installation at concrete foundation walls and cavity walls.
 - 2. Fire Propagation Characteristics: For cavity walls, passes NFPA 285 testing as part of an approved assembly.
 - 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.3 GLASS-FIBER BLANKET INSULATION

- A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
 - 1. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
 - 2. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
 - 3. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.4 BLOWN INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by the Architect:
 - a. CertainTeed Corporation : www.certainteed.com.
 - b. GreenFiber : www.greenfiber.com.
 - c. Johns Manville Corporation : www.jm.com.
 - d. Owens Corning: www.owenscorning.com.
 - e. Knauf Insulation, Inc. : www.knaufnorthamerica.com.
- B. Materials
 - 1. Blown Insulation: Provide one of the following:
 - a. ASTM C739, cellulose fiber type, bulk for pneumatic placement.
 - b. ASTM C764, glass fiber type, bulk for pneumatic placement.
- C. Thermal Conductivity: 0.27 BTU in/(hr sq ft deg F).
- D. Installed R-value and/or thickness:
 - 1. Attic Spaces: R-60.
 - 2. Floor Cavity Spaces: As indicated on Drawings.

2.5 CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Closed-Cell Spray Polyurethane Foam: ASTM C1029, Type II, minimum density of 1.5 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 6.2 deg F x h x sq. ft./Btu at 75 deg F.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. BASF Corporation.
 - b. Carlisle Spray Foam Insulation; a Carlisle Company.
 - c. Gaco; Amrize Building Envelope LLC.
 - d. Johns Manville; a Berkshire Hathaway company.
 - e. Thermoseal USA.
 - 2. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 3. Fire Propagation Characteristics: Passes NFPA 285 and NFPA 276 testing as part of an approved assembly.

2.6 INSULATION FASTENERS

- A. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.
- B. Insulation Fastener Accessories: Provide double-pointed weld pins, lagging pins, quilting pins, duct liner pins, insulation hangers, specialty washers, special caps, j-hooks, capacitor discharge annular weld pins, capacitor discharge acoustical lagging pins, and other accessory materials that are recommended in writing by insulation fastener manufacturer to produce complete insulation supports.

2.7 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
 - 2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
 - 3. Polyurethane Pour-In-Place Insulation: Closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84, specifically formulated for pour-in-place applications.

B. Miscellaneous Application Accessories:

1. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
2. Crack Sealer: Closed-cell insulating foam in aerosol dispenser recommended in writing by insulation manufacturer for filling gaps in board insulation.
3. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves with integral baffle.
 - a. Net Free Vent Area required: See Drawings.
4. Detailing Foam Insulation for Voids: Urethane foam complying with AAMA 812, low expansion pressure suitable for filling insulation gaps and voids adjacent to openings to protect against water, air, and sound intrusion.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or those that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products, applications and applicable codes.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF FOUNDATION WALL INSULATION

- A. Butt panels together for tight fit.
- B. Anchor Installation: Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive in accordance with anchor manufacturer's written instructions.
 - 2. Space anchors in accordance with insulation manufacturer's written instructions for insulation type, thickness, and application.
 - 3. Apply insulation standoffs to each spindle to create cavity width indicated on Drawings between concrete substrate and insulation.
 - 4. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation.
 - 5. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- C. Adhesive Installation: Install with adhesive or press into tacky waterproofing or dampproofing in accordance with manufacturer's written instructions.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended in writing by manufacturer.
 - 1. Fit courses of insulation between obstructions, with edges butted tightly in both directions, and with faces flush.
 - 2. Press units firmly against inside substrates.

3.5 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

- A. Blanket Insulation: Install in cavities formed by framing members in accordance with the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.

5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 6. Where glass-fiber blankets are indicated for sound attenuation above ceilings, install unfaced blanket insulation over ceiling area in thickness indicated. Where partitions occur, extend insulation up either side of partition.
 7. For wood-framed construction, install blankets in accordance with ASTM C1320 and as follows:
 - a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
 2. Detailing Foam Insulation for Voids: Apply in accordance with manufacturer's written instructions.
- C. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation in accordance with manufacturer's written instructions.
1. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked.
 2. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 INSTALLATION OF BOARD INSULATION

- A. Install board insulation in accordance with manufacturer's written instructions per project applications and conditions.
- B. Install interior radiation control coating system in accordance with ASTM C1321.

3.7 INSTALLATION OF BLOWN INSULATION

- A. Examination
 1. Verify that substrate, adjacent materials, and insulation are dry and ready to receive insulation.
 2. Verify that light fixtures have thermal cut-out device to restrict over-heating in soffit or ceiling spaces.
 3. Verify spaces are unobstructed to allow placement of insulation.

B. Installation

1. Install insulation and ventilation baffle in accordance with ASTM C1015 and manufacturer's instructions.
2. Place insulation pneumatically to completely fill stud, joist, and rafter spaces.
3. Place insulation against baffles. Do not impede natural attic ventilation to soffit.
4. Place against and behind mechanical and electrical services within the plane of insulation.
5. Completely fill intended spaces. Leave no gaps or voids.
6. Repair and reseal insulation access ports. Refinish to match disturbed work.

3.8 INSTALLATION OF CLOSED-CELL SPRAY POLYURETHANE FOAM

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Spray insulation to envelop entire area to be insulated and fill voids.
- C. Apply in multiple passes to not exceed maximum thicknesses recommended by manufacturer. Do not spray into rising foam.

3.9 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 2100

SECTION 07 2500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Building wrap: weather-resistive barrier (WRB) and air barrier.
 - 2. Self-adhering flexible flashing.

1.2 SUBSTITUTION PROCEDURES

- A. Pre-Bid: See Section 00 2600 Procurement Substitution Procedures.
- B. During Construction: See Section 01 2500 Substitution Procedures.

1.3 ACTION SUBMITTALS

- A. Product data.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, certified, or licensed by the weather barrier system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

PART 2 - PRODUCTS

2.1 WEATHER BARRIERS (WATER-RESISTIVE BARRIER / AIR BARRIER)

- A. Building Wrap: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested in accordance with ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. Alpha ProTech; REX Fortis Commercial.
 - b. Barricade Building Products; Building Wrap Plus HP.
 - c. Benjamin Obdyke Incorporated.; Flatwrap HP.
 - d. CertainTeed Saint-Gobain; CertaWrap Premium.
 - e. Dorken Systems Inc.; Delta-Vent S.
 - f. DuPont de Nemours, Inc.; Tyvek Commercial Wrap.
 - g. Typar Geosynthetics; a PGI brand; MetroWrap.
2. Building Wrap Types:
 - a. Type I, ASTM E2556/E2556M or Type I, ASTM E1677.
3. Composition Type:
 - a. Polypropylene nonwoven, nonperforated fabric with coating.
4. Water-Vapor Permeance: Minimum 10 perms in accordance with ASTM E96/E96M, Desiccant Method (Procedure A).
5. Air Permeance: Not more than 0.004 cfm/sq. ft. at 1.57 lbf/sq. ft. when tested in accordance with ASTM E2178.
6. Flame Propagation Test: Materials and construction to be as tested in accordance with NFPA 285.

2.2 ACCESSORY MATERIALS

- A. Requirement: Provide primers, fasteners, seam tapes, flashing, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by weather barrier manufacturer to produce a complete weather barrier assembly and that are compatible with primary weather barrier material and adjacent construction to which they may seal.

2.3 SELF-ADHERING FLEXIBLE FLASHING

- A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spun-bonded polyolefin.
- B. Manufacturers: Provide product from the same manufacturer as building wrap to extents possible

PART 3 - EXECUTION

3.1 INSTALLATION OF WEATHER BARRIERS

- A. Weather Barriers:
 - 1. Building Wrap or Drainage Wrap: Comply with manufacturer's written instructions and warranty requirements.
 - 2. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
 - 3. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- B. Install weather barrier accessories for a complete installation with weather barriers in accordance with manufacturers written instructions.

3.2 SELF-ADHERING FLEXIBLE FLASHING INSTLLATION

- A. Apply flexible flashing at all locations as recommended by building wrap manufacturer for a complete weather-tight installation and according to manufacturer's written installation instructions. Locations shall include, but are not limited to, perimeters of windows, doors, openings, and all other penetrations as well as other locations as detailed in the Drawings and recommended by the building wrap manufacturer.
 - 1. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
 - 2. Lap flashing over water-resistive barrier at bottom and sides of openings.
 - 3. Lap water-resistive barrier over flashing at heads of openings.

END OF SECTION 07 2500

SECTION 07 2600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Polyethylene vapor retarders.
- C. Related Requirements:
 - 1. Section 07 2100 "Thermal Insulation" for insulation products.

1.2 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

- A. Polyethylene Vapor Retarders:
 - 1. Thickness: no less than 15-mil- thick sheet.
 - 2. Permeance: ASTM E1745; no greater than 0.01 Perms.
 - 3. Radon Diffusion Coefficient: K124/02/95; no greater than $8.5 \times 10^{-12} \text{m}^2/\text{second}$.
 - 4. Impact Resistance: ASTM D1709; no less than 2600 grams.
 - 5. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. Stego Industries, LLC: StegoCrawl Wrap; www.stegoindustries.com
 - b. W. R. Meadows, Inc.: Perminator EVOH; www.wrmeadows.com
 - c. Tex-Trude: X-Treme Vapor Barrier, 15 MIL; www.xtremevaporbarrier.com

PART 3 - EXECUTION

3.1 INSTALLATION OF VAPOR RETARDERS IN CRAWL SPACES

- A. Install vapor retarders per manufacturer's written instructions.
- B. Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches and seal with manufacturer's recommended tape. Install second layer over pathways to equipment.
- C. Extend vapor retarder over footings and seal to foundation wall with solid aluminum or PVC termination bar anchored to the foundation wall and sealed as indicated in the Drawings.
 - 1. Extend vapor retarder vertically above top of footing as noted in the Drawings.
- D. Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

END OF SECTION 07 2600

SECTION 07 4113.13 - FORMED METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Tapered-rib-profile, exposed-fastener metal roof panels.
 - 2. Underlayment.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. For formed metal roof panels. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
 - 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
 - 2. Accessories: Include details of flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.
- C. Samples: Actual sample of finished products for each type of exposed finish for metal panels, clips, fasteners, closures, and other metal panel accessories.

1.4 INFORMATIONAL SUBMITTALS

- A. Certificates for portable roll-forming equipment.
- B. Product Test Reports: For formed metal roof panels, for tests performed by a qualified testing agency.

- C. Qualification Statements: For roof installers.
- D. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For metal panels.

1.6 QUALITY ASSURANCE

- A. Qualifications: For roof installer.
- B. Portable Roll-Forming Equipment Certification: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of Work.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
 - 4. .
- B. Air Infiltration: Air leakage of not more than 0.04 cfm/sq. ft. when tested in accordance with ASTM E1680 at the following test-pressure difference:

1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested in accordance with ASTM E1646 at the following test-pressure difference:
 1. Test-Pressure Difference: 2.86 lbf/sq. ft..
- D. Watertightness: No water penetration when tested in accordance with ASTM E2140 for hydrostatic-head resistance.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 EXPOSED-FASTENER METAL ROOF PANELS, GENERAL

- A. Provide factory-formed metal roof panels designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners. Include accessories required for weathertight installation.

2.3 TAPERED-RIB-PROFILE, EXPOSED-FASTENER METAL ROOF PANELS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 1. Architectural Metal Systems.
 2. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
 3. Pac-Clad, Petersen; a Carlisle Company.
- B. Panels: Formed with raised, trapezoidal ribs spaced at regular intervals.
 1. Structural Support: Over solid deck.
 2. Material: Metallic-coated steel.
 3. Panel Profile: Intermediate stiffening ribs, symmetrically spaced between major ribs.
 4. Rib Spacing: 12 inches o.c.
 5. Panel Coverage: 36 inches.
 6. Panel Height: 1.25 inches.
 7. Fasteners: Manufacturer's standard screw fasteners.

2.4 UNDERLAYMENT

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer when recommended by underlayment manufacturer.
 1. Thermal Stability: Stable after testing at 220 deg F; ASTM D1970/D1970M.

2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970/D1970M.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. ATAS International, Inc.
 - b. Henry; a Carlisle Company.
 - c. Owens Corning.
- B. Felt Underlayment: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felts.
- C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.5 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with minimum ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with minimum ASTM A792/A792M, Class AZ50 coating designation; structural quality. Sheet prepainted by coil-coating process to comply with ASTM A755/A755M.
 1. Nominal Thickness: 0.028 inch.

2.6 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645; cold-formed, metallic-coated steel sheet, minimum ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system, including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are

not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

- D. Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, of size and metal thickness in accordance with manufacturer's recommendations. Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match roof fascia and rake trim.
- E. Downspouts: Formed from same material as roof panels. Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness in accordance with manufacturer's recommendations. Finish downspouts to match gutters.
- F. Roof Curbs: Fabricated from same material as roof panels, 0.048-inch- nominal thickness; with bottom of skirt profiled to match roof panel profiles and with welded top box and integral full-length cricket. Fabricate curb subframing of 0.060-inch-nominal thickness, angle-, C-, or Z-shaped steel sheet. Fabricate curb and subframing to withstand indicated loads of size and height indicated. Finish roof curbs to match metal roof panels.
 - 1. Insulate roof curb with 1-inch-thick, rigid insulation.
- G. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- H. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.7 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate in

accordance with equipment manufacturer's written instructions and to comply with details shown.

- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with manufacturer's recommendations.
 - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by metal panel manufacturer for application, but not less than thickness of metal being secured.

2.8 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel and Aluminum Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Three-Coat Fluoropolymer: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Mica Fluoropolymer: Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
4. Metallic Fluoropolymer: Three-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
5. FEVE Fluoropolymer: Two-coat fluoropolymer finish containing 100 percent FEVE in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
6. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil for primer and 0.8 mil for topcoat.
7. Exposed Anodized Finish:
 - a. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.
 - b. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
8. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages in accordance with ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION OF SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.
 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 2. Tightly butt substrate boards together.

3. Cut substrate board to fit tightly around penetrations and projections, and to fit tightly to intersecting sloping roof decks.
4. Fasten substrate board in accordance with roofing system manufacturers' written installation instructions.

3.3 INSTALLATION OF VAPOR RETARDER

- A. Loosely lay vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2 and 6 inches, respectively.
 1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
 2. Continuously seal side and end laps with adhesive.

3.4 INSTALLATION OF ROOF INSULATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, in accordance with manufacturer's written installation instructions.
 1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
 2. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- B. Blanket Roof Insulation: Comply with the following installation method:
 1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal roof panels fastened to secondary framing.
 2. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.

3.5 INSTALLATION OF COVER BOARD

- A. Install cover boards over insulation in accordance with manufacturer's written installation instructions. Install with long joints in continuous straight lines, with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

3.6 INSTALLATION OF UNDERLAYMENT

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations

indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.
- B. Felt Underlayment: Apply at locations indicated below, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
 1. Apply over the entire roof surface.
 2. Apply on roof not covered by self-adhering sheet underlayment. Lap over edges of self-adhering sheet underlayment not less than 3 inches, in shingle fashion to shed water.
- C. Slip Sheet: Apply slip sheet over underlayment before installing metal roof panels.
- D. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 6200 "Sheet Metal Flashing and Trim."

3.7 INSTALLATION OF METAL ROOF PANELS

- A. Install metal panels in accordance with manufacturer's written instructions in orientation, sizes, and locations indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Shim or otherwise plumb substrates receiving metal panels.
 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that are concealed by metal panels are installed.
 3. Install screw fasteners in predrilled holes.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Install flashing and trim as metal panel Work proceeds.
 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners:
 1. Steel Panels: Use stainless steel fasteners for surfaces exposed to exterior; use galvanized-steel fasteners for surfaces exposed to interior.
 2. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

- D. Exposed-Fastener, Metal Roof Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 5. Flash and seal panels with weather closures at perimeter of all openings.
 6. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels and elsewhere as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal panel system, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.
- F. Flashing and Trim: Comply with performance requirements and manufacturer's written installation instructions. Provide concealed fasteners where possible and set units true to line and level. Install work with laps, joints, and seams that are permanently watertight.
1. Install exposed flashing and trim that are without buckling and tool marks, and that are true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft., with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

- G. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c., using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- H. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 - 1. Provide elbows at base of downspouts to direct water away from building.
 - 2. Connect downspouts to underground drainage system indicated.
- I. Roof Curbs: Install flashing around bases where they meet metal roof panels.
- J. Pipe and Conduit Penetrations: Fasten and seal to metal roof panels as recommended by manufacturer.

3.8 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 4113.13

SECTION 07 4213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Exposed-fastener, lap-seam metal wall panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Samples of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/180 of the span.
 - 4. .
- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 1.57 lbf/sq. ft..
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft..
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
- B. Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. ATAS International, Inc.
 - b. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
 - c. Elevate; Amrize Building Envelope LLC.
 - d. Firestone Metal Products.
 - e. Pac-Clad, Petersen; a Carlisle Company.
 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.
 - a. Nominal Thickness: 0.028 inch.
 - b. Exterior Finish: Two-coat fluoropolymer.
 - c. Color: As selected by Architect from manufacturer's full range.
 3. Major-Rib Spacing: 12 inches o.c.
 4. Panel Coverage: 36 inches.
 5. Panel Height: 1.25 inches.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
 - 2. Joint Sealant: ASTM C920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

2.4 FABRICATION

- A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

2.5 FINISHES

- A. Panels and Accessories:
 - 1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.2 INSTALLATION

- A. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 - 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 - 5. Flash and seal panels with weather closures at perimeter of all openings.
- B. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- C. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

3.3 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 07 4213.13

SECTION 07 6200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Formed wall sheet metal fabrications.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
 - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - 4. Include details for forming, including profiles, shapes, seams, and dimensions.
 - 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 6. Include details of termination points and assemblies.
 - 7. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
 - 8. Include details of special conditions.
 - 9. Include details of connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified, 12 inches long by actual width.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.
- B. Special warranty.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.5 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 coating designation; pre-painted by coil-coating process to comply with ASTM A755/A755M, nominal 22 gauge.
 - 1. Surface: Smooth, flat.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3. Color: As selected by Architect from manufacturer's full range.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil.

2.3 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.
- C. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances:
 - 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
 - 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Seams:
 - 1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 2. Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
 - 3. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.5 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, and at shelf angles. Fabricate discontinuous

lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch-high, end dams. Fabricate from the following materials:

1. Stainless Steel: 0.0156 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, or sealant.
 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 5. Install continuous cleats with fasteners spaced not more than 12 inches o.c.
 6. Space individual cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 8. Do not field cut sheet metal flashing and trim by torch.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
 1. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 2. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07 9200 "Joint Sealants."
- G. Rivets: Rivet joints in uncoated aluminum or zinc where necessary for strength.

3.2 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

3.3 INSTALLATION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.4 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.5 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 6200

SECTION 07 7100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes: Manufactured units for the following applications:
 - 1. Roof-edge drainage systems.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Samples: For each type of roof specialty indicated with factory-applied color finishes.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.5 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties to withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 ROOF-EDGE DRAINAGE SYSTEMS

- A. Gutters: Manufactured in uniform section lengths not exceeding 12 ft., with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.
 - 1. Formed Aluminum Sheet: 0.032 inch thick.
 - 2. Size: 6-inch.
 - 3. Gutter Profile: Style K in accordance with SMACNA's "Architectural Sheet Metal Manual."
 - 4. Corners: Factory mitered and mechanically clinched and sealed watertight.
 - 5. Gutter Supports: Gutter brackets with finish matching the gutters.
- B. Downspouts: Corrugated rectangular complete with machine-crimped elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.
 - 1. Formed Aluminum Sheet: 0.032 inch thick.
 - 2. Size: 4-inch by 6-inch.
- C. Finishes:
 - 1. Aluminum: Two-coat fluoropolymer.
 - a. Color: As selected by Architect from manufacturer's full range.

2.3 SHEET METAL MATERIALS

- A. Aluminum Sheet: ASTM B209/B209M, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight in color coat.
2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Roof specialty manufacturer's recommended fasteners, designed to meet performance requirements, suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 1. Fasteners for Metallic-Coated Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel in accordance with ASTM A153/A153M or ASTM F2329/F2329M.
 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 3. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
- C. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- D. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type joints with limited movement.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: 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.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install roof specialties in accordance with manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.
 - 1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 4. Torch cutting of roof specialties is not permitted.
 - 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer's written installation instructions.
 - 1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws or not less than recommended in writing by fastener manufacturer to achieve maximum pull-out resistance.
- D. Seal concealed joints with butyl sealant as required by roof specialty manufacturer.
- E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.2 INSTALLATION OF ROOF-EDGE DRAINAGE SYSTEMS

- A. Install components to produce a complete roof-edge drainage system in accordance with manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches apart. Attach ends with rivets and seal with sealant to make watertight. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated but not exceeding 50 ft. apart. Install expansion-joint caps.
- C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c.
 1. Provide elbows at base of downspouts at grade to direct water away from building.
 2. Connect downspouts to underground drainage system indicated.

3.3 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- B. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION 07 7100

SECTION 07 7253 - SNOW GUARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Rail-type, seam-mounted snow guards.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.
 - 1. Include details of rail-type snow guards.
- C. Samples:
 - 1. Rail-Type Snow Guards: Bracket, 12-inch-long rail, and installation hardware.
 - a. For units with factory-applied finishes, submit manufacturer's standard color selections.
- D. Delegated Design Submittals: For snow guards, include analysis reports signed and sealed by the qualified professional engineer responsible for their preparation.
 - 1. Include calculation of number and location of snow guards.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer's experience with providing delegated design engineering services of the kind indicated, including documentation that the engineer is licensed in the state in which the Project is located.
- B. Product Test Reports: For each type of snow guard, for tests performed by a qualified testing agency, indicating load at failure of attachment to roof system identical to roof system used on this Project.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design snow guards, including attachment to roofing material and roof deck, applicable for attachment method, based on the following:
 - 1. Roof snow load.
 - 2. Snow drifting
 - 3. Roof slope.
 - 4. Roof type.
 - 5. Roof dimensions.
 - 6. Roofing substrate type and thickness.
 - 7. Snow guard type.
 - 8. Snow guard fastening method and strength.
 - 9. Snow guard spacing.
 - 10. Coefficient of Friction Between Snow and Roof Surface: 0.
 - 11. Factor of Safety: 2.
- B. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- C. Structural Performance: Snow guards shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
 - 1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

- A. Rail-Type, Seam-Mounted Snow Guards:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - a. Alpine SnowGuards.
 - b. Requests for substitutions will be considered during the bid in accordance with provisions of Section 00 2600 "Procurement Substitutions."
 - 2. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with two rails.
 - 3. Brackets and Baseplates: 6000 series aluminum; powder coated.

- a. Color: As selected by Architect from Manufacturer's full range.
- 4. Bars: 6000 series aluminum; powder coated.
 - a. Color: As selected by Architect from Manufacturer's full range.
 - b. Profile: Round.
- 5. Seam Clamps: ASTM B221 aluminum extrusion or ASTM B85/B85M aluminum casting with stainless steel set screws incorporating round nonpenetrating point; designed for use with applicable roofing system to which clamp is attached.
- 6. Accessories:
 - a. External couplings.
 - b. End caps.
 - c. End collars.
 - d. Ice Flags.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install snow guards according to manufacturer's written instructions.
 - 1. Space rows as recommended by manufacturer.
- B. Attachment for Standing-Seam Metal Roofing:
 - 1. Do not use fasteners that will penetrate metal roofing or fastening methods that void metal roofing finish warranty.
 - 2. Rail-Type, Seam-Mounted Snow Guards:
 - a. Install brackets to vertical ribs in straight rows.
 - b. Secure with stainless steel set screws, incorporating round nonpenetrating point, on same side of standing seam.
 - c. Torque set screw according to manufacturer's instructions.
 - d. Install cross members to brackets.
 - e. Provide expansion joints at intervals recommended by manufacturer.

END OF SECTION 07 7253

SECTION 07 8123 - INTUMESCENT FIRE PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Mastic and intumescent fire-resistive coatings.
- C. Related Requirements:
 - 1. Section 07 8100 "Applied Fire Protection" for sprayed fire-resistive materials (SFRM).
 - 2. Section 09 9646 "Intumescent Painting" for intumescent paints that are fire retarding, but not fire resistive.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Mastic and intumescent fire-resistive coatings.
 - 2. Substrate primers.
 - 3. Topcoat.

1.4 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Evaluation reports.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by mastic and intumescent fire-resistive coating manufacturer as experienced and with sufficient trained staff to install manufacturer's products in accordance with specified requirements.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Assemblies: Provide fire protection, including auxiliary materials, in accordance with requirements of each fire-resistance design and manufacturer's written instructions.
- B. Fire-Resistance Design: Indicated on Drawings, tested in accordance with ASTM E119 or UL 263; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Steel members are to be considered unrestrained unless specifically noted otherwise.
- C. Asbestos: Provide products containing no detectable asbestos.

2.2 MASTIC AND INTUMESCENT FIRE-RESISTIVE COATINGS

- A. Mastic and Intumescent Fire-Resistive Coating: Manufacturer's standard, factory-mixed formulation, and complying with indicated fire-resistance design.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hilti, Inc.
 - b. LOCTITE Flame Control.
 - c. PPG Industries.
 - d. Pittsburgh Paints Company (The).
 - e. Sherwin-Williams Company (The).
 - 2. Application: Designated for "interior general purpose" "conditioned interior space purpose" use by a qualified testing agency acceptable to authorities having jurisdiction.
 - 3. Thickness: As required for fire-resistance design indicated, measured in accordance with requirements of fire-resistance design.
 - 4. Surface-Burning Characteristics: Comply with ASTM E84.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 50 or less.
 - 5. Finish: As selected by Architect from manufacturer's standard finishes.

- a. Color and Gloss: As indicated by manufacturer's designations.

2.3 AUXILIARY MATERIALS

- A. Provide auxiliary materials that are compatible with mastic and intumescent fire-resistive coating and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B. Substrate Primers: Primers approved by mastic and intumescent fire-resistive coating manufacturer for the required fire-resistance design.
- C. Topcoat: Suitable for application over applied mastic and intumescent fire-resistive coating; of type recommended in writing by mastic and intumescent fire-resistive coating manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and in accordance with each fire-resistance design.

3.2 PREPARATION

- A. Cover other work subject to damage from fallout or overspray of fire protection materials during application.
- B. Prime substrates where included in fire-resistance design and where recommended in writing by mastic and intumescent fire-resistive coating manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fire protection.
- C. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fire protection.

3.3 APPLICATION

- A. Construct fire protection assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fire protection Work.
- B. Comply with mastic and intumescent fire-resistive coating manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and

apply fire protection; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

- C. Spray apply fire protection to maximum extent possible. After the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by mastic and intumescent fire-resistive coating manufacturer.
- D. Do not install enclosing or concealing construction until after fire protection has been applied, inspected, and tested and corrections have been made to deficient applications.
- E. Finishes: Where indicated, apply fire protection to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish in accordance with manufacturer's written instructions for each finish selected.
 - 2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
 - 3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Test and inspect as required by the IBC, Subsection 17 05.14, "Mastic and Intumescent Fire-Resistant Coatings."
- B. Fire protection will be considered defective if it does not pass tests and inspections.
 - 1. Remove and replace fire protection that does not pass tests and inspections, and retest.
 - 2. Apply additional fire protection, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.
- C. Prepare test and inspection reports.

3.5 CLEANING

- A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

3.6 REPAIR

- A. Repair fire protection damaged by other work before concealing it with other construction.

- B. Repair fire protection by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 07 8123

SECTION 07 8400 - FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Through Penetration Firestopping.
 - 2. Fire Resistive Joint Systems.
- C. Related Sections
 - 1. Division 1 – General Requirements.
 - 2. Division 7 – Thermal and Moisture Protection.
 - 3. Division 9 – Finishes.
 - 4. Division 22 – Plumbing.
 - 5. Division 23 – Heating Ventilating and Air Conditioning.
 - 6. Division 26 – Electrical.
 - 7. Division 27 – Communication.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI/UL 263 - Fire Tests of Building Construction and Materials.
 - 2. ANSI/UL 723 - Surface Burning Characteristics of Building Materials.
 - 3. ANSI/UL 1479 - Standard for Fire Tests of Through-Penetration Firestops.
 - 4. ANSI/UL 2079 - Tests for Fire Resistance of Building Joint Systems.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 3. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Firestops.
 - 4. ASTM E 1399 - Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
 - 5. ASTM E 1966 - Standard Test Method for Fire Resistive Joint Systems.
 - 6. ASTM E 2174 - Standard Practice for On-Site Inspection of Installed Firestops.
 - 7. ASTM E 2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- C. Factory Mutual (FM) - FM4991 - Standard for Approval of Firestop Contractors.
- D. International Code Congress (ICC):
 - 1. International Building Code (IBC).

2. International Mechanical Code (IMC)
3. International Fire Code (IFC)
4. International Code Congress Evaluation Service (ICC ES)
- E. National Fire Protection Association (NFPA):
 1. NFPA 70 - National Electrical Code.
 2. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
 3. NFPA 101 - Life Safety Code.
 4. NFPA 5000 - Building Construction and Safety Code.
- F. Underwriters Laboratories (UL) - UL Building Materials Directory:
 1. Through-Penetration Firestops Systems (XHEZ).
 2. Joint Systems (XHBN).
 3. Firestop Devices (XHJI).
 4. Forming Materials (XHKU).
 5. Wall Opening Protective Materials (CLIV).
 6. Fill, Void or Cavity Materials (XHHW).
- G. American Society of Sanitary Engineering (ASSE):
 1. ASSE Series 9000 – Professional Qualification Standard for Firestop Systems and Device Installers, Inspectors and Surveyors.
- H. International Association of Plumbing and Mechanical Officials (IAPMO):
 1. Uniform Plumbing Code (UPC).
 2. Uniform Mechanical Code (UMC).
- I. International Standards Organization (ISO):
 1. ISO 6944
 2. ISO 10295-1: 2007.
 3. ISO 10295-2: 2009.
 4. ISO 10295-3:

1.3 PERFORMANCE REQUIREMENTS

- A. Provide systems that are listed by at least one of the following:
 1. Underwriters Laboratories Inc. (UL), in "Fire Resistance Directory".
 2. Intertek Testing Service (Formerly known as Omega Point Laboratories), in "Directory of Listed Products".
 3. Factory Mutual (FM), in FMRC Approval Guide.
 4. Any other qualified independent testing and inspection agency that conducts periodic follow-up inspections and is acceptable to authorities having jurisdiction.
- B. Provide firestop products that are flexible enough to allow for pipe vibration in a through-penetration application.
- C. Provide fire resistive sealants and sprays for construction joint applications that are flexible enough to satisfy the movement criteria per the test standards ASTM E 1399, ASTM E 1966 or ANSI/UL 2079.

- D. Provide products with the appropriate flame spread index and smoke develop index, when tested in accordance with ASTM E 84.
- E. Provide products that meet the intent of the L rating classification for the movement of smoke per ANSI/UL 1479 for through penetrations and ANSI/UL 2079 for construction joints.
- F. Provide products identical to those tested and listed for classification by UL, Intertek or any other qualified independent testing agency.
- G. Provide products that bear classification marking of qualified independent testing agency.
- H. Where firestop systems not listed by any listing agency are required due to project conditions, submit a substitution proposal with evidence specified.
- I. Use only products specifically listed for use in listed systems.
- J. Provide products that are compatible with each other, with the substrates forming openings, and with the items, if any, penetrating the firestopping, under the conditions represented by this project, based on testing and field performance demonstrated by manufacturer.
- K. Firestopping materials must meet and be acceptable for use by all building codes and NFPA codes cited in this section.
- L. Provide products that meet the intent of the state or local guidelines on volatile organic compounds (VOC).
- M. Where applicable provide products that meet the intent of the F rating classification for passage of flame per ANSI/UL 1479 for through penetrations.
- N. Where applicable provide products that meet the intent of the T rating classification for the transfer of temperature per ANSI/UL 1479 for through penetrations.
- O. Provide products that meet the intent of the L rating classification for the movement of smoke per ANSI/UL 1479 for through penetrations and ANSI/UL 2079 for construction joints.
- P. Where applicable provide products that meet the intent of the W rating classification for passage of water per ANSI/UL 1479 for through penetrations.

1.4 SUBMITTALS

- A. Submit under provisions of the Contract and Section 01 3300 "Submittal Procedures."
- B. Shop Drawings: For each firestopping system used, provide the following:
 - 1. Listing agency's detailed drawing showing opening, penetrating item(s), and firestopping materials, identified with listing agency's name and number or

- designated and fire rating achieved.
- 2. For proposed systems that do not conform strictly to the listing, submit written instructions showing modifications and approved by firestop system manufacturer.
- 3. Submit under provisions of the International Building Code (IBC) section 107 and 703 requiring a submittal package for fire-resistance ratings and fire tests.
- C. Product Certificates: Submit certificates of conformance signed by firestop system manufacturer certifying that materials furnished comply with requirements.
- D. Product Data: Furnish manufacturer's product data sheets on each material to be used in firestop systems. Information on manufacturer's product data sheet should include:
 - 1. Product characteristics including compliance with appropriate ASTM/UL/ANSI test standards.
 - 2. Storage and handling requirements and recommendations.
- E. Installation Instruction: Furnish manufacturer's installation instructions.
- F. UL Tested Systems: Submit drawings showing typical installation details for the methods of installation. Indicate which firestop materials will be used and thickness for different hourly ratings.
- G. Engineering Judgements: Submit manufacturer's drawings for all non-standard applications where no UL tested system exists. All drawings must indicate the "Tested" UL system upon which the judgement is based so as to assess the relevance of the judgement to some known performance.

1.5 QUALITY ASSURANCE

- A. General: All through-penetration firestop systems and construction gap fire resistive systems shall be installed with approved methods using materials that have been tested and classified to produce an approved assembly.
- B. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of twenty five (25) years experience.
 - 1. Products shall be manufactured in a facility that follows ISO 9001 best practices.
- C. Installer Qualifications: Firm must be qualified by having experience, staff, and be properly trained to install the specified products, and meets the following criteria:
 - 1. Contractor is acceptable to manufacturer.
 - 2. Contractor is acceptable to Authority Having Jurisdiction (AHJ).
 - 3. Contractor has completed the manufacturer's certified product installation training.
 - 4. Contractor must provide a list of completed projects as evidence of experience; include project name and address, owner's name and address, and architect's name and phone number.

- 5. Certificate: Contractor should provide certificate of qualification.
- D. Codes: Where manufacturer's application procedures are in conflict with those of the local Authority Having Jurisdiction, the more strict guidelines will prevail.
- E. Pre-installation Meetings: Meetings to agree on firestop requirements, conditions, manufacturer's instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products until ready for installation in manufacturer's original unopened packaging, legibly marked with manufacturer's name and product identification, date of manufacture, lot number, listing agency's classification marking, curing/dry time, mixing instructions (if applicable) and MSDS reference number.
- B. Store and handle in such a manner as to prevent deterioration or damage due to moisture, temperature changes, contaminants, and other causes; follow manufacturer's instructions.
- C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local Authority Having Jurisdiction.

1.7 PROJECT CONDITIONS

- A. Coordinate construction and cutting of openings so that each particular firestop system may be installed in accordance with its listing, including assembly rating, L rating, sizing, sleeves, manufacturer's published STC rating and penetrating items.
- B. Coordinate firestopping of dynamic and static construction joints (top-of-wall, bottom-of-wall, floor-to-wall, wall-to-wall,) so that each particular system may be installed in accordance with its listing, including assembly rating, sizing, movement capabilities and manufacturer's published STC rating.
- C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install firestopping under environmental conditions outside manufacturer's absolute limits.
- D. Provide ventilation as required by firestopping manufacturer, including mechanical ventilation if required.

1.8 WARRANTY

- A. At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: 3M Fire Protection Products, or others as approved by architect, including:
 - 1. Specified Technologies, Inc.
 - 2. Hilti Corporation.
- B. Requests for substitutions will be considered during the bid in accordance with provisions of Section 00 2600 "Procurement Substitutions."
- C. Single Source: To maintain control and integrity of the firestop applications a single manufacturer shall be used. Specific UL or approved listing agencies systems applicable to each type of firestop condition should be supplied by one manufacturer.

2.2 SCOPE/APPLICATION

- A. Provide installed firestop products that limit the spread of fire, heat, smoke, and gasses through otherwise unprotected openings in rated assemblies, including walls, partitions, floors, roof/ceilings, and similar locations, restoring the integrity of the fire rated construction to its original fire rating.
- B. Provide firestop systems listed that are necessary for the specific combination of fire-rated construction, type of penetrating item, annular space requirements, and fire rating, and the following criteria:
 - 1. F-Rating: Equal to or greater than the fire-resistance rating of the assembly in which the firestopping will be installed.
 - 2. T-Rating: In habitable areas where penetrating items are exposed to potential contact with materials on fire side(s) of rated assembly, T-rating must equal its F-rating.
 - 3. L-Rating: L-rating of 1 cfm per linear foot (5.5 cu m/h/m) maximum at ambient temperatures.
 - 4. W-Rating: meets UL Water Leakage Test, W Rating – Class 1 requirements for systems tested and listed in accordance with ANSI/UL 1479.
 - 5. Wall Penetrations: Through penetration systems must be symmetrical, with the same rating from both sides of the wall. Membrane penetrations may be asymmetrical.
 - 6. Testing: Determine ratings in accordance with ASTM E 814 or UL 1479.
- C. Provide fire-resistive systems listed that are necessary for construction gaps per the specific combination of fire-rated construction type, configuration, gap dimensions, and fire rating, and the following criteria:
 - 1. Fire resistance rating must be equal to or greater than that of the assembly in which it is to be installed.
 - 2. Movement capability must be appropriate to the potential movement of the gap, demonstrated by testing in accordance with ASTM E 1399/ASTM E 1966/UL 2079 for minimum of 500 cycles at 10 cycles per minute.
 - 3. L-Rating: L-rating of 1 cfm per linear foot (5.5 cu m/h/m) maximum.
 - 4. Determine ratings in accordance with ASTM E 1966/UL 2079.

2.3 THROUGH PENETRATION FIRESTOP PRODUCTS

- A. 3M Fire Barrier Ultra RC Pack: One piece metal collar assembly encasing intumescent material for firestopping of pipes and cables through rated walls and floors.
 - 1. Fire Resistance: For use in 1 or 2 hour fire-rated systems.
 - 2. Locations: Vertical assemblies and horizontal assemblies.
- B. 3M Fire Barrier Ultra Plastic Pipe Device: Intumescent device for firestopping of plastic pipe and cables through rated walls and floors.
 - 1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 - 2. Configuration: One-piece metal collar, with locking latch and bendable tabs to secure; equipped also for conventional anchoring.
 - 3. Locations: Vertical assemblies and horizontal assemblies.
- C. 3M Fire Barrier RC-1 Restricting Collar with either FS 195+ Wrap Strip or 3M Interam Ultra GS Wrap Strip . (See product descriptions below): For firestopping of plastic pipes from 4 inches to 10 inches in diameter.
 - 1. Fire Resistance: For use in 1 or 2 hour fire-rated systems.
 - 2. Material: 28 gauge steel.
 - 3. Size: 25 foot (7.6 m) roll.
 - 4. Locations: Vertical assemblies and horizontal assemblies.
- D. 3M Fire Barrier CP25WB+ Sealant: High-performance, intumescent, water-based sealant. No-sag, fast drying, paintable, red in color. Versatile firestop sealant for pipes (not for use with CPVC), cables, cable tray, blank opening and other penetrations along with mineral wool or other fire-rated assembly products.
 - 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.
 - 2. Locations: Vertical assemblies and horizontal assemblies.
 - 3. STC rating of 54 when tested in STC 54-rated wall assembly.
- E. 3M Fire Barrier IC 15WB+ Sealant: General-purpose, intumescent, water-based sealant. No-sag, fast drying, paintable, yellow in color. Economical firestop sealant for pipes, cables, cable tray, blank opening and other penetrations along with mineral wool or other fire-rated assembly products.
 - 1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 - 2. Locations: Vertical assemblies, horizontal assemblies and smoke barrier.
 - 3. STC rating of 54 when tested in STC 54-rated wall assembly.
- F. 3M Fire Barrier Sealant FD 150+: Single-part, water-based, acrylic latex sealant. No-sag, low-shrinkage, low VOC. Blue, red or limestone color. Used to firestop for pipe penetrations (not for use with CPVC).
 - 1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 - 2. Locations: Vertical assemblies and horizontal assemblies.
 - 3. STC rating of 54 when tested in STC 54-rated wall assembly.
- G. 3M Fire Barrier Water Tight Sealant 3000 WT: Single-part, water-tight, intumescent silicone firestop sealant for filling voids in concrete, gypsum, metal, plastic, wood and insulation. Light gray color with black flecks. Meets UL Water Leakage Test, W

Rating – Class 1 requirements.

1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.
 2. Locations: Vertical assemblies, horizontal assemblies and smoke barrier.
 3. STC rating of 53 when tested in STC 54-rated wall assembly.
- H. 3M Fire Barrier Water Tight 1000 NS Sealant: Single-part, non-slump firestopping silicone sealant for floor and wall openings. Light gray color. Meets UL Water Leakage Test, W Rating – Class 1 requirements.
1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems..
 2. Locations: Vertical assemblies, horizontal assemblies and smoke barrier.
 3. STC rating of 56 when tested in STC 56-rated wall assembly.
- I. 3M Fire Barrier Water Tight Sealant 1003 SL: Single-part, self-leveling firestopping silicone sealant for floor openings. Light gray color. Meets UL Water Leakage Test, W Rating – Class 1 requirements.
1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems..
 2. Locations: For horizontal assemblies only.
 3. STC rating of 56 when tested in STC 56-rated wall assembly.
- J. 3M Fire Barrier Sealant 2000 NS: Single-part, non-slump elastomeric silicone firestop sealant. Sag-resistant, low VOC. Light grey color. Used in mechanical, electrical and plumbing applications to firestop openings and penetrations through fire-rated floor or wall assemblies. Typical penetrants include: metallic pipe, non-metallic pipe (FGG/BM system CPVC compatible), conduit, power and communication cable and telephone or electrical wiring.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems
 2. Locations: Vertical and horizontal assemblies.
 3. STC-Rating of 56 when tested in STC 56-rated wall assembly.
- K. 3M Fire Barrier Sealant 2000+: Single-part, elastomeric silicone firestop sealant. Sag-resistant, low VOC. Light grey color. Used in mechanical, electrical and plumbing applications to firestop openings and penetrations through fire-rated floor or wall assemblies. Typical penetrants include: metallic pipe, non-metallic pipe (FGG/BM system CPVC compatible), conduit, power and communication cable and telephone or electrical wiring.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.
 2. Locations: Vertical and horizontal assemblies.
 3. STC-Rating of 56 when tested in STC 56-rated wall assembly.
- L. 3M Fire Barrier Moldable Putty+: One-part, 100 percent solids intumescent firestop. Remains pliable, flexible and easily re-enterable. Non-toxic synthetic formula. Versatile putty for pipes, cables, cable tray, blank opening and other penetrations along with mineral wool or other fire-rated assembly products.
1. Type: Stick or Pad
 2. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 3. Locations: Vertical assemblies and horizontal assemblies.
- M. 3M Fire Barrier 2001 Silicone RTV Foam: Two-part, liquid-silicone elastomer, foams in

place when mixed. For use sealing large or complex openings such as cable bundles, cable trays and conduit banks.

1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 2. Locations: Vertical assemblies and horizontal assemblies.
- N. 3M Fire Barrier CS-195+ Composite Sheet: Organic/inorganic intumescent elastomeric sheet, bonded on one side to a layer of 28 gauge galvanized steel. Other side reinforced with steel-wire mesh and covered with aluminum foil. Re-enterable. For use in firestopping larger openings
1. Thickness: Nominal 0.3 inch (7.6 mm).
 2. Thermal Expansion: 8 - 10 times original size.
 3. Tensile Strength (ASTM D412): 93.6 psi (645 kPa)/489 percent.
 4. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems..
 5. Locations: Vertical assemblies and horizontal assemblies.
- O. 3M Interam Ultra GS Wrap Strip: Graphite based, flexible, largely inorganic, intumescent mat. For use around non-metallic piping with or with RC-1 collar.
1. Fire Resistance: For use in 1, 2 or 3 hour fire rated systems..
 2. Locations: Vertical assemblies, horizontal assemblies and smoke barrier.
- P. 3M Fire Barrier FS-195+ Wrap/Strip: One-part, organic/inorganic intumescent strip with foil on one side. May be cut to fit irregular shapes. For use around non-metallic piping with or with RC-1 collar.
1. Length: 24 inch (610 mm).
 2. Width: 1 or 2 inches.
 3. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.
 4. Locations: Vertical assemblies and horizontal assemblies.
- Q. 3M Fire Barrier Pass-Through Devices: One-Piece device for firestopping of cable penetrations through rated walls and floors.
1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 2. Locations: Vertical assemblies and horizontal assemblies.
- R. 3M Fire Barrier Tuck-In: Graphite-based, flexible, intumescent wrap strip for use around non-metallic piping. Adhesive closure tab.
1. Fire Resistance: For use in 1, 2 or 3 hour fire-rated systems.
 2. Locations: Vertical assemblies and horizontal assemblies.
- S. 3M Fire Barrier Putty Sleeve Kit: Device used for firestopping of cable penetrations through fire rated walls and floors.
1. Fire Resistance: For use in 1, 2 3 or 4 hour fire-rated systems.
 2. Locations: Vertical assemblies and horizontal assemblies.

2.4 FIRE RESISTIVE JOINT PRODUCTS

- A. 3M Fire Barrier Sealant FD 150+: Single-part, water-based sealant. Sag-resistant, low-shrinkage, low VOC.
1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire-rated systems.
 2. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall and floor-to-

- floor.
 - 3. Compression/Extension Recovery: +/- 19 percent of original joint width.
 - 4. Meets optional L rating requirements.
 - 5. STC rating of 56 when tested in STC 56-rated wall assembly.
- B. 3M Fire Barrier Water Tight Sealant 1000 NS: Single-part, non-slump elastomeric silicone sealant. Sag-resistant, low VOC.
- 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 - 2. Meets UL Water Leakage Test, W Rating – Class 1 requirements.
 - 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-floor, floor-to-wall and perimeter joints.
 - 4. Compression/Extension Recovery: +/- 15 percent of original joint width.
 - 5. STC-Rating of 56 when tested in STC-56-rated wall assembly.
- C. 3M Fire Barrier Sealant 2000 NS: Single-part, non-slump elastomeric silicone sealant. Sag-resistant, low VOC.
- 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 - 2. Service Flexibility: Accommodate vibration from normal building movement.
 - 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-wall, floor-to-floor and perimeter joints.
 - 4. Compression/Extension Recovery: +/- 31 percent of original joint width.
 - 5. STC-Rating of 56 when tested in STC 56-rated wall assembly.
- D. 3M Fire Barrier Sealant 2000+: Silicone Sealant: Single-part, elastomeric silicone sealant. Sag-resistant, low VOC.
- 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 - 2. Compression/Extension Recovery: +/- 13 percent of original joint width.
 - 3. Location: For use at top-of-wall, bottom-of-wall, wall-to-wall, floor-to-wall and floor-to-floor joints.
- E. 3M FireDam Spray 200: Water-based, paintable, low VOC, freeze/thaw resistant spray applied fire resistive product. Applied with conventional airless spray equipment.
- 1. Fire Resistance: For use in 1, 2, 3 or 4 hour fire rated systems.
 - 2. Compression/Extension Recovery: +/- 50 percent of joint width.
 - 3. Location: For use at head-of-wall, wall-to-wall, floor-to-floor, bottom-of-wall, floor-to-wall and perimeter joints.
 - 4. STC-Rating of 56 when tested in STC 56-rated wall assembly.

2.5 FIRESTOPPING FOR SINGLE MEMBRANE PENETRATIONS

- A. 3M Fire Barrier Moldable Putty+: One-part, 100 percent solids intumescent firestop. Remains pliable, flexible and easily re-enterable. Non-toxic synthetic formula.
- 1. Type: Pad.
 - 2. Fire Resistance: For use in 1, 2 or 3 hour fire rated systems.
- B. 3M Endothermic Mat E-5A-4: Endothermic heat absorbing mat.
- 1. Type: Mat.
 - 2. Fire Resistance: For use in 1 or 2 hour fire rated systems.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Conduct tests according to manufacturer's written recommendations to verify that substrates are free of oil, grease, rolling compounds, incompatible primers, loose mill scale, dirt and other foreign substances capable of impairing bond of firestopping.
- C. Verify that items penetrating fire rated assemblies are securely attached, including sleeves, supports, hangers, and clips.
- D. Verify that openings and adjacent areas are not obstructed by construction that would interfere with installation of firestopping, including ducts, piping, equipment, and other suspended construction.
- E. Verify that environmental conditions are safe and suitable for installation of firestopping.
- F. If substrate preparation is the responsibility of another installer, notify Architect or Engineer of Record of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Prepare substrates in accordance with manufacturer's instructions and recommendations.
- B. Install masking and temporary coverings as required to prevent contamination or defacement of adjacent surfaces due to firestopping installation.

3.3 INSTALLATION

- A. Install in strict accordance with manufacturer's detailed installation instructions and procedures.
- B. Install so that openings are completely filled and material is securely adhered.
- C. Where firestopping surface will be exposed to view, finish to a smooth, uniform surface flush with adjacent surfaces.
- D. After installation is complete, remove combustible forming materials and accessories that are not part of the listed system.
- E. Repair or replace defective installations in accordance with manufacturer's recommendations, listed systems details and applicable code requirements.
- F. At each through penetration or fire-resistive joint system, attach identification labels on both sides in location where label will be visible to anyone seeking to remove penetrating items or firestopping.

- G. Clean firestop materials off surfaces adjacent to openings as work progresses, using methods and cleaning materials approved in writing by firestop system manufacturer and which will not damage the surfaces being cleaned.
- H. Notify Authority Having Jurisdiction when firestopping installation is ready for inspection; obtain advance approval of anticipated inspection dates and phasing, if any, required to allow subsequent construction to proceed.
- I. Do not cover firestopping with other construction until approval of authority having jurisdiction has been received.

3.4 FIELD QUALITY CONTROL

- A. Owner will engage an independent testing agency to inspect installed firestopping and to prepare reports indicating whether the installed work complies with the contract documents.
- B. Notify testing agency at least 7 days prior to date when firestopping installation will be ready for inspection; obtain advance approval of general schedule and phasing, if any, required to allow subsequent construction to proceed.

3.5 CLEANING AND PROTECTION

- A. Remove left over material and debris from Work area. Use necessary means to protect fire protection product(s) before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. Install identification Labels for Through Penetration and Construction Joint Systems: Pressure sensitive self-adhesive vinyl labels, preprinted with the following information:
 - 1. The applicable words "Warning - Through Penetration Firestop System - Do not Disturb. Notify Building Management of Any Damage." or "Warning - Construction Gap Fire Resistive System - Do not Disturb. Notify Building Management of Any Damage."
 - 2. Listing agency's system number or designation.
 - 3. System manufacturer's name, address, and phone number.
 - 4. Installer's name, address, and phone number.
 - 5. General contractor's name, address, and phone number (if applicable).
 - 6. Date of installation.

END OF SECTION 07 8400

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Silicone joint sealants.
 - 2. Urethane joint sealants.

1.2 ACTION SUBMITTALS

- A. Product data.
- B. Samples: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Warranty Documentation:
 - 1. Manufacturers' special warranties.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Locations: For use at interior locations.

2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 100/50, T, NT: Single-component, non-sag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Locations: For use at exterior locations.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after

cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
 - b. Masonry.
3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants in accordance with requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.
- G. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- H. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 9200

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Interior standard steel frames.
 - 2. Exterior standard steel doors and frames.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.3 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAl) certification.
- B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies is to meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
 - 1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAl) certification.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1. Manufacturers: Subject to compliance with requirements, provide product by the following, or equal as approved by Architect:
 - a. Ceco Door; AADG, Inc.; ASSA ABLOY.
 - b. Curries, AADG, Inc.; ASSA ABLOY Group.
 - c. Republic Doors and Frames; an Allegion brand.
 - d. Steelcraft; Allegion plc.
- 2. Requests for substitutions will be considered during the bid in accordance with provisions of Section 00 2600 "Procurement Substitutions."

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.
- B. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.37 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C1363 or ASTM E1423.

2.3 INTERIOR STANDARD STEEL FRAMES

- A. Construct hollow-metal frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

2.4 EXTERIOR STANDARD STEEL DOORS AND FRAMES

- A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B..
 - 1. Doors:
 - a. Type: As indicated in the Door and Frame Schedule on Drawings.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.042 inch, with minimum A60coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
 - f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
 - g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
 - h. Core: Polyurethane or Polyisocyanurate with Vertical steel stiffener.
 - 2. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
 - b. Construction: Full profile welded.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
 - 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
 - 3. Post installed Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.
- B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.
- C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at top of underlayment.

- D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.
- G. Glazing: Comply with requirements in Section 08 8000 "Glazing."

2.7 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Sidelite Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

3. Door Silencers: Except on weather-stripped & gasketed frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.
- D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 1. Provide stops and moldings flush with face of door, and with square stops unless otherwise indicated.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
 4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
 5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Hollow-Metal Frames: Comply with ANSI/SDI A250.11 or NAAMM-HMMA 840.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Install frames with removable stops located on secure side of opening.
 - 2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
 - 3. Floor Anchors: Secure with post installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 4. Solidly pack mineral-fiber insulation inside frames.
 - 5. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
 - 1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8 or NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.
 - 2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
 - 3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
- C. Glazing: Comply with installation requirements in Section 08 8000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 1113

SECTION 08 5413 - FIBERGLASS WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section includes fiberglass-framed windows.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.
- C. Samples: For each exposed product and for each color specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Sample warranties.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace fiberglass windows that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period:
 - a. Window: 10 years from date of Substantial Completion.
 - b. Glazing Units: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

- A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Window Certification: WDMA certified with label attached to each window.
- B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:
 - 1. Minimum Performance Class: LC.
 - 2. Minimum Performance Grade: 25.
 - 3. Large-Missile Test: For glazing located within 30 feet of grade.
 - 4. Small-Missile Test: For glazing located between 30 feet and 60 feet above grade.

2.2 FIBERGLASS WINDOWS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - 1. Alpen High Performance Products.
 - 2. Milgard Manufacturing, LLC.
 - 3. Pella Corporation.
- B. Operating Types: As indicated on Drawings.
- C. Frames and Sashes: Pultruded fiberglass complying with AAMA/WDMA/CSA 101/I.S.2/A440 and with exposed exterior fiberglass surfaces finished with manufacturer's standard enamel coating complying with AAMA 613.
 - 1. Exterior Color: As selected by Architect from manufacturer's full range.
 - 2. Interior Finish: Matching exterior finish, in color selected by Architect from manufacturer's full range.
- D. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.
 - 1. Kind: Fully tempered where indicated on Drawings.
- E. Insulating-Glass Units: ASTM E2190.
 - 1. Glass: ASTM C1036, Type 1, Class 1, q3.
 - a. Tint: Clear.
 - b. Kind: Fully tempered where indicated on Drawings.

2. Lites: .
 3. Filling: Fill space between glass lites with argon.
 4. Low-E Coating: Pyrolytic on second surface.
- F. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.
- G. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.
1. Exposed Hardware Color and Finish: As selected by Architect from manufacturer's full range.
- H. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.
1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.3 FABRICATION

- A. Fabricate fiberglass windows in sizes indicated. Include a complete system for installing and anchoring windows.
- B. Glaze fiberglass windows in the factory.
- C. Weather strip each operable sash to provide weathertight installation.
- D. Mullions: Provide mullions and cover plates, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections. Provide mullions and cover plates capable of withstanding design wind loads of window units.
- E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

- B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.
- C. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.
- D. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.
- E. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08 5413

SECTION 08 7100 - DOOR HARDWARE

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinders for door hardware specified in other Sections.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For electrified door hardware.
 - 1. Include diagrams for power, signal, and control wiring.
 - 2. Include details of interface of electrified door hardware and building safety and security systems.
- C. Samples: For each exposed product in each finish specified.
- D. Door hardware schedule.
- E. Keying schedule.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedule.
 - 2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Exit Devices: 2 years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.
- B. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- C. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC A117.1.

2.2 SCHEDULED DOOR HARDWARE

- A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule, or equal as approved by the Architect.
 - 1. Door hardware is scheduled in Section 08 7105 "Door Hardware Schedule".

2.3 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum 1/2-inch latchbolt throw.
 - 2. Mortise Locks: Minimum 3/4-inch latchbolt throw.

- 3. Deadbolts: Minimum 1-inch bolt throw.
- C. Lock Backset: 2-3/4 inches unless otherwise indicated.
- D. Lock Trim:
 - 1. Description: Allegion, Falcon, T Series, extra heavy duty, Grade 1 cylindrical lever locks.
 - 2. Levers: Cast.
 - a. Quantum lever.
 - 3. Escutcheons (Roses): Wrought.
 - 4. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
 - 4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.
- F. Bored Locks: BHMA A156.2; Grade 1; Series 4000.
- G. Mortise Locks: BHMA A156.13; Operational Grade 1 and Security Grade 1; stamped steel case with steel or brass parts; Series 1000.

2.5 AUXILIARY LOCKS

- A. Bored Auxiliary Locks: BHMA A156.36; Grade 1; with strike that suits frame.
- B. Mortise Auxiliary Locks: BHMA A156.36; with strike that suits frame.

2.6 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.

2.7 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.
 - 1. Core Type: Interchangeable.
- C. High-Security Lock Cylinders: BHMA A156.30; Grade 1 permanent cores that are removable; face finished to match lockset.

1. Type: M, mechanical.
- D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.8 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 1. Master Key System: Change keys and a master key operate cylinders.
 - a. Provide three cylinder change keys and five master keys.
 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."

2.9 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel unless otherwise indicated.

2.10 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

2.11 MECHANICAL STOPS AND HOLDERS

- A. Wall-and Floor-Mounted Stops: BHMA A156.16.

2.12 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

2.13 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
- B. Maximum Air Leakage: When tested according to ASTM E 283 with tested pressure differential of 0.3-inch wg, as follows:
 - 1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. of door opening.
 - 2. Gasketing on Single Doors: 0.3 cfm/sq. ft. of door opening.
 - 3. Gasketing on Double Doors: 0.50 cfm per foot of door opening.

2.14 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.15 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.062-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

2.16 FINISHES

- A. Unless otherwise indicated in the hardware schedule or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1. Butt Hinges: Exterior, or Non-Ferrous	630 (US32D - Satin Stainless Steel)
2. Butt Hinges: Interior	652 (US26D - Satin Chromium)
3. Continuous Hinges	630 (US32D - Satin Stainless Steel)
4. Exit Devices	626 (US26D - Satin Chromium)
5. Locks and Latches	626 (US26D - Satin Chromium)
6. Pulls and Push Plates/Bars	630 (US32D - Satin Stainless Steel)
7. Closers	689 (Aluminum)
8. Protective Plates	630 (US32D - Satin Stainless Steel)
9. Overhead Stops	630 (US32D - Satin Stainless Steel)
10. Wall Stops and Holders	630 (US32D - Satin Stainless Steel)
11. Thresholds	628 (Mill Aluminum)
12. Weather-strip, Sweeps Drip Caps (wood and hollow metal doors)	Aluminum Anodized
13. Weather-strip, Sweeps Drip Caps (aluminum doors)	Match finish of aluminum doors.
14. Miscellaneous	626 (US26D – Satin Chromium)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Custom Steel Doors and Frames: HMMA 831.
 - 3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than (2286 mm).
- E. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
 - 2. Furnish permanent cores to Owner for installation.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 9200 "Joint Sealants."
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 ADJUSTING

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

3.3 DOOR HARDWARE SCHEDULE

- A. See Section 08 7105 Door Hardware Schedule attached to the specification manual.

END OF SECTION 08 7100

SECTION 08 7105 - DOOR HARDWARE SCHEDULE

PART 1 - GENERAL – Not used.

PART 2 - PRODUCTS – Not used.

PART 3 - EXECUTION.

3.1 DOOR HARDWARE SCHEDULE

List of Manufacturers:

All Manufacturers and products are a basis of design. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

IVE	Ives_____Hinges
LCN	LCN Closers_____Closers – Auto Operators – Actuators
FAL	Falcon Lock_____Passage – Privacy – Locksets - Cylinders
VON	Von Duprin_____Exit Devices – Mullion – Power Transfers
GLY	Glynn-Johnson_____Overhead Stops
IVE	Ives_____Flush Bolt – D.P. Strike – Kick Plates – Wall Bumpers – Silencers
NGP	National Guard Products_____Thresholds – Sweeps – Weatherstrip – Gasketing – Door Bottom – Astragal – Drip Cap – Corner Seal

List of Material

Quantities Listed are Per Opening

Group 1.0

3070 1 3/4 HMF x HMD
Opng 104-1, 102-1

<u>IVE</u>	3 Ea.	Hinges	5BB1 – 4 1/2" x 4 1/2" – 652
<u>FAL</u>	1 Ea.	Passage	T101S QUA 626
<u>IVE</u>	1 Ea.	Wall Stop	WS406CVX – 630
<u>IVE</u>	3 Ea.	Silencers	SR64

Group 2.0

3070 1 3/4 HMF x HMD
Opng 106-1, 108-1, 109-1

<u>IVE</u>	3 Ea.	Hinges	5BB1 – 4 1/2" x 4 1/2" – 652
<u>LCN</u>	1 Ea.	Closer	1461 – REG – ALUM
<u>FAL</u>	1 Ea.	Passage	T101S QUA 626
<u>IVE</u>	1 Ea.	Wall Stop	WS406CVX – 630
<u>NGP</u>	1 Ea.	Gasketing	2525C – 17'

Group 3.0

20 Min

3070 1 3/4 HMF x HMD
Opng 103-1, 107-1

<u>IVE</u>	3 Ea.	Hinges	5BB1 – 4 1/2" x 4 1/2" – 652
<u>LCN</u>	1 Ea.	Closer	1461 – REG – ALUM
<u>FAL</u>	1 Ea.	Privacy	T301S QUA 626
<u>IVE</u>	1 Ea.	Wall Stop	WS406CCV – 630
<u>NGP</u>	1 Ea.	Gasketing	2525C – 17'

Group 4.0

3070 1 3/4 HMF x HMD
Opng 101-1

<u>IVE</u>	3 Ea.	Hinges	5BB1HW – 4 1/2" x 4 1/2" – 652
<u>LCN</u>	1 Ea.	Closer	4040XP – REG - ALUM
<u>FAL</u>	1 Ea.	Storeroom Lock	T581PD QUA 626
<u>VON</u>	1 Ea.	Electric Strike	6211 US32D – 24V - FSE
<u>IVE</u>	1 Ea.	Kick Plates	8400 – 10" x 40" – US32D
<u>NGP</u>	1 Ea.	Gasketing	2525C – 20'

B/O Power Supply & Card Reader by others

Group 5.0

3070 1 3/4 HMF x HMD
 Opng 100-1, 104-2, 105-1

<u>IVE</u>	3 Ea.	Hinges	5BB1 – 4 1/2" x 4 1/2" – 652
<u>LCN</u>	1 Ea.	Closer	4040XP – SCUSH - ALUM
<u>VON</u>	1 Ea.	Exit Device	QEL99L-NL #17 3' 626
<u>FAL</u>	1 Ea.	Rim Cylinders	951 - 626
<u>VON</u>	1 Ea.	Power Transfer	EPT-10 – SP28
<u>IVE</u>	1 Ea.	Kick Plates	8400 – 10" x 34" – US32D
<u>NGP</u>	1 Ea.	Drip Cap	16A – 40"
<u>NGP</u>	1 Ea.	Threshold	425E – 36"
<u>NGP</u>	1 Ea.	W./Strip	700SA – 36 x 84"
<u>NGP</u>	1 Ea.	Sweep	D698A – 36"
<u>NGP</u>	2 Ea.	Corner Pad	54CP
<u>IVE</u>	3 Ea.	Silencers	SR64

B/O Power Supply & Card Reader by others

Install weatherstrip before closer & exit device

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Interior gypsum board.
 - 2. Texture finishes.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples: For each texture finish indicated on same backing indicated for Work.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
 - 1. Manufacturers: Subject to compliance with requirements, provide product by the following, or equal as approved by Architect:
 - a. CertainTeed; SAINT-GOBAIN.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - e. Requests for substitutions will be considered during the bid in accordance with provisions of Section 00 2600 "Procurement Substitutions."
 - 2. Thickness: 5/8 inch.
 - 3. Long Edges: Tapered.
 - 4. Locations: All locations except those listed to be Mold-Resistant Gypsum board as noted below.
- B. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
 - 1. Manufacturers: Subject to compliance with requirements, provide product by the following, or equal as approved by Architect:
 - a. CertainTeed; SAINT-GOBAIN.
 - b. Georgia-Pacific Gypsum LLC.
 - c. National Gypsum Company.
 - d. USG Corporation.
 - 2. Thickness: As indicated, Type X.
 - 3. Long Edges: Tapered.
 - 4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
 - 5. Locations: Bathrooms, walls behind kitchen casework, garage walls, door & window opening returns @ heads & jambs.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. L-Bead: L-shaped; exposed long flange receives joint compound.
 - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - e. Expansion (control) joint.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:

1. Interior Gypsum Board: Paper.
 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
- E. Acoustical Sealant: Manufacturer's standard non-sag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- F. Thermal Insulation: As specified in Section 07 2100 "Thermal Insulation."
- G. Vapor Retarder: As specified in Section 07 2600 "Vapor Retarders" or Section 13 3419 "Metal Building Systems."

2.7 TEXTURE FINISHES

- A. Primer-Surfacer for Smooth Wall Finishes: As recommended by textured finish manufacturer.
 - 1. Primer-surfacer is a preparation coating to be applied prior to paint primer and top-coatings.
- B. Primer: As recommended by textured finish manufacturer.
- C. Non-Aggregate Finish: Premixed, vinyl texture finish for spray application.
 - 1. Texture: Orange Peel.
 - a. Create 4'-0" x 4'-0" mock-up on site over prepared substrate for architect's review. Do not proceed with texture application until mock-up has been approved.

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C 840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- E. Prefill open joints, rounded or beveled edges, and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 9000 "Painting."
 - 4. Level 5: At training room 150.
 - a. Primer and its application to surfaces are specified in Section 09 9000 "Painting."
 - 5.
- H. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.2 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

3.3 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION 09 2900

SECTION 09 5123 - ACOUSTIC CEILING TILES

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Acoustic tiles.
 - 2. Metal suspension system.
 - 3. Accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, and coordinated with each other, using input from installers of the items involved.
- B. Product test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: Class B in accordance with ASTM E1264.
 - 2. Smoke-Developed Index: 450 or less.

2.2 ACOUSTIC CEILING TILES - (ACT)

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Chicago Metallic Corporation
 - 3. USG Corporation
- B. Basis of Design: Armstrong Cirrus Angled Tegular
- C. Acoustic Panel Tile Standard: Manufacturer's standard tiles of configuration indicated that comply with ASTM E1264.
- D. Classification: Medium Texture
- E. Color: White.
- F. Light Reflectance (LR): .85.
- G. Ceiling Attenuation Class (CAC): 35.
- H. Noise Reduction Coefficient (NRC): 75.
- I. Edge/Joint Detail: Angled Tegular as Indicated by Manufacturer's Designation
- J. Thickness: 7/8 inch.
- K. Modular Size: 24x24 as designated on drawings.

2.3 METAL SUSPENSION SYSTEM

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Chicago Metallic Corporation
 - 3. USG Corporation
- B. Metal Suspension-System Standard: Manufacturer's standard, direct-hung, fully concealed, metal suspension system that complies with applicable requirements in ASTM C635/C635M.
- C. Wide-face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from and capped with cold-rolled steel sheet, prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished wide metal caps on flanges.
 - 1. Armstrong Prelude 15/16 or equal
 - 2. Structural Classification: Heavy-duty system.

3. End Condition of Cross Runners: butt-edge type
4. Face Design: Flat, flush
5. Cap Material: cold-rolled steel
6. Cap Finish: Painted White

2.4 ACCESSORIES

- A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Measure each ceiling area and establish layout of acoustic tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated.
- B. Layout openings for penetrations centered on the penetrating items.

3.2 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

- A. Install suspended acoustic tile ceilings in accordance with ASTM C636/C636M and manufacturer's written instructions.
- B. Install edge moldings and trim of type indicated at perimeter of acoustic ceiling area and where necessary to conceal edges of acoustic tiles.
- C. Arrange directionally patterned acoustic tiles as indicated on reflected ceiling plans.
 1. Periodic inspection during the installation of suspended ceiling grids in accordance with ASCE/SEI 7.

END OF SECTION 09 5123

SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Vinyl base.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 VINYL BASE

- A. Product Standard: ASTM F1861, Type TV (vinyl, thermoplastic).
 - 1. Group: I (solid, homogeneous).
 - 2. Style and Location:
 - a. Style B, Cove: All Locations.
- B. Minimum Thickness: 0.125 inch.
- C. Height: 4 inches.
- D. Lengths: Coils in manufacturer's standard length.
- E. Outside Corners: Job formed.
- F. Inside Corners: Job formed.
- G. Colors and Patterns: As selected from manufacturer's full range of standard colors.

2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. No vinyl base less than 4'-0" in length shall be installed.
- G. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches.
 - a. Miter or cope corners to minimize open joints.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 09 6513

SECTION 09 6519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Luxury vinyl floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and pattern specified.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 LUXURY VINYL FLOOR TILE (Luxury Vinyl Tile; LVT)

- A. Basis of Design: ShawContract, Terrain II 30 Mil, 0892V
- B. Tile Standard: ASTM F 1700.
 - 1. Class: Class III, Printed Film Vinyl Tile.
 - 2. Type: B, Embossed Surface.
- C. Wear Layer Thickness: 30mil.
- D. Overall Thickness: 0.12 inch.
- E. Size: 6 by 48 inches.
- F. Edge Profile: Square Edge.
- G. Installation Type: Dry Back.
- H. Installation: Direct Glued.
- I. Colors and Patterns: As selected from manufacturer's full line of available colors.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
- C. Floor Polish: Provide protective, liquid floor-polish products recommended by floor tile manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.2 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
 1. Lay tiles square with room axis.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- I. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
 - 1. Apply two coat(s).

END OF SECTION 09 6519

SECTION 10 2800 – TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.
- B. Section Includes:
 - 1. Public-use restroom accessories.
 - 2. Custodial accessories.

1.2 ACTION SUBMITTALS

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

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data and warranty certificate.

1.4 WARRANTY

- A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following, or equal as approved by Architect:
 - 1. American Specialties, Inc.
 - 2. Bobrick Washroom Equipment, Inc.
 - 3. Bradley Corporation.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

- A. Toilet Tissue (Roll) Dispenser:
 - 1. Basis of Design: Bradley, Model 5A10
 - 2. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
 - 3. Mounting: Surface mounted.
 - 4. Operation: Non-control delivery with standard spindle.
 - 5. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
 - 6. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 7. Location
 - a. Provide one (1) per restroom.
- B. Waste Receptacle:
 - 1. Basis of Design: Bradley, Model 377-38
 - 2. Mounting: Freestanding.
 - 3. Minimum Capacity: 36-gallon.
 - 4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
 - 5. Liner: Reusable vinyl liner.
 - 6. Lockset: Tumbler type for waste receptacle.
 - 7. Location
 - a. Provide one (1) per restroom.
- C. Automatic Soap Dispenser:
 - 1. Basis of Design: Bradley, Model 6A01-11
 - 2. Automatic dispenser with infrared sensor to detect presence of hands; battery powered; designed for dispensing soap in lather form.
 - 3. Mounting: Vertically oriented, surface mounted.
 - 4. Capacity: 27 oz.
 - 5. Materials: Stainless steel, No. 4 finish (satin).
 - 6. Lockset: Tumbler type.
 - 7. Refill Indicator: LED indicator.
 - 8. Low-Battery Indicator: LED indicator.
 - 9. Location
 - a. Provide one (1) per restroom.
- D. Grab Bar:
 - 1. Basis of Design: Bradley, 812 Series
 - 2. Mounting: Flanges with concealed fasteners.
 - 3. Material: Stainless steel, 0.05 inch thick.
 - a. Finish: Smooth, No. 4 finish (satin).
 - 4. Outside Diameter: 1-1/2 inches.
 - 5. Configuration and Length: As indicated on the Drawings.
 - 6. Locations
 - a. Provide one (1) set per restroom.

- E. Sanitary-Napkin Disposal Unit:
 - 1. Basis of Design: Bradley, Model 4A10-11
 - 2. Mounting: Partition mounted, dual access.
 - 3. Door or Cover: Self-closing, disposal-opening cover and hinged face panel with tumbler lockset.
 - 4. Receptacle: Removable.
 - 5. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 6. Locations:
 - a. Provide one (1) per restroom.
- F. Mirror Unit:
 - 1. Basis of Design: Bradley, Model 780 Series
 - 2. Frame: Stainless-steel channel.
 - a. Corners: Mitered and mechanically interlocked.
 - 3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
 - 4. Size: 18 inches wide by 30 inches high.
 - 5. Locations
 - a. Provide one (1) per restroom.
- G. Paper Towel Dispenser:
 - 1. Basis of Design: Bradley, Model 250-15
 - 2. Mounting: Surface Mounted.
 - 3. Material and Finish: Stainless steel, No. 4 finish (satin).
 - 4. Lockset: Tumbler Lock
 - 5. Locations
 - a. Provide one (1) per restroom.

2.4 FABRICATION

- A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446. Provide blocking as required.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

END OF SECTION 10 2800

SECTION 10 5723 – CLOSET AND UTILITY SHELVING

PART 1 GENERAL

1.1 SUMMARY

- A. All products and materials must comply with BABA. See Project Requirements in Section 00 7400.

1.2 SECTION INCLUDES

- A. Vinyl-coated ventilated shelving.
- B. Adjustable shelf systems.
- C. Storage accessories.

1.3 RELATED SECTIONS

- A. Section 033000 - Cast-In-Place Concrete.
- B. Section 061000 - Rough Carpentry.
- C. Section 092900 - Gypsum Board.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's catalog data, detail sheets, and specifications.
- C. Shop Drawings: Prepared specifically for this project; show dimensions of shelving and interface with other products.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years experience.
- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.

- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. At project closeout, provide to Owner or Owner's Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. ClosetMaid Corp., which is located at: 650 S.W. 27th Ave.; Ocala, FL 34471; Tel: 352-401-6338; Email:[request info \(lou.cuomo@emerson.com\)](mailto:request info (lou.cuomo@emerson.com)); Web:www.closetmaidpro.com
 - 2. Rubbermaid.
 - 3. Organized Living: Shelftech.
- B. Requests for substitutions will be considered in accordance with provisions of Section 01600.
- C. Provide all storage shelving from a single manufacturer.

2.2 MATERIALS

- A. Steel Wire: Basic cold drawn, Grade C-1006; average tensile strength over 100,000 psi (690 MPa); coated.
- B. Wire Coating: Proprietary heavy-duty polyvinyl chloride (PVC) formula resin, plasticizers, stabilizers, pigments, and other additives.
 - 1. Thickness: 7 to 17 mil.

2. Classification: No ingredients listed as hazardous per OSHA 29CFR1910.0017.

2.3 MANUFACTURED UNITS

- A. Size:
 1. Part # 773300 Black MaxLoad 12 ft. x 16 in. Wire Shelf.
 2. Part # 73300 White MaxLoad 12 ft. x 16 in. Wire Shelf
- B. Cross Deck Spacing: 1 inch (25 mm) 12-3/4 GA wire.
- C. Color:
 1. White PVC Tuff Coated Wire.
- D. Performance: System is capable of a maximum static load of 100 lbs. per linear ft. using heavy duty
- E. Mounting System: Provide the fixed mounting system mounting hardware as required using hardware components recommended by the manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
 1. Prepared spaces are sized and located in accordance with shop drawings.
 2. Framing, reinforcement, and anchoring devices are correct type and are located in accordance with shop drawings.
- B. Installer's Examination:
 1. Examine conditions under which installation is to be performed; submit written notification if such conditions are unacceptable.
 2. Installation activities started before unacceptable conditions have been corrected is prohibited.
 3. Installation indicates installer's acceptance of conditions.

3.2 INSTALLATION

- A. Install shelving plumb and level at heights indicated in accordance with shop drawings and manufacturer's printed installation instructions.
- B. Place wall clips No. 910, 911 every 10 to 12 inches on level line.
- C. Install end brackets No. 932, 933, 914, 940, and 941 on same level line as wall clips, centered on the front rods of shelves. Support shelves 36 inches maximum with end brackets, support brackets, or poles.
- D. Drill holes where required using sharp bit; do not punch.

- E. Drywall: Drill 1/4 inch hole, insert No. 910 or 911 wall clip. Use No. 658 # 8 x 1 inch pin to expand anchor if unloaded.
- F. Wood: Drill 1/4 inch hole into wood, secure wall clip with No. 8 x 1 inch screw or secure pole clip No. 978 directly to wood with No. 8 x 1-1/4 inch screws.
- G. Concrete: Drill 1/4 inch hole with masonry bit, insert wall clip No. 911 or 978 with 250 anchor, secure with No. 8 x 1 inch screws.
- H. Standards and Brackets:
 - 1. Install standards vertically every 16 inches to a maximum of 24 inches on studs or hang from horizontal hang track.
 - 2. Hang track shall be secured to studs. Once standards are hung from track, secure with anchors to keep from moving.
 - 3. Attach shelf brackets with SuperSlide, Heavy Duty, Linen, Shelf and Rod and Close Mesh.
 - 4. For all 12-inch, 16-inch, and 20-inch decking.
- I. Attach shelf brackets with SuperSlide, Heavy Duty, Linen, Shelf and Rod and Close Mesh for 12-inch shelving and for 16 or 20 inches) decking.
- J. Use lightning pole clip No. 978 for linen shelving, clip No. 977 for shelf and rod shelving.
- K. Shelf Supports:
 - 1. Place shelf support brackets No. 1164, 1166 or 1180 vertically to the shelf, attach with No. 954 or 955 wall anchors.
 - 2. Install down clips No 978, 981, or multi-purpose No. 612 with No. 250 anchor or secure to stud with 1-1/4 inch screws (preferred) on the back rod behind every support bracket.
 - 3. Spacing, 24 inches to 36 inches o.c. maximum.
- L. Attach No. 977 or 978 pole clips at same elevations as wall clips for a given shelf; use with No. 117, 118, 2117 or 2118 poles.
- M. Use No. 120 corner support brackets on all corner "butt" joints.
- N. For wall to wall installation, use lightning end bracket No. 932, 933, 940 or 941; drill 1/4 inch holes, and secure with No. 658 # 8 x 1 inch pins.
- O. SuperSlide Component Installation:
 - 1. Place hang bar supports No. 925 or 5672 every 24 to 36 inches; place express support brackets (No. 1164) adjacent to supports.
 - 2. Use SuperSlide end bracket No. 979 or 980 at side wall where pole is used.
 - 3. Use 12 inch (305 mm) support brackets (No. 1164) for 12 inches or 16 inches deep shelves.
 - 4. Place pole caps No. 2083 on cut ends of poles.
 - 5. Use pole connector No. 2085 to connect 3/4 inch poles; rest joints in brackets No. 925.

6. For side wall installation, use end bracket No. 979 or 980.
 7. For open end installations, use down clips No. 978, 981, or 612 (612 stud installation recommended).
- P. TotalSlide Component Installation:
1. Use end bracket No. 947 or 948 at the side wall.
 2. Use 12 inch express support brackets (No. 1164) for 12 inches deep shelves.
 3. Place shelf stop (No. 969) on open ends.
 4. For support pole installation, use No. 952 or 951 pole clips; use with No. 117, 118, 2117 or 2118 poles.
 5. For open end installations, use down clips No. 978, 981, or 612 (612 stud installation preferred).

3.3 CLEANING

- A. As work proceeds, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris related to this work.
- B. Upon completion of installation, clean all surfaces that have become soiled during installation.

END OF SECTION 10 5723 – CLOSET AND UTILITY SHELVING

SECTION 22 0500 - BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A This Section includes the following:
 - 1. General Plumbing Requirements specifically applicable to all Division 22 Sections.
 - 2. Some piping material and installation instructions common to most piping systems.
 - 3. Equipment installation requirements common to equipment sections.

1.3 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

1.4 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 Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
 - 1. Any item listed as furnished shall also be installed, unless otherwise noted.
 - 2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.5 REFERENCES AND STANDARDS:

- A The editions recognized by latest adopted versions of the following are hereby included in and made a part of Division 22:
 - 1. National Fire Protection Association
 - 2. Underwriters' Laboratories, Inc.
 - 3. National Electrical Manufacturer's Association
 - 4. National Electric Code
 - 5. American Society of Mechanical Engineers
 - 6. American Welding Society
 - 7. American National Standards Institute

8. American Gas Association
9. Hydronics Institute
10. Occupational Safety and Health Act
11. American Water Works Association
12. Cast Iron Soil Pipe Institute

1.6 QUALITY ASSURANCE AND COORDINATION

- A Contractor's Responsibility Prior to Submitting Pricing Data:
1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.
 2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.
- B Electrical Characteristics for 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 at no cost to the owner. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.
- C Compliance with Codes, Laws, Ordinances:
1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
 2. Conform to all State Codes.
 3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
 4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
 5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
 6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.
 7. All work to meet in-force local plumbing code. In the case of discrepancies between the project contract documents and the in-force local code, the most stringent shall govern.

- D Engineer or plumbing staff shall walk through and inspect all plumbing work prior to walls or ceilings being closed up, deficiencies shall be noted and given to the project manager in writing. Notify Engineer when project is ready for above ceiling inspection.
- E All materials and installations shall meet applicable FM Global requirements.
- F Permits, Fees, Taxes, Inspections:
 - 1. Procure all applicable permits and licenses.
 - 2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
 - 3. Pay all charges for permits or licenses.
 - 4. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
 - 5. Pay all charges arising out of required inspections by an authorized body.
 - 6. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
 - 7. It is the sole responsibility of the contractor to obtain and procure permits. The Engineer is not liable for any costs associated with delays associated with permitting or obtaining permits under this division. The engineer at times may submit the plumbing permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting process is being completed.
 - 8. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.
- G Utility Company Requirements:
 - 1. Secure from the appropriate private or public utility company all applicable requirements.
 - 2. Comply with all utility company requirements.
 - 3. Make application for and pay for service connections, such as gas.
 - 4. Make application for and pay for all meters and metering systems required by the utility company.
- H Examination of Drawings:
 - 1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
 - 2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
 - 3. Scaling of the drawings is not sufficient or accurate for determining these locations.
 - 4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
 - 5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
 - 6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
 - 7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.

- I Field Measurements:
 - 1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.
- J Electronic Media/Files:
 - 1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms
 - 2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
 - 3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by Engineer.
 - 4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
 - 5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
 - 6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.
 - 7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
 - 8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor's use of these documents.

1.7 SUBMITTALS

- A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.
- B General Submittal Procedures: In addition to the provisions of Division 1, the following are required:
 - 1. Transmittal: Each transmittal shall include the following:
 - a. Date
 - b. Project title and number
 - c. Contractor's name and address
 - d. Division of work (e.g., plumbing, heating, ventilating, etc.)
 - e. Description of items submitted and relevant specification number
 - f. Notations of deviations from the contract documents
 - g. Other pertinent data
 - 2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
 - a. Date
 - b. Project title and number
 - c. Architect/Engineer
 - d. Contractor and subcontractors' names and addresses
 - e. Supplier and manufacturer's names and addresses
 - f. Division of work (e.g., plumbing, heating, ventilating, etc.)

- g. Description of item submitted (using project nomenclature) and relevant specification number
 - h. Notations of deviations from the contract documents
 - i. Other pertinent data
 - j. Provide space for Contractor's review stamps
- 3. Composition:
 - a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
 - b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).
 - c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
- 4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
- 5. Contractor's Approval Stamp:
 - a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
 - b. Unstamped submittals will be rejected.
 - c. The Contractor's review shall include, but not be limited to, verification of the following:
 - 1) Only approved manufacturers are used.
 - 2) Addenda items have been incorporated.
 - 3) Catalog numbers and options match those specified.
 - 4) Performance data matches that specified.
 - 5) Electrical characteristics and loads match those specified.
 - 6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
 - 7) Dimensions and service clearances are suitable for the intended location.
 - 8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
 - 9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
 - d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.

- e. The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.
- 6. Submittal Identification and Markings:
 - a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
 - b. The Contractor shall clearly indicate the size, finish, material, etc.
 - c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
 - d. All marks and identifications on the submittals shall be unambiguous.
- 7. Schedule submittals to expedite the project. Coordinate submission of related items.
- 8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
- 9. Reproduction of contract documents alone is not acceptable for submittals.
- 10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
- 11. Submittals not required by the contract documents may be returned without review.
- 12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
- 13. Submittals shall be reviewed and approved by the Architect/Engineer before
 - a. releasing any equipment for manufacture or shipment.
- 14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.
- C Electronic Submittal Procedures:
 - 1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
 - 2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
 - 3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
 - 4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. Submittal file name: 2026-088SD 23 XX XX description.pdf
 - 5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.8 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.
- C Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions. Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.
- D Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.
- E Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.9 WARRANTY

- A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.
- B The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

1.10 COORDINATION

- A Contractor shall coordinate the work of the different trades so that interference between piping, equipment, structural, and electrical work will be avoided. All necessary offsets in piping and ductwork, and all fittings, and other components, required to install the work properly shall be furnished complete in place at no additional cost.
- B Unless otherwise stipulated under a particular heading, the following rules relative to responsibilities of the Contractors and Subcontractors will apply:
 - 1. Make-up water piping connections shall be provided by the Plumbing Contractor to within five (5) feet of the required point of connection to the equipment and there terminated with a shut-off valve. Each trade shall make the final connection to the equipment it installs.
 - 2. Ceiling access panels will be installed by the General Contractor at locations determined by the Plumbing Contractor.
 - 3. The Plumbing Contractor or subcontractor shall install all roughing-in pertaining to his trade for each item of equipment furnished under another Section of the Specifications or by the Owner.

4. The Plumbing Contractor shall make final connections of equipment to rough-ins.

1.11 MATERIAL SUBSTITUTION

- A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.
- B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.
- C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.
- D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.
- E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.
- F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

1.12 TESTING AND REPAIR

- A All piping and systems shall be thoroughly cleaned and flushed prior to final testing.
- B Pressure testing shall be completed for the following piping systems:
 - 1. Domestic water, sanitary and vent, storm and gas piping systems, and other systems as noted on the plans.
- C All testing must be witnessed and accurately recorded noting methods of testing, times, dates, and results.
- D Any damage as a result of tests shall be repaired or damaged materials replaced at no cost to the Owner.

1.13 FINAL COMPLETION

- A All work shall be cleaned prior to issuance of Substantial Completion.
- B Retouch or repaint factory painted prime and finish coats where scratched or damaged.
- C Deliver any equipment as required by this Specification to Owner and obtained signed receipts of delivery.
- D Clean equipment, restore damaged materials, and leave the Work in acceptable condition.
- E Remove all site tools, equipment, surplus materials and rubbish continuously at no additional cost to the Owner.
- F Contractor shall submit written certificates warranting each item of equipment.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS:

- A All equipment and materials shall be furnished in strict accordance with the equipment named and according to Specification requirements. Each bid shall be based upon one of the materials or manufacturers specified.

- B Equipment and materials specified shall be considered to have prior approval, but submittal for approval is required. Furnish construction drawings to other Contractors when required to coordinate construction.
- C Where multiple manufacturers are named the drawings and specifications are based on the requirements and layouts for the equipment of the first named manufacturer. Any change required by the use of other named manufacturers such as revisions to foundations, bases, piping, controls, wiring, openings, and appurtenances shall be made by the Contractor at no additional cost to the Owner.

2.2 PIPE, TUBE, AND FITTINGS - GENERAL

- 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.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A All materials and/or equipment shall be installed per manufacturer's recommendations and instructions.
- B When temporary water is required, an approved backflow device shall be used and testing reports from device shall be sent to plumbing foreman for verification.
- C Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- D 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.
- E Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- F 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.
- G Piping shall not project beyond walls or steel lines nor shall it hang below slabs more than is absolutely necessary. Particular attention shall be paid to the required clearances.
- H Offset piping where required to avoid interference with other work, to provide greater headroom or clearance, or to conceal pipe more readily. Offsets shall be properly drained or trapped where necessary.
- I Provide swing joints and expansion bends wherever required to allow the piping to expand without undue stress to connections or equipment.
- J Exposed piping around fixtures or in other conspicuous places shall not show tool marks at fittings.
- K Isolate pipe from the building construction to prevent transmission of vibration to the structure and to eliminate noise.

- L Install piping such that any equipment connected to piping may be removed by disconnecting two (2) flanges or unions and removing only one or two pipe sections. All equipment shall have bolted or screwed flanges or unions at pipe connections.
- M Install fittings for changes in direction and branch connections. T-drill system for mechanically formed tee connections and couplings, and Victaulic hole cut piping system are not allowed.
- N Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.
- O Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- P Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- Q Install piping to permit valve servicing.
- R Install piping at indicated slopes.
- S Install piping free of sags and bends.
- T Install piping to allow application of insulation.
- U Eccentric reducing couplings shall be provided in all cases where air or water pockets would otherwise occur due to a reduction in pipe size.
- V Cap and plug all openings in pipes during construction with suitable metal plugs or cap to keep out dirt and rubbish until equipment is connected.
- W Install drains, consisting of a tee fitting, NPS 3/4 full port-ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- X Select system components with pressure rating equal to or greater than system operating pressure.
- Y 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.
- Z Verify final equipment locations for roughing-in.
- AA AA. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.
- BB BB. Provide proper access to materials and equipment that require inspection, repair, service, or maintenance.
- CC CC. Minimum service access size for materials equipment/components above ceilings shall be 24" square.
- DD All piping sized utilizing copper pipe as the base material. Installing contractor shall upsize piping according to ensure equal pressure drop. Changes to plumbing system to increase flow and reduce pressure drop to meet design shall be at the sole cost of the installing contractor.

3.2 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 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.

3.3 PIPING CONNECTIONS

- A Pipe sizes indicated shall be carried full size to equipment served. Any change of size to match equipment connection shall be made within one foot of the equipment. At temperature control valves with sizes smaller than connected lines, reduction shall be made immediately adjacent to valves.

3.4 EXCAVATION, FILL, BACKFILL, COMPACTION

- A General:
 - 1. Prior to the commencement of any excavation or digging, the Contractor shall verify all underground utilities with the regional utility locator. Provide prior notice to the locator before excavations. Contact information for most regional utility locaters can be found by calling 811.
 - 2. The Contractor shall do all excavating, filling, backfilling and compacting associated with his work.
- B Excavation:
 - 1. Make all excavations to accurate, solid, undisturbed earth, and to proper dimensions.
 - 2. Where excavations are made in error below foundations, concrete of same strength as specified for the foundations or thoroughly compacted sand-gravel fill, as determined by the Architect/Engineer, shall be placed in such excess excavations. Place thoroughly compacted, clean, stable fill in excess excavations under slabs on grade, at the Contractor's expense.
 - 3. Trim bottom and sides of excavations to grades required for foundations.
 - 4. Protect excavations against frost and freezing.
 - 5. Take care in excavating not to damage surrounding structures, equipment or buried pipe. Do not undermine footing or foundation.
 - 6. Perform all trenching in a manner to prevent cave-ins and risk to workmen.
 - 7. Where original surface is pavement or concrete, the surface shall be saw cut to provide clean edges and assist in the surface restoration.
 - 8. Where satisfactory bearing soil for foundations is not found at the indicated levels, the Architect/Engineer or their representative shall be notified immediately, and no further work shall be done until further instructions are given by the Architect/Engineer or their representative.
- C Dewatering:
 - 1. Contractor shall furnish, install, operate and remove all dewatering pumps and pipes needed to keep trenches and pits free of water to complete their work.
- D Underground Obstructions:

1. Known underground piping, foundations, and other obstructions in the vicinity of construction are shown on the drawings. Use great care in making installations near underground obstruction.
 2. If objects not shown on the drawings are encountered, remove, relocate, or perform extra work as directed by the Architect/Engineer.
- E Fill and Backfilling:
1. No rubbish or waste material is permitted for fill or backfill.
 2. Provide all necessary sand for backfilling.
 3. Dispose of the excess excavated earth as directed.
 4. Backfill materials shall be suitable for required compaction, clean and free of perishable materials and stones greater than 4 inches in diameter. Water shall not be permitted to rise in unbackfilled trenches. No material shall be used for backfilling that contains frozen earth, debris or earth with a high void content.
 5. Backfill all trenches and excavations immediately after installing pipes, or removal of forms, unless other protection is provided.
 6. Around piers and isolated foundations and structures, backfill and fill shall be placed and consolidated simultaneously on all sides to prevent wedge action and displacement. Fill and backfill materials shall be spread in 6 inch uniform horizontal layers with each layer compacted separately to required density.
 7. Lay all piping on a compacted bed of sand at least 3 inches deep. Backfill around pipes with sand, 6 inch layers, and compact each layer.
 8. Use sand for backfill up to grade for all piping under slabs or paved areas. All other piping shall have sand backfill to 6 inches above the top of the pipe.
 9. Place all backfill above the sand in uniform layers not exceeding 6 inches deep. Each layer shall be placed, then carefully and uniformly tamped, to eliminate lateral or vertical displacement.
 10. Where the fill and backfill will ultimately be under a building, floor or paving, each layer of fill shall be compacted to 95% of the maximum density determined by AASHTO Designation T-99 or ASTM Designation D-698. Moisture content of soil at time of compaction shall not exceed plus or minus 2% of optimum moisture content determined by AASHTO T-99 or ASTM D-698 test.
- F Surface Restoration:
1. Where trenches are cut through graded, planted or landscaped areas, the areas shall be restored to the original condition. Replace all planting removed or damaged to its original condition. A minimum of 6 inches of topsoil shall be applied where disturbed areas are to be seeded or sodded.
 2. Concrete or asphalt type pavement, seal coat, rock, gravel or earth surfaces removed or damaged shall be replaced with comparable materials and restored to original condition.

3.5 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.

3.6 PROJECT CLOSEOUT

- A The following paragraphs supplement the requirements of Division 1.
- B Final Jobsite Observation:
 - 1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
 - 2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
 - 3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
 - 4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer's additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.
- C Before final payment is authorized, this Contractor must submit the following:
 - 1. Operation and maintenance manuals with copies of approved shop drawings.
 - 2. Record documents including marked-up or reproducible drawings and specifications.
 - 3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
 - 4. Inspection by State Boiler Inspector.
 - 5. Start-up reports on all equipment requiring a factory installation inspection or start-up.
 - 6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.7 OPERATION AND MAINTENANCE MANUALS

- A General:
 - 1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
 - 2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.
- B Electronic Submittal Procedures:
 - 1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
 - 2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
 - 3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not

set any permission restrictions on files; protected, locked, or secured documents will be rejected.

4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. O&M file name: O&M.div22.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:

1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.
8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.8 RECORD DOCUMENTS

A The following paragraph supplements Division 1 requirements:

1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.

- B Mark drawings to indicate revisions to piping and plumbing systems size and location, both exterior and interior.
- C Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.
- D Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.
- E Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.
- F Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

END OF SECTION 22 0500

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SECTION 22 0519 - METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Pressure gauges.
- B Thermometers.
- C Pressure-temperature test plugs.

1.2 REFERENCE STANDARDS

- A ASME B40.100 - Pressure Gauges and Gauge Attachments; 2022.
- B ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014 (Reapproved 2020).
- C ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014 (Reapproved 2021).
- D UL 393 - Indicating Pressure Gauges for Fire-Protection Service; Current Edition, Including All Revisions.
- E UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide red-marked product data sheets for each furnished item with associated components and accessories.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

2.2 PRESSURE GAUGES

- A Manufacturers:
 - 1. Ashcroft, Inc: www.ashcroft.com/#sle.
 - 2. Dwyer Instruments, Inc: www.dwyer-inst.com/#sle.
 - 3. Winters Instruments: www.winters.com/#sle.
- B Pressure Gauges: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Stainless Steel casing with brass or stainless burbon tube sensor.
 - 2. Size: 3-1/2 inch diameter.
 - 3. Mid-Scale Accuracy: One percent.
 - 4. Scale: Psi.
 - 5. Liquid Filled: Glycerine

2.3 THERMOMETERS

- A General:
 - 1. Product Compliance: ASTM E1.
 - 2. Lens: Clear glass, except where stated.
 - 3. Accuracy: One percent, when tested in accordance with ASTM E77, except where stated.
 - 4. Scale: Black markings depicting single scale in degrees F where expected process value falls half-span of standard temperature range.

- B Thermometers - Adjustable Angle: 7 inch v-shape aluminum case with clear glass window scale, 6 inch NPT stem, red or blue organic non-toxic liquid filled glass tube, and adjustable joint with positive locking device allowing 360 degrees in horizontal plane or 180 degrees in vertical plane adjustments.
- C Thermometers - Dial Type:
 - 1. Fixed: 5 inch diameter dial with black pointer, stainless steel case, silicone damping bimetal element, hermetically sealed lens, recalibrating screw, and 2-1/2 inch NPT stem.

2.4 PRESSURE-TEMPERATURE TEST PLUGS:

- A Size: 500 psi capacity; 1/2 inch MPT brass fitting with gasket, cap, and retaining strap for 1/8 inch pressure gauge or temperature probe.
- B Wetted Materials per Temperature Range:
 - 1. Up to 200 degrees F: Brass probe with neoprene core.

PART 3 EXECUTION

3.1 EXAMINATION

- A Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports, and test plugs.

3.2 INSTALLATION

- A Install pressure gauges as follows:
 - 1. At Pumps: Place single gauge before strainer, suction side and discharge side.
 - 2. Include gauge cock to isolate each gauge and extend nipples for insulation clearance.
- B Install thermometers as follows:
 - 1. Hot Water Heaters: Place upstream and downstream of heater. Add one on the inlet end when using steam as the water heating medium.

END OF SECTION 22 0519

SECTION 22 0553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Tags.
- B Stencils.
- C Pipe markers.

1.2 RELATED REQUIREMENTS

- A Section 09 9123 - Interior Painting: Identification painting.

1.3 REFERENCE STANDARDS

- A ASME A13.1 - Scheme for the Identification of Piping Systems; 2020.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.

PART 2 PRODUCTS

2.1 PLUMBING COMPONENT IDENTIFICATION GUIDELINE

- A Stencil:
 - 1. Piping: 3/4 inch diameter and higher.
- B Pipe Markers: 3/4 inch diameter and higher.

2.2 TAGS

- A Flexible: Vinyl with engraved black letters on light contrasting background color with up to three lines of text. Minimum tag size 1-1/2 inch in diameter.

2.3 STENCILS

- A Pipe: Stencil size required per external insulated or uninsulated pipe diameter.
 - 1. 3/4 to 1-1/4 inch Range: 1/2 inch text over 8 inch long background.
 - 2. 1-1/2 to 2 inch Range: 3/4 inch text over 8 inch long background.
 - 3. 2-1/2 to 6 inch Range: 1-1/4 inch text over 12 inch long background.
- B Stencil Paint: As specified in Section 09 9123, semi-gloss enamel, colors complying with ASME A13.1.
- C Fluid Service Identification Scheme, ASME A13.1:
 - 1. Water; Potable, Cooling, Boiler Feed and Other: White text on green background.

2.4 PIPE MARKERS

- A Comply with ASME A13.1.
- B Flexible Marker: Factory fabricated, semi-rigid, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid conveyed.
- C Flexible Tape Marker: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.
- D Identification Scheme, ASME A13.1:
 - 1. Primary: External Pipe Diameter, Uninsulated or Insulated.
 - a. 3/4 to 1-1/4 inches: Use 8 inch field-length with 1/2 inch text height.
 - b. 1-1/2 to 2 inches: Use 8 inch field-length with 3/4 inch text height.
 - c. 2-1/2 to 6 inches: Use 12 inch field-length with 1-1/4 inch text height.
 - d. 8 to 10 inches: Use 24 inch field-length with 2-1/2 inch text height.
 - 2. Secondary: Color scheme per fluid service.

- a. Combustible Fluids: White text on brown background.
 - b. Compressed Air: White text on blue background.
 - c. Fire Quenching Fluids: White text on red background.
 - d. Water; Potable, Cooling, Boiler Feed, and Other: White text on green background.
3. Tertiary: Other Details.
 - a. Directional flow arrow.

PART 3 EXECUTION

3.1 PREPARATION

- A Degrease and clean surfaces to receive identification products.

3.2 INSTALLATION

- A Apply stencil painted identification in compliance with Section 09 9123 requirements. Identify unit with assigned id-number and area being served using pipe marking rules.
- B Apply ASME A13.1 Pipe Marking Rules:
 1. Place pipe marker adjacent to changes in direction.
 2. Place pipe marker adjacent each valve port and flange end.
 3. Place pipe marker at both sides of floor and wall penetrations.
 4. Place pipe marker every 25 to 50 feet interval of straight run.

END OF SECTION 22 0553

SECTION 22 0719 - PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Glass fiber insulation.
- B Jacketing and accessories.

1.2 RELATED REQUIREMENTS

- A Section 07 8400 - Firestopping.

1.3 REFERENCE STANDARDS

- A ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- B ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2019).
- C ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2024).
- D ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2022a.
- E ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- F ASTM C1423 - Standard Guide for Selecting Jacketing Materials for Thermal Insulation; 2021.
- G ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- H ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- I SAE AMS3779 - Tape, Adhesive, Pressure-Sensitive Thermal Radiation Resistant, Aluminum Coated Glass Cloth; 2016b.
- J UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

- A Maintain ambient conditions required by manufacturers of each product.
- B Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.
- B Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 GLASS FIBER INSULATION

- A Insulation: ASTM C547 and ASTM C795; rigid, preformed pipe insulation, noncombustible.
 - 1. K Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm.
- C Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- D Vapor Barrier Lap Adhesive: Compatible with insulation.
- E Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- F Insulating Cement: ASTM C449.
- G PVC fitting covers

2.3 JACKETING AND ACCESSORIES

- A PVC Plastic Jacket:
 - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
 - 2. Covering Adhesive Mastic: Compatible with insulation.
- B Reinforced Tape:
 - 1. FSK tape suitable for sealing seams between insulation, insulated pipe bends, and fittings resulting in a tight, smooth surface without wrinkles.
 - 2. Comply with UL 723 or ASTM E84.
 - 3. Moisture Vapor Permeability: 0.00 perm inch, when tested in accordance with ASTM E96/E96M.
 - 4. Finish: Match insulation.

PART 3 EXECUTION

3.1 EXAMINATION

- A Verify that piping has been tested before applying insulation materials.

- B Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C Exposed Piping: Locate insulation and cover seams in least visible locations.
- D Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E Glass fiber insulated pipes conveying fluids below ambient temperature:
 - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H Glass fiber insulated pipes conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I Inserts and Shields:
 - 1. Application: Piping 1-1/2 inches diameter or larger.
 - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 - 3. Insert Location: Between support shield and piping and under the finish jacket.
 - 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, see Section 07 8400.

3.3 SCHEDULES

- A Insulation of Piping shall be in accordance with table C403.13.3 of the IECC 2024 addition
- B Domestic Hot Water and Recirculated Domestic Hot Water - Glass Fiber
 - 1. Pipe Size up to 1 1/2" = 1" Insulation
 - 2. Pipe Size Over 1 1/2" to 8" = 1.5" Insulation
- C Domestic Cold Water - Glass Fiber
 - 1. Pipe Size up to 1 1/2" = 1/2" Insulation
 - 2. Pipe Size Over 1 1/2" to 8" = 1.0" Insulation

END OF SECTION 22 0719

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SECTION 22 1005 - PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Sanitary waste piping, buried within 5 feet of building.
- B Sanitary waste piping, above grade.
- C Domestic water piping, buried within 5 feet of building.
- D Domestic water piping, above grade.
- E Pipe flanges, unions, and couplings.
- F Pipe hangers and supports.
- G Ball valves.

1.2 RELATED REQUIREMENTS

- A Section 22 0529 - Hangers and Supports for Plumbing Piping and Equipment.
- B Section 22 0553 - Identification for Plumbing Piping and Equipment.
- C Section 22 0719 - Plumbing Piping Insulation.

1.3 REFERENCE STANDARDS

- A ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- B ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- C ASME B16.51 - Copper and Copper Alloy Press-Connect Pressure Fittings; 2021.
- D ASME B31.9 - Building Services Piping; 2025.
- E ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2025, with Errata.
- F ASTM B32 - Standard Specification for Solder Metal; 2020.
- G ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- H ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- I ASTM B813 - Standard Specification for Water Flushable Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2024.
- J ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2023.
- K ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020 (Reapproved 2024).
- L ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2025.
- M ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020 (Reapproved 2024).
- N ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2024, with Editorial Revision (2025).
- O ASTM F876 - Standard Specification for Crosslinked Polyethylene (PEX) Tubing; 2026.
- P ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems; 2025.

- Q AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
- R AWWA C651 - Disinfecting Water Mains; 2023.
- S CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2021.
- T CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2020.
- U IAPMO (UPC) - Uniform Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V IAPMO/ANSI/CAN Z1117 - Standard for Press Connections; 2022.
- W ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- X ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
- Y ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).
- Z ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
- AA ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
- BB MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2025.
- CC MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; 2010, with Errata .
- DD NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum
- EE NSF 372 - Drinking Water System Components - Lead Content; 2024.
- FF PPI TR-4 - PPI HSB Listing of Hydrostatic Design Basis (HDB), Hydrostatic Design Stress (HDS), Strength Design Basis (SDB), Pressure Design Basis (PDB) and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe; 2024.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C Welders' Certificates: Submit certification of welders' compliance with ASME BPVC-IX.
- D Shop Drawings: For non-penetrating rooftop supports, submit detailed layout developed for this project, with design calculations for loadings and spacings.

1.5 QUALITY ASSURANCE

- A Perform work in accordance with applicable codes.
- B Valves: Manufacturer's name and pressure rating marked on valve body.
- C Welding Materials and Procedures: Comply with ASME BPVC-IX and applicable state labor regulations.

- D Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.
- E Mechanical Coupling for grooved installations shall have a labor and material warranty for 10 years. Including insurance for damaged caused by failure of 1 Million.
- F All plumbing piping has been sized by engineer utilizing copper domestic water piping. All other materials being utilized its the sole responsibility of the installing contractor to verify pipe pressure loss and upsize piping and fittings accordingly to match design pressure loss of the system.
- G Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B Provide temporary protective coating on cast iron and steel valves.
- C Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.7 FIELD CONDITIONS

- A Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.
- B Potable Water Supply Systems: Provide piping, pipe fittings, solder, and flux (if used), complying with NSF 61 and NSF 372; label pipe and fittings.

2.2 SANITARY WASTE PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A PVC Pipe: ASTM D2665.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY WASTE PIPING, ABOVE GRADE

- A Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. Fittings: Cast iron.
 - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B PVC Pipe: ASTM D2665.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
 - 1. PPI TR-4 Pressure Design Basis:
 - a. 160 psig at maximum 73 degrees F.

2. PEX Type, Fittings, and Joints:
 - a. PEX-a, Engle method or PEX-b, Silane method; no fittings; use continuous runs of piping.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A All piping sized utilizing copper pipe as the base material. Installing contractor shall modify piping sizes according to ensure equal pressure drop if other than copper piping is utilized. Changes after the fact to plumbing system to increase flow and reduce pressure drop to meet design shall be at the sole cost of the installing contractor.
- B Copper Pipe: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
 2. Joints: ASTM B32 solder.
 3. Mechanical Press Sealed Fittings: ASME B16.51 or IAPMO/ANSI/CAN Z1117, ICC (IPC), and IAPMO (UPC) approved, NSF 61 and NSF 372 certified, with EPDM seals.
- C Cross-Linked Polyethylene (PEX) Pipe: ASTM F876 or ASTM F877.
 1. PPI TR-4 Pressure Design Basis:
 - a. 100 psig at maximum 180 degrees F.
 2. Pex Pipe Sizes 1" and above shall be straight lengths with Pex A fittings
 3. Pex Pipe Sizes 3/4" and below shall be flexible lengths with Pex A fittings

2.6 PIPE FLANGES, UNIONS, AND COUPLINGS

- A Unions for Pipe Sizes 3 inch and Under:
 1. Ferrous Pipe: Class 150 malleable iron threaded unions.
 2. Copper Tube and Pipe: Class 150 bronze unions with soldered joints.
- B Flanges for Pipe Sizes Over 1 inch:
 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.7 PIPE HANGERS AND SUPPORTS

- A Provide hangers and supports that comply with MSS SP-58.
 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 3. Trapeze Hangers: Welded steel channel frames attached to structure.
 4. Vertical Pipe Support: Steel riser clamp.
- B Plumbing Piping - Drain, Waste, and Vent:
 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron, adjustable swivel, split ring.
 2. Hangers for Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 3. Wall Support for Pipe Sizes to 3 inch: Cast iron hook.
 4. Wall Support for Pipe Sizes 4 inch and Over: Welded steel bracket and wrought steel clamp.
- C Plumbing Piping - Water:

1. Hangers for Cold Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
 2. Hangers for Hot Pipe Sizes 2 to 4 inch: Carbon steel, adjustable, clevis.
 3. Hangers for Hot Pipe Sizes 6 inch and Larger: Adjustable steel yoke, cast iron pipe roll, double hanger.
 4. Wall Support for Pipe Sizes 4 inch and Larger: Welded steel bracket and wrought steel clamp.
- D Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Comply with ICC-ES AC193.
 2. Masonry Wedge Expansion Anchors: Comply with ICC-ES AC01.
 3. Concrete Screw Type Anchors: Comply with ICC-ES AC193.
 4. Masonry Screw Type Anchors: Comply with ICC-ES AC106.
 5. Concrete Adhesive Type Anchors: Comply with ICC-ES AC308.

2.8 BALL VALVES

- A Construction, 4 inch and Smaller: MSS SP-110, Class 150, 600 psi CWP, bronze or ductile iron body, 304 stainless steel or chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, threaded or grooved ends with union.

PART 3 EXECUTION

3.1 EXAMINATION

- A Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

- A Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B Remove scale and dirt, on inside and outside, before assembly.
- C Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- C Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- D PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- E Sleeve pipes passing through partitions, walls, and floors.
- F Inserts:
1. Provide inserts for placement in concrete formwork.
- G Pipe Hangers and Supports:
1. Install in accordance with ASME B31.9.
 2. Support horizontal piping as indicated.
 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 4. Place hangers within 12 inches of each horizontal elbow.
 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
 8. Provide copper plated hangers and supports for copper piping.
 9. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- H When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.

3.4 APPLICATION

- A Use grooved mechanical couplings and fasteners only in accessible locations.
- B Install unions downstream of valves and at equipment or apparatus connections.
- C Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- D Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- E Install globe valves for throttling, bypass, or manual flow control services.
- F Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- G Provide spring-loaded check valves on discharge of water pumps.
- H Provide flow controls in water recirculating systems where indicated.

3.5 TOLERANCES

- A Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope.
- B Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.6 FIELD TESTS AND INSPECTIONS

- A Verify and inspect systems according to requirements by the Authority Having Jurisdiction. In the absence of specific test and inspection procedures proceed as indicated below.
- B Domestic Water Systems:
 1. Perform hydrostatic testing for leakage prior to system disinfection.
 2. Test Preparation: Close each fixture valve or disconnect and cap each connected fixture.
 3. General:
 - a. Fill the system with water and raise static head to 10 psi above service pressure. Minimum static head of 50 to 150 psi. As an exception, certain codes allow a maximum static pressure of 80 psi.
- C Test Results: Document and certify successful results, otherwise repair, document, and retest.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A Prior to starting work, verify system is complete, flushed, and clean and complies with local regulations.
- B Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form throughout system to obtain 50 to 80 mg/L residual.

- D Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E Maintain disinfectant in system for 24 hours.
- F If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.8 SERVICE CONNECTIONS

- A Provide new sanitary sewer services. Before commencing work, check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B Provide new water service complete with approved double check backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.
 - 1. Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Calk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.
 - 2. Provide 18 gauge, 0.0478-inch galvanized sheet metal sleeve around service main to 2 inch above floor and 6 feet minimum below grade. Size for minimum of 2 inches of loose batt insulation stuffing.

END OF SECTION 22 1005

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SECTION 22 1006 - PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Drains.
- B Cleanouts.
- C Hose bibbs.
- D Hydrants.
- E Washing machine outlet boxes.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A ASME A112.6.3 - Floor Drains; 2022.
- B ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers; 2023.
- C ASSE 1019 - Performance Requirements for Wall Hydrant with Backflow Protection and Freeze Resistance; 2023.
- D NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum
- E NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- C Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- D Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.
- B Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

- A Floor Drains:
- B Floor Drain:
 - 1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable nickel-bronze strainer.
- C Floor Drain:

1. ASME A112.6.3; lacquered cast iron or stainless steel, two piece body with double drainage flange, weep holes, reversible clamping collar, and round, adjustable square nickel bronze strainer with removable perforated sediment bucket.

2.3 CLEANOUTS

- A Cleanouts at Exterior Surfaced Areas:
 1. Round cast nickel bronze access frame and non-skid cover.
- B Cleanouts at Exterior Unsurfaced Areas:
 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.
- C Cleanouts at Interior Finished Floor Areas:
 1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

2.4 HOSE BIBBS

- A Interior Hose Bibbs:
 1. Bronze or brass with mounting flange, replaceable seat, hose thread spout, and integral or add-on vacuum breaker complying with ASSE 1011.
 2. Finishes:
 - a. Exposed Locations: Polished chrome.
 - b. Mechanical and Equipment Rooms: Polished chrome or rough bronze.
 - c. Service Areas: Polished chrome.
 3. Operation:
 - a. Exposed Locations: Operating key.
 - b. Mechanical and Equipment Rooms: Handwheel, T-handle, or lever.
 - c. Service Areas: Operating key.
- B Interior Mixing Type Hose Bibbs:
 1. Basis of Design: Woodford Model 122 and V122
 2. Bronze or brass, hot- and cold- water wall-faucet with mounting flange, replaceable seats, hose thread spout, integral checks, handwheels, and vacuum breaker complying with ASSE 1011.
 3. Finishes:
 - a. Exposed Locations: Polished chrome.
 - b. Mechanical and Equipment Rooms: Rough bronze.
 - c. Service Areas: Polished chrome.

2.5 HYDRANTS

- A Wall Hydrants:
 1. ASSE 1019, freeze resistant, self-draining, hose thread spout, and integral vacuum breaker.
 - a. Installation: Wall plate.
 - b. Finish: Polished chrome.
 - c. Operation: Operating key.
 - d. Casing and Operating Brass Rod to match wall thickness. Include wall clamp
 - e. Pressure Rating 125 PSIG

2.6 WASHING MACHINE OUTLET BOXES

- A Description: Plastic preformed rough-in box with brass quarter-turn ball valves or single lever-handle valves, socket for 2 inch waste, and slip-in finishing cover.
- B Provide fire-rated outlet-box assembly for installation in 1- and 2-hour rated walls.
- C Accessories:
 - 1. Water-hammer arrestors.
 - 2. Support brackets for installation between framing studs.

PART 3 EXECUTION

3.1 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Encase exterior cleanouts in concrete flush with grade.
- C Install floor cleanouts at elevation to accommodate finished floor.
- D Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to Flush Valves.

END OF SECTION 22 1006

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SECTION 22 3000 - PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Commercial electric water heaters.
- B Diaphragm-type compression tanks.
- C In-line circulator pumps.
- D Domestic Hot Water Recirculation Valves

1.2 REFERENCE STANDARDS

- A ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1: Rules for Construction of Pressure Vessels; 2025, with Errata .

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittals procedures.
- B Product Data:
 - 1. Product Data: Provide manufacturer's literature and data sheets for each product. Include information on materials of fabrication, assembly of components, dimensions, weights, capabilities, performance, electrical characteristics, location and sizes of connections, service and access locations, and manufacturer-provided and field-installed accessories.
- C Shop Drawings:
 - 1. Provide plans and elevations showing equipment assembly, including fabrication and installation details. Show location and sizes of connections.
 - 2. Indicate clearances required for service, access, maintenance, and replacement of internal components.
- D Manufacturer's Instructions: Indicate installation instructions.
- E Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- F Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A Certifications:
 - 1. Water Heaters: NSF approved.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.6 WARRANTY

- A See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B Manufacturer Warranty: Provide 15 year manufacturer warranty for commercial gas fired water heaters. Complete forms in Owner's name and register with manufacturer.
- C Manufacturer Warranty: Provide 5-year manufacturer warranty for domestic water heaters and water storage tanks. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 WATER HEATERS

- A Commercial Electric Water Heaters: - Polybutene Tank
 1. Type: Factory-assembled and wired, electric, vertical storage.
 2. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
 3. Performance: See Drawing Schedule
 4. Seamless, blow-molded, polybutene tank impervious to rust and corrosion.
 5. Pex dip tube
 6. Tough molded polyethylene outer shell resist dents, scratches and salt air corrosion.
 7. Polyurethane Insulation
 8. Controls: Automatic immersion water thermostat; externally adjustable temperature range from 60 to 180 degrees F, flanged or screw-in nichrome elements, high temperature limit thermostat.
 9. Accessories:
 - a. Water Connections: Brass.
 - b. Dip Tube: Crosslink polyethylene (PEX).
 - c. Drain valve.
 - d. Anode: Not Required
 - e. Temperature and Pressure Relief Valve: ASME labeled.
 10. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in.
- B Commercial Electric Water Heaters - Cement Lined
 1. Type: Factory-assembled and wired, electric, vertical storage.
 2. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
 3. Performance: See Drawing Schedule
 4. Controls: Automatic immersion water thermostat; externally adjustable temperature range from , flanged or screw-in nichrome elements, high temperature limit thermostat.
 5. Tank: Welded steel ASME labeled pressure vessel; cement lining, mounted on steel channel base with lifting lugs, insulated with 2 inch polyurethane; enclosed in a high impact colorized composite jacket.
 6. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in.
 7. Accessories:
 - a. Water Connections: Brass.
 - b. Dip Tube: Brass.
 - c. Drain valve.
 - d. Temperature and Pressure Relief Valve: ASME labeled.
- C Commercial Electric Water Heaters: Glass Lined
 1. Type: Factory-assembled and wired, electric, vertical storage.

2. Minimum Efficiency Required: ASHRAE Std 90.1 I-P.
3. Performance: See Drawing Schedule
4. Electrical Characteristics:
5. Tank: Glass lined welded steel; 4 inch diameter inspection port, thermally insulated with minimum 2 inches polyurethane encased in corrosion-resistant steel jacket; baked-on enamel finish.
6. Controls: Automatic immersion water thermostat; externally adjustable temperature range from 60 to 180 degrees F, flanged or screw-in nichrome elements, high temperature limit thermostat.
7. Accessories:
 - a. Water Connections: Brass.
 - b. Dip Tube: Brass.
 - c. Drain valve.
 - d. Anode: Magnesium.
 - e. Temperature and Pressure Relief Valve: ASME labeled.
8. Heating Elements: Flange-mounted immersion elements; individual elements sheathed with Incoloy corrosion-resistant metal alloy, rated less than 75 W/sq in.

2.3 DIAPHRAGM-TYPE COMPRESSION TANKS

- A Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psi, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- B Accessories: Pressure gauge and air-charging fitting, tank drain; precharge to 12 psi.
- C Size
 1. Provide the following sizes for each water heater tanks unless noted otherwise.
 - a. Systems with water heaters less than 60 gallons. Provide Amtrol ST-5
 - b. System with water heater tanks greater or equal to 60 gallons provide ST-12

2.4 IN-LINE CIRCULATOR PUMPS

- A Casing: Bronze, rated for 125 psi working pressure, with stainless steel rotor assembly.
- B Impeller: Bronze.
- C Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.
- D Seal: Carbon rotating against a stationary ceramic seat.
- E Drive: Flexible coupling.

2.5 DOMESTIC HOT WATER RECIRCULATION VALVES

- A Furnish and install as indicated on the plans, a thermostatically controlled recirculation valve (TRV) in the domestic hot water piping. TRV shall be self contained and fully automatic without additional piping or control mechanisms. Valve shall be a Circuit Solver™ TRV as manufactured by Therm-Omega-Tech, Inc., or equivalent.
- B TRV shall regulate the flow of recirculated domestic hot water based on water temperature entering the TRV regardless of system operating pressure.
- C When fully closed the TRV shall bypass a minimum of 0.1 GPM hot water to maintain dynamic control of the recirculating loop.

- D TRV shall be factory adjustable from 105 F (40.5 C) to 140 F (60 C) as required by project conditions.
- E Fully open TRV shall modulate towards a minimum closed position upon sensing a water temperature above 3 F of set point.
- F TRV shall be available in sizes ranging from ½ inch NPT to 2" NPT.
- G TRV body and all internal components shall be constructed of stainless steel with major components constructed of type 303 stainless steel.
- H TRV sizes ½ inch through 2 inch shall be rated to 200 PSIG maximum working pressure.
- I All TRV shall be standard tapered female thread, NPT.
- J All TRV shall be rated to 300 F (148.9 C) maximum working temperature.
- K TRV shall be ANSI/AWWA C800 compliant.
- L All TRV shall be NSF-61 certified for use in all domestic water systems.
- M The TRV will come complete with union, strainer, isolation ball valves, check valve and thermometer. The unit will come completely assembled from the factory.
- N Thermal actuator shall be spring operated and self cleaning, delivering closing thrust sufficient to keep orifice opening free of scale deposits.
- O Thermal actuator shall be rated for a minimum of 200,000 cycles.
- P Installation of TRV shall be made by qualified tradesmen. Install TRV in each domestic hot water return piping branch beyond last hot water device in that branch.
- Q Assembly shall provide suitable line size isolation valves, unions, and strainer as indicated in piping detail shown on the drawings. Provide intergral thermometer for reading recirculated water temperature.

PART 3 EXECUTION

3.1 INSTALLATION

- A Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions required for applicable certifications.
- B Coordinate system, equipment, and piping work with applicable electrical, fuel, gas, vent, drain, and waste support interconnections as included or provided by other trades.
- C Domestic Hot Water Storage Tanks:
 - 1. Provide steel pipe support, independent of building structural framing members.
 - 2. Clean and flush prior to delivery to site. Seal until pipe connections are made.
- D Pumps:
 - 1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

3.2 FIELD QUALITY CONTROL

- A See Section 01 4000 - Quality Requirements for additional requirements.

END OF SECTION 22 3000

SECTION 22 4000 - PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Tank type water closets.
- B Lavatories.
- C Sinks.
- D Under-lavatory pipe supply covers.
- E Mop sinks.
- F Service sinks.

1.2 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B ASME A112.6.1M - Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use; 1997 (Reaffirmed 2017).
- C ASME A112.18.1 - Plumbing Supply Fittings; 2024.
- D ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2022).
- E ASME A112.19.2 - Ceramic Plumbing Fixtures; 2024.
- F ASME A112.19.3 - Stainless Steel Plumbing Fixtures; 2022.
- G ASSE 1070 - Performance Requirements for Water Temperature Limiting Devices; 2020.
- H ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- I NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum
- J NSF 372 - Drinking Water System Components - Lead Content; 2024.

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide manufacturer's literature and data sheets for each product. Include materials of fabrication, rough-in requirements, location and sizes of connections, configurations, dimensions, finishes, features, and accessories.
- C Manufacturer's Instructions: Indicate installation methods and procedures.
- D Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- E Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Accept fixtures on-site in factory packaging. Inspect for damage.
- B Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.6 WARRANTY

- A See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A Potable Water Systems: Provide drinking water system components certified as complying with NSF 61 and NSF 372.
- B ADA: Where indicated to be ADA-compliant, provide fixtures complying with ADA Standards and ICC A117.1.
- C Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 REGULATORY REQUIREMENTS

- A Comply with applicable codes for installation of plumbing systems.
- B Perform work in accordance with local health department regulations.

2.3 TANK TYPE WATER CLOSETS

- A Floor-Mounted Bowl:
 - 1. ASME A112.19.2; siphon jet, vitreous china, 16.5 inches high, close-coupled closet combination with elongated rim, insulated vitreous china closet tank with fittings and lever flushing valve, bolt caps, vandalproof cover locking device.
 - 2. Water Consumption: 1.6 gal per flush, maximum.
 - 3. Handle Height: 44 inches or less.
 - 4. Trapway Outlet: 4 inch.
- B Toilet Seats:
 - 1. Plastic: Solid, white, elongated, open front, slow-closing hinged seat cover, extended back with self-sustaining hinges, and brass bolts with covers.
 - 2. Manufacturers:
 - a. Bemis Manufacturing Company: www.bemismfg.com/#sle.

2.4 LAVATORIES

- A Wall-Hung Basin:
 - 1. Vitreous China: ASME A112.19.2; white, rectangular basin with splash lip, front overflow, soap depression, and hanger. Size as indicated on drawings with 4-inch centerset spacing or single hole to match faucet.
 - 2. Carrier:
 - a. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded studs for fixture hanger, bearing plate and studs.
 - b. Manufacturers:
 - 1) Jay R. Smith MFG. Co: www.jrsmith.com/#sle.
 - 2) JOSAM Company: www.josam.com/#sle.
 - 3) Zurn Water, LLC; Z1231: www.zurn.com/#sle.
- B Supply Faucet:
 - 1. ASME A112.18.1; chrome plated combination supply fitting with pop-up waste, water economy aerator with maximum flow of 2.2 gpm, indexed handles.
- C Manual Operated
 - 1. Single-Lever Handle Monoblock, Supply Faucet: ASME A112.18.1; deck-mount, ceramic cartridge disc valve, escutcheon, and maximum flow of 0.5 gpm, low-flow.

- D Thermostatic Mixing Valve:
 - 1. ASSE 1070 water temperature limiting valve.
- E Accessories:
 - 1. Chrome plated 17 gauge, 0.0538 inch brass P-trap and arm with escutcheon.
 - 2. Offset waste with perforated open strainer.
 - 3. Combination stop and strainer.
 - 4. Screwdriver stops.
 - 5. Rigid supplies.

2.5 SINKS

- A Double Compartment Bowl:
 - 1. ASME A112.19.3; See Drawing Schedule for outside dimensions, 18 gauge, 0.050 inch thick, type 304 stainless steel, self rimming and undercoated, with ledge drilled for trim.
 - 2. Drain: 3-1/2 inch crumb cup and tailpiece.
 - 3. Sound Deadening - Bottom Pads
- B Faucets:
 - 1. Single Handle Faucet with Two-Function Pulldown Spray Head:
 - a. Minimum Spout Height: 8 inch.
 - b. Minimum Spout Reach: 10-3/8 inch.
 - c. Type: Deck-mount, swivel faucet with mounting plate.
 - d. Spray Functions: Stream and aerated spray at 1.8 gpm, maximum.
 - e. Materials: Ceramic disc-cartridge valve on brass body with polished chrome finish.
- C Accessories: Provide braided water supply lines, slip-joint p-trap, stainless steel basket strainer, and ASSE 107 Mixing valve where required..

2.6 UNDER-LAVATORY PIPE SUPPLY COVERS

- A General:
 - 1. Insulate exposed drainage piping including hot, cold and tempered water supplies under lavatories or sinks per ADA Standards.
 - 2. Construction: 1/8 inch PVC with antimicrobial, antifungal and UV resistant properties.
 - a. Comply with ASME A112.18.9 for covers on accessible lavatory piping.
 - b. Comply with ICC A117.1.

2.7 MOP SINKS

- A Molded Stone Mop Sink Manufacturers:
 - 1. Material: Molded Stone composed of
 - 2. Type: Rectilinear, standard height.
 - 3. Tiling Flange Construction: Galvanized steel.
 - 4. Grid strainer: Stainless steel; integral; removable.
 - 5. Dimensions: As indicated on drawings.
 - 6. Accessories:
 - a. 3 feet of 1/2 inch diameter plain end reinforced rubber hose.
 - b. Hose and Hose clamp hanger. 832AA
 - c. Mop hanger. 889CC
 - d. Chicago 540-LD897SWXFABC commercial faucet with pail hook and wall bracket.

- e. Sealed to wall
- f. Provide SS Wall Backing 12" past in each direction up to 4 feet.

2.8 SERVICE SINKS

- A Manufacturers:
 - 1. FIAT.
- B Bowl: 20 by 24 by 34 inches high, white molded stone, floor mounted, with 1-inch wide shoulders, vinyl bumper guard, stainless steel strainer. bowl depth of 14"
- C Two-Lever Handle Service Faucet:
 - 1. Type: Deck-mount spout faucet with union inlets and mounting plate.
 - 2. Spray Type: Full stream spray at 1.8 gpm, maximum.
 - 3. ASME A112.18.1, ADA Standards, and NSF 61 compliant assembly.
 - 4. Materials: Ceramic disc cartridge valve on brass body with polished chrome finish.
- D Accessories:
 - 1. P-trap

PART 3 EXECUTION

3.1 EXAMINATION

- A Verify walls, floors, and finishes are prepared and ready for installation of fixtures.
- B Verify rough-ins for field connections match sizes and locations shown on drawings.

3.2 INSTALLATION

- A Install products in accordance with manufacturer's instructions.
- B Install components level and plumb.
- C Secure fixtures in place.
- D Install rigid or flexible supplies to fixtures. Provide supply stops, reducers, and escutcheons.

3.3 ADJUSTING

3.4 CLEANING

- A See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B Clean plumbing fixtures to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.5 PROTECTION

- A Protect installed products from damage due to subsequent construction operations.
- B Do not permit use of fixtures by construction personnel.

END OF SECTION 22 4000

SECTION 23 0500 - BASIC HVAC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A All materials and installation methods shall conform to the applicable standards, guidelines and codes referenced in the specification sections throughout the project manual.

1.2 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

1.3 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 rubber materials:
 - 1. EPDM: Ethylene-propylene-diene monomer rubber.
 - 2. NBR: Acrylonitrile-butadiene rubber.
- G Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
 - 1. Any item listed as furnished shall also be installed, unless otherwise noted.
 - 2. Any item listed as installed shall also be furnished, unless otherwise noted.

1.4 QUALITY ASSURANCE

- A Contractor's Responsibility Prior to Submitting Pricing Data:
 - 1. The Contractor is responsible for constructing complete and operating systems. The Contractor acknowledges and understands that the Contract Documents are a two-dimensional representation of a three-dimensional object, subject to human interpretation. This representation may include imperfect data, interpreted codes, utility guidelines, three-dimensional conflicts, and required field coordination items. Such deficiencies can be corrected when identified prior to ordering material and starting installation. The Contractor agrees to carefully study and compare the individual Contract Documents and report at once in writing to the Design Team any deficiencies the Contractor may discover. The Contractor further agrees to require each subcontractor to likewise study the documents and report at once any deficiencies discovered.

2. The Contractor shall resolve all reported deficiencies with the Architect/Engineer prior to awarding any subcontracts, ordering material, or starting any work with the Contractor's own employees. Any work performed prior to receipt of instructions from the Design Team will be done at the Contractor's risk.
- B Qualifications:
 1. Only products of reputable manufacturers are acceptable.
 2. All Contractors and subcontractors shall employ only workers skilled in their trades.
- C Compliance with Codes, Laws, Ordinances:
 1. Conform to all requirements of the Codes, Laws, Ordinances and other regulations having jurisdiction.
 2. Conform to all State Codes.
 3. If there is a discrepancy between the codes and regulations and these specifications, the Architect/Engineer shall determine the method or equipment used.
 4. If the Contractor notes, at the time of bidding, any parts of the drawings or specifications that do not comply with the codes or regulations, he shall inform the Architect/Engineer in writing, requesting a clarification. If there is insufficient time for this procedure, he shall submit with his proposal a separate price to make the system comply with the codes and regulations.
 5. All changes to the system made after letting of the contract, to comply with codes or requirements of Inspectors, shall be made by the Contractor without cost to the Owner.
 6. If there is a discrepancy between manufacturer's recommendations and these specifications, the manufacturer's recommendations shall govern.
- D Permits, Fees, Taxes, Inspections:
 1. Procure all applicable permits and licenses.
 2. Abide by all laws, regulations, ordinances, and other rules of the State or Political Subdivision where the work is done, or as required by any duly constituted public authority.
 3. It is the sole responsibility of the contractor to obtain and procure permits. The Engineer is not liable for any costs associated with the cost of permits or delays associated with permitting or obtaining permits under this division. The engineer at times may submit the permit in advance to help with project timeline. However, this fact does not relieve the installing contractor(s) from tracking and ensuring permitting process is being completed.
 4. Pay all charges for permits or licenses.
 5. Pay all fees and taxes imposed by the State, Municipal and/or other regulatory bodies.
 6. Pay all charges arising out of required inspections by an authorized body.
 7. Pay all charges arising out of required contract document reviews associated with the project and as initiated by the Owner or authorized agency/consultant.
 8. Where applicable, all fixtures, equipment and materials shall be approved or listed by Underwriter's Laboratories, Inc.
- E Utility Company Requirements:
 1. Secure from the appropriate private or public utility company all applicable requirements.
 2. Comply with all utility company requirements.
 3. Make application for and pay for service connections, such as gas.

4. Make application for and pay for all meters and metering systems required by the utility company.
- F Examination of Drawings:
 1. The drawings for the mechanical work are completely diagrammatic, intended to convey the scope of the work and to indicate the general arrangements and locations of equipment, outlets, etc., and the approximate sizes of equipment.
 2. Contractor shall determine the exact locations of equipment and rough-ins, and the exact routing of pipes and ducts to best fit the layout of the job.
 3. Scaling of the drawings is not sufficient or accurate for determining these locations.
 4. Where job conditions require reasonable changes in indicated arrangements and locations, such changes shall be made by the Contractor at no additional cost to the Owner.
 5. Because of the scale of the drawings, certain basic items, such as fittings, boxes, valves, unions, etc., may not be shown, but where required by other sections of the specifications or required for proper installation of the work, such items shall be furnished and installed.
 6. If an item is either on the drawings or in the specifications, it shall be included in this contract.
 7. Determination of quantities of material and equipment required shall be made by the Contractor from the documents. Where discrepancies arise between drawings, schedules and/or specifications, the greater number shall govern.
 8. Where used in mechanical documents, the word "furnish" shall mean supply for use, the word "install" shall mean connect complete and ready for operation, and the word "provide" shall mean to supply for use and connect complete and ready for operation.
 - a. Any item listed as furnished shall also be installed, unless otherwise noted.
 - b. Any item listed as installed shall also be furnished, unless otherwise noted.
- G Field Measurements:
 1. Verify all pertinent dimensions at the job site before ordering any materials or fabricating any supports, pipes or ducts.
- H Electronic Media/Files:
 1. Construction drawings for this project have been prepared utilizing Revit or Cadd platforms
 2. Contractors and Subcontractors may request electronic media files of the contract drawings and/or copies of the specifications. Specifications will be provided in PDF format.
 3. Upon request for electronic media, the Contractor shall complete and return a signed "Electronic File Transmittal" form provided by Engineer.
 4. If the information requested includes floor plans prepared by others, the Contractor will be responsible for obtaining approval from the appropriate Design Professional for use of that part of the document.
 5. The electronic contract documents can be used for preparation of shop drawings and as-built drawings only. The information may not be used in whole or in part for any other project.
 6. The drawings prepared by Engineer for bidding purposes may not be used directly for ductwork layout drawings or coordination drawings.

7. The use of these CAD documents by the Contractor does not relieve them from their responsibility for coordination of work with other trades and verification of space available for the installation.
8. The information is provided to expedite the project and assist the Contractor with no guarantee by Engineer as to the accuracy or correctness of the information provided. Engineer accepts no responsibility or liability for the Contractor's use of these documents.
9. Electrical Characteristics for 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.

1.5 SUBMITTALS

- A Submittals shall be required for the following items, and for additional items where required elsewhere in the specifications or on the drawings.
- B General Submittal Procedures: The following are required:
 1. Transmittal: Each transmittal shall include the following:
 - a. Date
 - b. Project title and number
 - c. Contractor's name and address
 - d. Division of work (e.g., plumbing, heating, ventilating, etc.)
 - e. Description of items submitted and relevant specification number
 - f. Notations of deviations from the contract documents
 - g. Other pertinent data
 2. Submittal Cover Sheet: Each submittal shall include a cover sheet containing:
 - a. Date
 - b. Project title and number
 - c. Architect/Engineer
 - d. Contractor and subcontractors' names and addresses
 - e. Supplier and manufacturer's names and addresses
 - f. Division of work (e.g., plumbing, heating, ventilating, etc.)
 - g. Description of item submitted (using project nomenclature) and relevant specification number
 - h. Notations of deviations from the contract documents
 - i. Other pertinent data
 - j. Provide space for Contractor's review stamps
 3. Composition:
 - a. Submittals shall be submitted using specification sections and the project nomenclature for each item.
 - b. Individual submittal packages shall be prepared for items in each specification section. All items within a single specification section shall be packaged together where possible. An individual submittal may contain items from multiple specifications sections if the items are intimately linked (e.g., pumps and motors).

- c. All sets shall contain an index of the items enclosed with a general topic description on the cover.
- 4. Content: Submittals shall include all fabrication, erection, layout, and setting drawings; manufacturers' standard drawings; schedules; descriptive literature, catalogs and brochures; performance and test data; wiring and control diagrams; dimensions; shipping and operating weights; shipping splits; service clearances; and all other drawings and descriptive data of materials of construction as may be required to show that the materials, equipment or systems and the location thereof conform to the requirements of the contract documents.
- 5. Contractor's Approval Stamp:
 - a. The Contractor shall thoroughly review and approve all shop drawings before submitting them to the Architect/Engineer. The Contractor shall stamp, date and sign each submittal certifying it has been reviewed.
 - b. Unstamped submittals will be rejected.
 - c. The Contractor's review shall include, but not be limited to, verification of the following:
 - 1) Only approved manufacturers are used.
 - 2) Addenda items have been incorporated.
 - 3) Catalog numbers and options match those specified.
 - 4) Performance data matches that specified.
 - 5) Electrical characteristics and loads match those specified.
 - 6) Equipment connection locations, sizes, capacities, etc. have been coordinated with other affected trades.
 - 7) Dimensions and service clearances are suitable for the intended location.
 - 8) Equipment dimensions are coordinated with support steel, housekeeping pads, openings, etc.
 - 9) Constructability issues are resolved (e.g., weights and dimensions are suitable for getting the item into the building and into place, sinks fit into countertops, etc.).
 - d. The Contractor shall review, stamp and approve all subcontractors' submittals as described above.
 - e. The Contractor's approval stamp is required on all submittals. Approval will indicate the Contractor's review of all material and a complete understanding of exactly what is to be furnished. Contractor shall clearly mark all deviations from the contract documents on all submittals. If deviations are not marked by the Contractor, then the item shall be required to meet all drawing and specification requirements.
- 6. Submittal Identification and Markings:
 - a. The Contractor shall clearly mark each item with the same nomenclature applied on the drawings or in the specifications.
 - b. The Contractor shall clearly indicate the size, finish, material, etc.
 - c. Where more than one model is shown on a manufacturer's sheet, the Contractor shall clearly indicate exactly which item and which data is intended.
 - d. All marks and identifications on the submittals shall be unambiguous.

7. Schedule submittals to expedite the project. Coordinate submission of related items.
8. Identify variations from the contract documents and product or system limitations that may be detrimental to the successful performance of the completed work.
9. Reproduction of contract documents alone is not acceptable for submittals.
10. Incomplete submittals will be rejected without review. Partial submittals will only be reviewed with prior approval from the Architect/Engineer.
11. Submittals not required by the contract documents may be returned without review.
12. The Architect/Engineer's responsibility shall be to review one set of shop drawing submittals for each product. If the first submittal is incomplete or does not comply with the drawings and/or specifications, the Contractor shall be responsible to bear the cost for the Architect/Engineer to recheck and handle the additional shop drawing submittals.
13. Submittals shall be reviewed and approved by the Architect/Engineer before releasing any equipment for manufacture or shipment.
14. Contractor's responsibility for errors, omissions or deviation from the contract documents in submittals is not relieved by the Architect/Engineer's approval.

C Electronic Submittal Procedures:

1. Distribution: Email submittals as attachments to all parties designated by the Architect/Engineer, unless a web-based submittal program is used.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. Submittal file name: 2026-088SD 23 XX XX description.pdf
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be transmitted via a pre-approved method.

1.6 CHANGE ORDERS

- A A detailed material and labor takeoff shall be prepared for each change order, along with labor rates and markup percentages. Change orders with inadequate breakdown will be rejected.
- B Change order work shall not proceed until authorized.

1.7 EQUIPMENT SUPPLIERS' INSPECTION

- A Contractor shall arrange for and obtain supplier's on-site inspection(s) at proper time(s) to assure each phase of equipment installation and/or connection is in accordance with the manufacturer's instructions.
- B Submit copies of start-up reports to the Architect/Engineer and include copies of Owner's Operation and Maintenance Manuals.

1.8 PRODUCT DELIVERY, STORAGE, HANDLING & MAINTENANCE

- A Exercise care in transporting and handling to avoid damage to materials. Store materials on the site to prevent damage. Keep materials clean, dry and free from harmful conditions.

Immediately remove any materials that become wet or that are suspected of becoming contaminated with mold or other organisms.

- B Coordinate the installation of heavy and large equipment with the Construction Manager or General Contractor. If the Mechanical Contractor does not have prior documented experience in rigging and lifting similar equipment, he/she shall contract with a qualified lifting and rigging service that has similar documented experience. Follow all equipment lifting and support guidelines for handling and moving.
- C Contractor is responsible for moving equipment into the building and/or site. Contractor shall review site prior to bid for path locations and any required building modifications to allow movement of equipment. Contractor shall coordinate his/her work with other trades.

1.9 WARRANTY

- A Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship from date of substantial completion.
- B The warranty period for all work in this Division of the specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

1.10 MATERIAL SUBSTITUTION

- A Where several manufacturers' names are given, the manufacturer for which a catalog number is given is the basis for job design and establishes the quality required.
- B Equivalent equipment manufactured by the other named manufacturers may be used. Contractor shall ensure that all items submitted by these other manufacturers meet all requirements of the drawings and specifications, and fits in the allocated space.
- C Any material, article or equipment of other unnamed manufacturers which will adequately perform the services and duties imposed by the design and is of a quality equal to or better than the material, article or equipment identified by the drawings and specifications may be used if approval is secured in writing from the Architect/Engineer not later than ten days prior to the bid opening.
- D This Contractor assumes all costs incurred as a result of using the offered material, article or equipment, on his part or on the part of other Contractors whose work is affected.
- E This Contractor may list voluntary add or deduct prices for alternate materials on the bid form. These items will not be used in determining the low bidder.
- F All material substitutions requested later than ten (10) days prior to bid opening must be listed as voluntary changes on the bid form.

PART 2 PRODUCTS

2.1 NOT APPLICABLE

PART 3 EXECUTION

3.1 JOBSITE SAFETY

- A Neither the professional activities of the Architect/Engineer, nor the presence of the Architect/Engineer or his or her employee and subconsultants at a construction site, shall relieve the Contractor and other entity of their obligations, duties and responsibilities including, but not limited to, construction means, methods, sequence, techniques or procedures necessary for performing, superintending or coordinating all portions of the work of construction in accordance with the contract documents and any health or safety precautions required by any regulatory agencies. The Architect/Engineer and his or her personnel have no authority to exercise any control over any construction contractor or other entity or their employees in connection with their work or any health or safety precautions. The Contractor is solely responsible for jobsite safety. The Architect/Engineer and the Architect/Engineer's consultants shall be indemnified and shall be made additional insureds under the Contractor's general liability insurance policy.

3.2 PROJECT CLOSEOUT

- A The following paragraphs supplement the requirements of Division 1.
- B Final Jobsite Observation:
1. In order to prevent the Final Jobsite Observation from occurring too early, the Contractor is required to review the completion status of the project and certify that the job is ready for the final jobsite observation.
 2. Attached to the end of this section is a typical list of items that represent the degree of job completeness expected prior to requesting a review.
 3. Upon Contractor certification that the project is complete and ready for a final observation, the Contractor shall sign the attached certification and return it to the Architect/Engineer so that the final observation can be scheduled.
 4. It is understood that if the Architect/Engineer finds the job not ready for the final observation and that additional trips and observations are required to bring the project to completion, the costs incurred by the Architect/Engineer's additional time and expenses will be deducted from the Contractor's contract retainage prior to final payment at the completion of the job.
- C Before final payment is authorized, this Contractor must submit the following:
1. Operation and maintenance manuals with copies of approved shop drawings.
 2. Record documents including marked-up or reproducible drawings and specifications.
 3. A report documenting the instructions given to the Owner's representatives complete with the number of hours spent in the instruction. The report shall bear the signature of an authorized agent of This Contractor and shall be signed by the Owner's representatives.
 4. Inspection by State Boiler Inspector.
 5. Start-up reports on all equipment requiring a factory installation inspection or start-up.
 6. Provide spare parts, maintenance, and extra materials in quantities specified in individual specification sections. Deliver to project site and place in location as directed; receipt by Architect/Engineer required prior to final payment approval.

3.3 OPERATION AND MAINTENANCE MANUALS

A General:

1. Provide an electronic copy of the O&M manuals as described below for Architect/Engineer's review and approval. The electronic copy shall be corrected as required to address the Architect/Engineer's comments. Once corrected, electronic copies and paper copies shall be distributed as directed by the Architect/Engineer.
2. Approved O&M manuals shall be completed and in the Owner's possession prior to Owner's acceptance and at least 10 days prior to instruction of operating personnel.

B Electronic Submittal Procedures:

1. Distribution: Email the O&M manual as attachments to all parties designated by the Architect/Engineer.
2. Transmittals: Each submittal shall include an individual electronic letter of transmittal.
3. Format: Electronic submittals shall be in PDF format only. Scanned copies, in PDF format, of paper originals are acceptable. Submittals that are not legible will be rejected. Do not set any permission restrictions on files; protected, locked, or secured documents will be rejected.
4. File Names: Electronic submittal file names shall include the relevant specification section number followed by a description of the item submitted, as follows. Where possible, include the transmittal as the first page of the PDF instead of using multiple electronic files.
 - a. O&M file name: O&M.div23.contractor.YYYYMMDD
5. File Size: Electronic file size shall be limited to a maximum of 10MB. Larger files shall be divided into files that are clearly labeled as "1 of 2", "2 of 2", etc.
6. Provide the Owner with an approved copy of the O&M manual in digital format which is tabbed and bookmarked accordingly.
7. All text shall be searchable.
8. Bookmarks shall be used, dividing information first by specification section, then systems, major equipment and finally individual items. All bookmark titles shall include the nomenclature used in the construction documents and shall be an active link to the first page of the section being referenced.

C Operation and Maintenance Instructions shall include:

1. Title Page: Include title page with project title, Architect, Engineer, Contractor, all subcontractors, and major equipment suppliers, with addresses, telephone numbers, website addresses, email addresses and point of contacts. Website URLs and email addresses shall be active links in the electronic submittal.
2. Table of Contents: Include a table of contents describing specification section, systems, major equipment, and individual items.
3. Copies of all final approved shop drawings and submittals. Include Architect's/Engineer's shop drawing review comments. Insert the individual shop drawing directly after the Operation and Maintenance information for the item(s) in the review form.
4. Copy of final approved test and balance reports.
5. Copies of all factory inspections and/or equipment startup reports.
6. Copies of warranties.
7. Schematic wiring diagrams of the equipment that have been updated for field conditions. Field wiring shall have label numbers to match drawings.

8. Dimensional drawings of equipment.
9. Capacities and utility consumption of equipment.
10. Detailed parts lists with lists of suppliers.
11. Operating procedures for each system.
12. Maintenance schedule and procedures. Include a chart listing maintenance requirements and frequency.
13. Repair procedures for major components.
14. List of lubricants in all equipment and recommended frequency of lubrication.
15. Instruction books, cards, and manuals furnished with the equipment.

3.4 RECORD DOCUMENTS

- A The following paragraph supplements Division 1 requirements:
 1. Contractor shall maintain at the job site a separate and complete set of mechanical drawings and specifications on which he shall clearly and permanently mark in complete detail all changes made to the mechanical systems.
- B Mark drawings to indicate revisions to piping and ductwork, size and location, both exterior and interior; including locations of coils, dampers, other control devices, filters, and other
 1. units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; actual inverts and locations of underground piping; concealed equipment, dimensioned from column lines; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (e.g., traps, strainers, expansion compensators, tanks, etc.); Change Orders; concealed control system devices.
- C Refer to Section 23 09 00 for additional requirements for Temperature Control documents.
- D Before completion of the project, a set of reproducible mechanical drawings will be given to the Contractor for transfer of all as-built conditions from the paper set maintained at the job site. All marks on reproducibles shall be clear and permanent.
- E Mark specifications to show approved substitutions; Change Orders, and actual equipment and materials used.
- F Record changes daily and keep the marked drawings available for the Architect/Engineer's examination at any normal work time.
- G Upon completing the job, and before final payment is made, give the marked-up drawings to the Architect/Engineer.

3.5 FIRE CAULKING

- A This contractor is responsible for all fire caulking around all penetrations of duct, pipe, conduit or any misc items which pass through fire rated assemblies which require fire caulking and protection of the penetration.

3.6 ADJUST AND CLEAN

- A Thoroughly clean all equipment and systems prior to the Owner's final acceptance of the project. Clean all foreign paint, grease, oil, dirt, labels, stickers, and other foreign material from all equipment.
- B Clean all drain pans and areas where moisture is present. Immediately report any mold, biological growth, or water damage.
- C Remove all rubbish, debris, etc., accumulated during construction from the premises.

3.7 SPECIAL REQUIREMENTS

- A Contractor shall coordinate the installation of all equipment, valves, dampers, operators, etc., with other trades to maintain clear access area for servicing.
- B All equipment shall be installed in such a way to maximize access to parts needing service or maintenance. Review the final field location, placement, and orientation of equipment with the Owner's designated representative prior to setting equipment.
- C Installation of equipment or devices without regard to coordination of access requirements and confirmation with the Owner's designated representative will result in removal and reinstallation of the equipment at the Contractor's expense.

END OF SECTION 23 0500

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SECTION 23 0593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Testing, adjustment, and balancing of air systems.

1.2 REFERENCE STANDARDS

- A ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - d. Final test report forms to be used.
 - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- C Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Engineer and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A Perform total system balance in accordance with one of the following:
- B Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C TAB Agency Qualifications:
 - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2. Having minimum of three years documented experience.
 - 3. Certified by one of the following:

- D TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.
- E Pre-Qualified TAB Agencies:
 - 1. Design Control.
 - 2. Balancing Professionals.
 - 3. MNDak Testing and Balancing

3.2 EXAMINATION

- A Verify that systems are complete and operable before commencing work. Installing Contractor shall ensure the following conditions:
 - 1. Systems are started and operating in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Fans are rotating correctly.
 - 7. Fire and volume dampers are in place and open.
 - 8. Air coil fins are cleaned and combed.
 - 9. Access doors are closed and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage is minimized.
 - 12. Hydronic systems are flushed, filled, and vented.
 - 13. Pumps are rotating correctly.
 - 14. Proper strainer baskets are clean and in place.
 - 15. Service and balance valves are open.
- B Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

3.3 PREPARATION

- A Hold a pre-balancing meeting at least one week prior to starting TAB work.
- B Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer to facilitate spot checks during testing.

3.4 ADJUSTMENT TOLERANCES

- A Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

- A Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B Ensure recorded data represents actual measured or observed conditions.

- C Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 AIR SYSTEM PROCEDURE

- A Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C Measure air quantities at air inlets and outlets.
- D Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- F Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- G Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- H Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- I Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- J Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- K For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.

3.7 SCOPE

- A Test, adjust, and balance the following:
 - 1. Forced Air Furnaces.
 - 2. Energy Recovery Units
 - 3. Air Inlets and Outlets.

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SECTION 23 0713 - DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Duct insulation.

1.2 REFERENCE STANDARDS

- A ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2024.
- C ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- D ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2024a.
- E UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

1.4 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.
- C All insulation shall be replaced if subjected to water or moisture during installation. Contractor is not allowed to dry insulation in place.

1.6 FIELD CONDITIONS

- A Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. K value: 0.25 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 850 degrees F.
 - 3. Maximum Water Vapor Absorption: 5.0 percent by weight.
 - 4. Density: 1.0 PCF
 - 5. Installed R Value: R-6 2" Thick
- B Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure-sensitive tape.
 - 4. Provide 2" Staple Overlap
- C Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure-sensitive rubber-based adhesive.
- D Tie Wire: Annealed steel, 16 gauge, 0.0508 inch diameter.

PART 3 EXECUTION

3.1 EXAMINATION

- A Test ductwork for design pressure prior to applying insulation materials.
- B Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Install in accordance with NAIMA National Insulation Standards.
- C Insulated Ducts Conveying Air Below Ambient Temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
 - 4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D Insulated Ducts Conveying Air Above Ambient Temperature:
 - 1. Provide with or without standard vapor barrier jacket.
 - 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape, or wires.
 - 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.3 SCHEDULES (ALL R VALUES ARE INSTALLED VALUES)

- A Insulation thickness of Ductwork shall be in accordance with table C403.12.3 of the IECC 2024 addition.
- B Exhaust Ducts Within 10 ft of Exterior Openings: R-6 Glass Fiber Flexible
- C Exhaust Ducts and Return Exposed to Outdoor Air: R-6 Glass Fiber Flexible for the first 10 feet.
- D Concealed Return and Exhaust Ducts in conditioned spaces: None
- E Concealed Supply ducts: R-6 Glass Fiber Flexible
- F Exposed Supply Ducts: None

END OF SECTION 23 0713

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SECTION 23 3100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Metal ducts.
- B Flexible ducts.
- C Air plenums and casings.

1.2 RELATED REQUIREMENTS

- A Section 07 8400 - Firestopping.
- B Section 23 0713 - Duct Insulation: External insulation and duct liner.
- C Section 23 3300 - Air Duct Accessories.
- D Section 23 3600 - Air Terminal Units.
- E Section 23 3700 - Air Outlets and Inlets: Fabric air distribution devices.

1.3 REFERENCE STANDARDS

- A ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.
- C ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019, with Editorial Revision (2023).
- D ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.
- E NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- F NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- G SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- H UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data for duct materials.
- C Provide the following information in chart form for each of the pressure classes in paragraph 2.1.
 - 1. Duct Dimension
 - 2. SMACNA Reinforcement Code
 - 3. Duct Gauge
 - 4. Longitudinal seams
 - 5. Duct lengths
 - 6. Reinforcement Spacing.
 - 7. Traverse joints
 - 8. Mid Joint Reinforcement
 - 9. Tie Rod Placement code
 - 10. Seal Class.

- D Shop Drawings: Indicate duct fitting types, gauges, sizes, welds, and configuration.
- E Manufacturer's Certificate: Certify that installation of glass fiber ductwork meets or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.
- B Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of documented experience.

1.6 FIELD CONDITIONS

- A Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.
- C Duct Shape and Material in accordance with Allowed Static Pressure Range: General Mechanical Areas
 - 1. Round: Plus or minus 2 in-wc of G60-coated galvanized steel.
 - 2. Rectangular: Plus or minus 2 in-wc of G60-coated galvanized steel.
 - 3. Flat Oval: Plus 2 in-wc of galvanized steel.
 - 4. Flexible Duct (Fabric and wire): Plus or minus 2 in-wc; see Section 23 3700.
- D Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Low Pressure Service: Below 2 in-wc: Units with External Static Below 1" ESP on Supply and Return
 - a. Seal: Class C, apply to seal off transverse joints.
 - b. Leakage:
 - 1) Rectangular: Class 24 or 24 cfm/100 sq ft.
 - 2) Round: Class 12 or 12 cfm/100 sq ft.
- E Duct Fabrication Requirements:
 - 1. Minimum gauge for all ductwork is 26 gauge.
 - 2. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 3. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class. Minimum Gauge for all ductwork shall be 26 gauge.
 - 4. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
 - 5. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.

6. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.2 METAL DUCTS

- A Material Requirements:
 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
 2. Provide paint grip on all exposed ductwork.
- B Round Metal Ducts:
 1. Round Single Wall Duct: Round lock seam duct with galvanized steel outer wall.
 2. Round Connection System: Interlocking duct connection system in accordance with SMACNA (DCS).
 - a. Manufacturers:
 - 1) Ductmate Industries, Inc, a DMI Company: www.ductmate.com/#sle.
- C Round Spiral Duct:
 1. Round spiral lock seam duct with galvanized steel outer wall.
- D Connectors, Fittings, Sealants, and Miscellaneous:
 1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
 2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).
 3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 4. Gasket Tape:
 - a. Provide butyl rubber gasket tape for a flexible seal between transfer duct connector (TDC), transverse duct flange (TDF), applied flange connections, and angle ring connections.
 5. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.3 FLEXIBLE DUCTS

- A Flexible Ducts: UL 181, Class 1, polyethylene film, mechanically fastened and rolled using galvanized steel to form spiral helix.
 1. Insulation: R6 insulation with polyethylene vapor barrier film.
 2. Pressure Rating: 10 in-wc positive and 2 in-wc negative.
 3. Maximum Velocity: 5500 fpm.
 4. Temperature Range: Minus 20 degrees F to 250 degrees F.

2.4 AIR PLENUMS AND CASINGS

- A Fabricate in accordance with SMACNA (DCS) for indicated operating pressures indicated.
- B Minimum Fabrication Requirements:
 - 1. Fabricate acoustic plenum or casing with reinforcing turned inward.
 - 2. Provide 16-gauge, 0.059-inch sheet steel back facing and 22-gauge, 0.029-inch perforated sheet steel front facing with 3/32 inch diameter holes on 5/32 inch centers.
 - 3. Construct panels 3 inches thick, packed with 4.5 pcf minimum glass fiber insulation media, on inverted channel of 16-gauge, 0.059-inch sheet steel.
 - 4. Mount floor-mounted plenum or casings on 4-inch high concrete curbs. At floor, rivet panels on 8-inch centers to angles. Where floors are acoustically insulated, provide liner of galvanized 18-gauge, 0.052-inch expanded metal mesh supported at 12-inch centers, turned up 12 inches at sides with sheet metal shields.
- C Access Doors:
 - 1. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection.
 - 2. Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles.
 - 3. Provide clear wire glass observation ports, minimum 6 by 6 inch size.
- D Thermal Panels:
 - 1. Material: Steel-faced composite panel with noncombustible structural high density mineral fiber core for plenum fabrication.
 - a. Facing: Galvanized steel (G90), 24 gauge, 0.0275 inch.
 - b. Finish: Unpainted.
 - c. Core: Mineral wool board.
 - d. Structural: Nonload bearing.
 - 2. Panel Thickness: 2.5 inches.
 - 3. R-Value: 12 when tested in accordance with ASTM C177.

PART 3 EXECUTION

3.1 INSTALLATION

- A Install, support, and seal ducts in accordance with SMACNA (DCS).
- B Install products following the manufacturer's instructions.
- C Comply with safety standards NFPA 90A and NFPA 90B.
- D During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- F Flexible Ducts: Connect to metal ducts with draw bands.
- G Kitchen Hood Exhaust: Provide residue traps at the base of vertical risers with provisions for the cleanout.
- H Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- I Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

- J Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with a crimp in the direction of airflow.
- K Connect diffusers or light troffer boots to low-pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp. Do not use flexible duct to change direction.
- L Set plenum doors at 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
- M At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- N Fire Partitions: Provide firestopping sealing. See Section 07 8400.
- O Duct Accessories, Terminal Units, Inlets, and Outlets: Interconnect as indicated in Sections 23 3300, 23 3600, and 23 3700.
- P Duct Insulation: Provide duct insulation. See Section 23 0713.

3.2 CLEANING

- A Clean duct system by forcing air at high velocity through duct to remove accumulated dust. Clean half the system at a time to obtain sufficient air. Protect equipment that could be harmed by excessive dirt with temporary filters or bypass during cleaning.

END OF SECTION 23 3100

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SECTION 23 3300 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Air turning devices/extractors.
- B Backdraft dampers - metal.
- C Duct access doors.
- D Duct test holes.
- E Flexible duct connectors.
- F Volume control dampers.
- G Constant Volume Regulators
- H Miscellaneous Products:
 - 1. Flexible Duct Elbow Support
 - 2. Return Air Duct Canopy

1.2 RELATED REQUIREMENTS

- A Section 23 3100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A AMCA 500-D - Laboratory Methods of Testing Dampers for Rating; 2018.
- B NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- C SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- D UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances; Current Edition, Including All Revisions.
- E UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide for shop-fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.
- D Project Record Drawings: Record actual locations of access doors and test holes.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 AIR TURNING DEVICES/EXTRACTORS

- A Multi-blade device with blades aligned in short dimension; steel construction; with individually adjustable blades, mounting straps.

2.3 BACKDRAFT DAMPERS - METAL

- A Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: Galvanized steel, with center pivoted blades of maximum 6 inch width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.4 DUCT ACCESS DOORS

- A Fabricate in accordance with SMACNA (DCS) and as indicated.
- B Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick-fastening locking devices. For insulated ducts, install minimum 1-inch thick insulation with sheet metal cover.
 - 1. Less Than 12 inches Square: Secure with sash locks.
 - 2. Up to 18 inches Square: Provide two hinges and two sash locks.
 - 3. Up to 24 by 48 inches: Three hinges and two compression latches with outside and inside handles.
- C Access doors with sheet metal screw fasteners are not acceptable.

2.5 DUCT TEST HOLES

- A Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.6 FLEXIBLE DUCT CONNECTORS

- A Fabricate in accordance with SMACNA (DCS) and as indicated.
- B Flexible Duct Connections: Fabric crimped into metal edging strip.
 - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz/sq yd.
 - a. Net Fabric Width: Approximately 2 inches wide.
- C Maximum Installed Length: 14 inch.

2.7 VOLUME CONTROL DAMPERS

- A Fabricate in accordance with SMACNA (DCS) and as indicated.
- B Splitter Dampers:
 - 1. Material: Same gauge as duct to 24 inches size in either direction, and two gauges heavier for sizes over 24 inches.
 - 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
 - 3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

- C Single Blade Dampers:
 - 1. Fabricate for duct sizes up to 6 by 30 inch.
 - 2. Blade: 24 gauge, 0.0239 inch, minimum.
- D End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.

2.8 CONSTANT AIRFLOW REGULATORS:

- A General Requirements:
 - 1. Provide bi-directional, air balancing regulator for pressure independent air volume control.
 - 2. Complies with UL 2043 for heat and smoke release.
 - 3. Complies with AMCA 500-D for the allowable leakage rates.
 - 4. Airflow regulator to be field adjustable.
 - 5. Provide marks on ductwork and exterior of insulation to mark the location of the constant flow regulator.
- B Construction:
 - 1. Nominal Diameter: See Drawing Schedule
 - 2. Frame: Thermoplastic resin in compliance with UL 94.
 - 3. Blade: Thermoplastic resin in compliance with UL 94.
 - 4. Bearings: Hydraulic blade dampener.
 - 5. Outer Seal: Removable rubber gasket-type around circumference of damper.
 - 6. Spring: Stainless steel leaf-type.
 - 7. Temperature Range: 25 to 150 degrees F .
 - 8. Operating Range: 0.15 to 1.2 in-wc.
- C Accessories:
 - 1. Provide airflow regulators with rectangular to round transitions.
- D Manufacturers:
 - 1. Aldes
 - 2. Automatic Airflow Balancing, a brand of Metal Industries Inc:
www.airflowbalancing.com/#sle.
 - 3. Ruskin Company: www.ruskin.com/#sle.
 - 4. United Enertech: www.unitedenertech.com/#sle.
 - 5. Walkair

2.9 MISCELLANEOUS PRODUCTS

- A Flexible Duct Elbow Support
 - 1. Manufacturer
 - a. FlexRight
 - 2. Clasified UL2043
 - 3. Size: 4" to 16" diameter
 - 4. Suppor Radius >8"
 - 5. ASHRAE Compliant
 - 6. Material: Recycled Polypropylene
- B Return Air Canopy

1. Return air canopies shall be constructed in accordance with ASHRAE and SMACNA Standards for the pressure and velocity classification specified for the air distribution system which is installed.
2. Return air canopies shall be constructed of:
 - a. 24 gauge solid steel casing
 - b. Acoustic media
 - c. Absorptive acoustic fiberglass media.
3. Acoustic media:
 - a. Fiber free foam:
 - 1) Fiber free foam shall be self-sealing engineered foam that will not expose fibers to the airstream.
 - 2) Fiber free foam shall be in accordance with erosion requirements of UL 181, and shall conform to the physical properties and Requirements of ASTM C1071
 - 3) Mold growth and humidity requirements shall be in accordance with ASHRAE Standard 62.1.
4. Fire-Performance Characteristics:
 - a. Air transfer silencer assemblies, including acoustic media fill, sealants, and acoustical spacers shall have combustion rating equal to or less than shown below when tested according to ASTM E84, NFPA 255 or UL 723
 - 1) Flame-spread index not exceeding 25
 - 2) Smoke-developed index not exceeding 50

PART 3 EXECUTION

3.1 PREPARATION

- A Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 3100 for duct construction and pressure class.
- B Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C Provide duct test holes where indicated and required for testing and balancing purposes.
- D Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
- E Use splitter dampers only where indicated.
- F Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION 23 3300

SECTION 23 3423 - HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Ceiling exhaust fans.

1.2 RELATED REQUIREMENTS

- A Section 23 0548 - Vibration and Seismic Controls for HVAC.
- B Section 23 3300 - Air Duct Accessories: Backdraft dampers.

1.3 REFERENCE STANDARDS

- A AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B AMCA 99 - Standards Handbook; 2016.
- C AMCA 204 - Balance Quality and Vibration Levels for Fans; 2020.
- D AMCA 210 - Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating; 2016.
- E AMCA 300 - Reverberant Room Method for Sound Testing of Fans; 2014.
- F AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

- A Coordination: Coordinate fan roof curbs and service utilities installation according to fan size.
- B Sequencing: Ensure that utility connections are completed in an orderly and expeditious manner.

1.5 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data on fans and accessories, including fan curves with specified operating point plotted, power, rpm, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C Manufacturer's Instructions: Indicate installation instructions.
- D Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 POWER VENTILATORS - GENERAL

- A Static and Dynamically Balanced: Comply with AMCA 204.
- B Performance Ratings: Comply with AMCA 210, bearing certified rating seal.
- C Sound Ratings: Comply with AMCA 301, tested to AMCA 300, bearing certified sound ratings seal.

- D Fabrication: Comply with AMCA 99.
- E Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.3 CEILING EXHAUST FANS

- A Centrifugal Fan Unit: V-belt or direct driven with galvanized steel housing lined with acoustic insulation, resiliently mounted motor, gravity backdraft damper in discharge.
- B Disconnect Switch: Cord and plug-in housing for thermal overload protected motor and control noted on drawing schedule..
- C Grille: Molded white plastic.
- D Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is reached with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.
- E Accessories
 - 1. Radiation Damper installed in fan assembly.
- F Performance Ratings: As indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Hung Cabinet Fans:
 - 1. Install fans with resilient mountings and flexible electrical leads, see Section 23 0548.
 - 2. Install flexible connections between fan and ductwork; see Section 23 3300. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.
- C Install backdraft dampers on inlet to roof and wall exhausters.
- D Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.

3.2 SCHEDULES - SEE DRAWING SCHEDULES

END OF SECTION 23 3423

SECTION 23 3700 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Rectangular ceiling diffusers.
- B Duct-mounted supply and return registers/louvers.
- C Ceiling supply registers/grilles.
- D Ceiling exhaust and return registers/grilles.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2023.
- B ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Air Inlets; 2023.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.5 QUALITY ASSURANCE

- A Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B Test and rate louver performance in accordance with AMCA 500-L.
- C Provide room schedule and coordinate with general items located in the ceiling and floor. Ceiling items include but are not limited to lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and moldings.
- D Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 RECTANGULAR CEILING DIFFUSERS

- A Type: Provide rectangular and square formed adjustable, backpan stamped, core removable, and Plaque ceiling diffusers constructed to maintain 360 degree discharge air pattern.
- B Connections: Round.
- C Frame: Provide surface mount, snap-in, inverted T-bar, and spline type. In plaster ceilings, provide plaster frame and ceiling frame.
- D Fabrication: Steel with baked enamel finish.
- E Color: As indicated.
- F Accessories: Provide radial opposed blade and butterfly volume control damper; plaster ring and gaskets for surface mounted diffusers with damper adjustable from diffuser face.

2.3 DUCT-MOUNTED SUPPLY AND RETURN REGISTERS/LOUVERS

- A Type: Duct-mounted, rectangular register for round-spiral duct with adjustable pivot-ended blades, end caps, built-in volume damper, and dual cover flanges to lay flush on duct surface regardless of diameter. Performance to match manufacturer's catalog data.
- B Material: 22 gauge, 0.0299 inch.
 - 1. Provide crossing spiral fitting-body of matching duct diameter.
- C Color: As indicated on drawings.

2.4 CEILING SUPPLY REGISTERS/GRILLES

- A Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.
- B Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C Construction: Made of aluminum extrusions with factory enamel finish.
- D Color: As indicated.
- E Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.
- F Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

2.5 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
- B Frame: 1-1/4 inch margin with countersunk screw mounting.
- C Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D Color: As indicated.
- E Solid Ceiling Accessory: Provide plaster ring for all diffusers in solid surface ceiling with gaskets.

PART 3 EXECUTION

3.1 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- C Install diffusers to ductwork with air tight connection.
- D Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.2 CLOSEOUT ACTIVITIES

- A Demonstrate operational system to Owner's representative.
- B Instruct Owner's representative to maintain system and use occupant controls or interfaces, as required.

3.3 PROTECTION

- A Protect installed products until completion of project.
- B Replace, repair, or touch-up damaged products before Substantial Completion.

END OF SECTION 23 3700

SECTION 23 5400 - FURNACES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Forced air furnaces.
- B Refrigeration Components
- C Thermostats.
- D Equipment Drains and Overflows
- E Equipment Drain Insulation
- F Equipment Mounting

1.2 REFERENCE STANDARDS

- A ANSI Z21.47 - American National Standard for Gas-Fired Central Furnaces; 2021.
- B ASHRAE Std 103 - Method of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; 2022.
- C ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.
- D ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- E ASTM B32 - Standard Specification for Solder Metal; 2020.
- F ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.
- G ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- H ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2025.
- I ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2021a.
- J ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2025a.
- K ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2024.
- L ASTM D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2020 (Reapproved 2024).
- M NEMA MG 00001 - Motors and Generators; 2024.
- N NFPA 54 - National Fuel Gas Code; 2024.
- O NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- Q NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances; 2024.
- R UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

- C Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
- D Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- E Project Record Documents: Record actual locations of components and connections.

1.4 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 WARRANTY

- A See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B Provide ten year manufacturers warranty for heat exchangers.
- C Provide 5 years on integrated circuit boards and integrated ignition parts
- D Provide 5 years on draft inducer motor

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A Comply with NFPA 70.
- B Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- C Subject to BABAA compliance requirements. All products shall match basis of design quality and performance. Any product substitutions shall be provided with full BABBA compliance documentation.

2.2 GAS FIRED FURNACES

- A Manufacturers:
 - 1. Variable Volume Zoned Systems
 - a. Carrier Corporation, a brand of United Technologies Corporation Building & Industrial Systems:
 - 2. Constant Volume Systems
 - a. Carrier
 - b. Daikin
 - c. Rheem Manufacturing Company Inc: www.rheem.com/#sle.
 - d. York International Corporation / Johnson Controls: www.york.com/#sle.
- B Annual Fuel Utilization Efficiency (AFUE): 0.95 ("condensing") in accordance with ASHRAE Std 103.
- C Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
 - 1. Safety certified by CSA in accordance with ANSI Z21.47.
 - 2. Venting System: Direct.
 - 3. Combustion: Sealed.
 - 4. Air Flow Configuration: Downflow.
 - 5. Heating: Natural gas fired.
 - 6. Intake and Vent Materials

- a. Polypropylene Vent UL-1738 Centrotherm or equal
 - b. PVC System by Ipex UL 1738 along with all rated fittings
 - c. Standard PVC not approved
7. Accessories:
 - a. Condensate drain.
 - b. Roof termination kit
 - c. Wall termination kit.
 - d. Provide Manufactured 4" Filter Rack 20x25x4 or
 - e. Provide furnace return support plenum with Filter 20x25x4
8. Performance:
 - a. Refer to Furnace Schedule. Gas heating capacities are sea level ratings.
9. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner. Provide pad for furnace as needed to set on combustible floor if applicable.
10. Primary Heat Exchanger:
 - a. Material: Hot-rolled steel.
 - b. Shape: Tubular type.
11. Secondary Heat Exchanger:
 - a. Material: Stainless steel.
 - b. Shape: Serpentine, clamshell, or tubular.
12. Gas Burner:
 - a. Atmospheric type with adjustable combustion air supply.
 - b. Gas valve, variable capacity provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
 - c. Electronic pilot ignition, with electric spark igniter.
 - d. Non-corrosive ECM combustion air blower with permanently lubricated motor.
13. Gas Burner Safety Controls:
 - a. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
 - b. Flame rollout switch: Installed on burner box and prevents operation.
 - c. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
 - d. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.
14. Supply Fan: Centrifugal type rubber mounted with direct drive.
15. Motor: ECM Motor controlled by integrated furnace blower controller.
16. Air Filters: 4" thick glass fiber, disposable type arranged for easy replacement.
17. Operating Controls:
 - a. Room Thermostat: Cycles burner to maintain room temperature setting.

- b. Supply Fan Control: Energize from bonnet temperature independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation. Provide continuous low speed fan operation.
- 18. Refrigerant Detection
 - a. Furnaces with R-32 or R454B shall have on board refrigerant detections systems which comply with authority having jurisdiction.

2.3 ELECTRIC FURNACES

- A Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
 - 1. Air Flow Configuration: Multipoise.
 - 2. Heating: Electric.
- B Cabinet: Steel with baked enamel finish, easily removed and secured access doors, glass fiber insulation and reflective liner.
- C Supply Fan: Centrifugal type rubber mounted with direct drive motor.
- D Motor:
 - 1. 1750 rpm multiple speed, permanently lubricated, hinge mounted.
 - 2. Comply with NEMA MG 00001.
- E Electric Heater: Helix wound bare nichrome wire heating elements arranged in incremental states of 5 kW each, with porcelain insulators.
- F Electric Heater Operating Controls:
 - 1. Low voltage adjustable room thermostat energized heater stages in sequence with pre-determined delay between heating stages.
 - 2. High limit temperature control de-energizes heating elements, automatic resets.
 - 3. Supply fan starts before electric elements are energized and continues operating after thermostat is satisfied until bonnet temperature reaches minimum setting. Include manual switch for continuous fan operation.
 - 4. Outdoor thermostat locks out some heating elements until outdoor temperature drops.
- G Air Filters: 4 inch thick glass fiber, disposable type arranged for easy replacement.
- H Performance: See Drawing Schedule

2.4 REFRIGERATION COMPONENTS

- A General Refrigeration Component Requirements:
 - 1. Refrigeration compressor, coils, and specialties shall be designed to operate with CFC-free refrigerants.
 - 2. Energy Efficiency: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Standard for Buildings except Low-Rise Residential Buildings."
- B Refrigerant Coil: Copper tubes mechanically expanded into aluminum fins. Comply with ARI 210/240, "Unitary Air-Conditioning and Air-Source Heat Pump Equipment." Match size with furnace. Include condensate drain pan with accessible drain outlet complying with ASHRAE 62.1.
 - 1. Refrigerant Coil Enclosure: Steel, matching furnace and evaporator coil, with access panel and flanges for integral mounting at or on furnace cabinet and galvanized sheet metal drain pan coated with black asphaltic base paint.

- C 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, 1/2 inch thick.
- D 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 gage ports on exterior of casing.
 - 2. Compressor: Hermetically sealed scroll type.
 - 3. Crankcase heater.
 - 4. Vibration isolation mounts for compressor.
 - 5. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
 - 6. Multi-speed compressor motors shall have manual-reset high-pressure switch and automatic-reset low-pressure switch.
 - a. Minimum two stage compressor or variable speed.
- E Refrigerant Charge: Puron, R32, or R-454B
- F Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- G Heat-Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- H Fan: Aluminum-propeller type, directly connected to motor.
- I Motor: Permanently lubricated, with integral thermal-overload protection.
- J Low Ambient Kit: Permits operation down to 10 deg F.
- K Mounting Base: Polyethylene.
- L Capacities and Characteristics: See drawing schedule.
- M Compressor-Condenser Unit:
 - 1. Cooling Energy Efficiency (SEER): 17 or greater
 - 2. Volts: 208-240.
 - 3. Phase: 1.
 - 4. Hertz: 60.

2.5 THERMOSTATS

- A Manufacturers:
 - 1. Carrier Corporation for zone controlled systems.
 - 2. Honeywell Thermostates with wireless access for single zone systems.
- B Room Thermostat: Low voltage, electric solid state microcomputer based room thermostat with remote sensor:
 - 1. Honeywell Pro 9000 Smarth Color Touchscreen Thermostat
 - 2. System selector switch (heat-off) and fan control switch (auto-on).
 - 3. Preferential rate control to minimize overshoot and deviation from setpoint.
 - 4. Set-up for four separate temperatures per day.
 - 5. Instant override of setpoint for continuous or timed period from one hour to 31 days.
 - 6. Programming based on weekdays, Saturday and Sunday.

7. Selection features including degree F or degree C display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
8. WiFi Capable
9. Battery replacement without program loss.
10. Thermostat Display:
 - a. Actual room temperature.
 - b. Programmed temperature.
 - c. System Mode Indication: Heating, cooling, fan auto, off, and on, auto or on, off.

2.6 EQUIPMENT DRAINS AND OVERFLOWS

- A Copper Tube: ASTM B88 (ASTM B88M), Type M (C), drawn; using one of the following joint types:
 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
- B PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
 1. Fittings: ASTM D2466 or D2467, PVC.
 2. Joints: Solvent welded in accordance with ASTM D2855.

2.7 EQUIPMENT DRAIN INSULATION

- A Flexible Elastomeric Insulation
 1. Manufacturers:
 - a. Aeroflex USA, Inc: www.aeroflexusa.com/#sle.
 - b. Armacell LLC; ArmaFlex Ultra with FlameDefense: www.armacell.us/#sle.
 - c. K-Flex USA LLC; K-Flex Titan: www.kflexusa.com/#sle.
 2. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 3. Minimum Service Temperature: Minus 40 degrees F.
 4. Maximum Service Temperature: 180 degrees F.
 5. Connection: Waterproof vapor barrier adhesive.
 6. Plenum Rated
- B Provide 3/8" insulation on all equipment drains and overflows above ceilings and routed in concealed shafts and spaces.

2.8 EQUIPMENT MOUNTING (GROUND)

- A Provide 4" reinforced concrete pad which is a minimum of 6" larger in each direction. Pad shall be minimum of 3" above surrounding grade.
- B Provide 18" heat pump stand on top of concrete pad for all heat pump style units.
- C Pad shall be located a minimum of 18" away from exterior wall and space shall be filled with gravel or space shall be filled with concrete.

PART 3 EXECUTION

3.1 EXAMINATION

- A Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B Verify that proper power supply is available and located correctly.
- C Verify that proper fuel supply is available for connection.

3.2 INSTALLATION

- A Install in accordance with manufacturer's instructions and requirements of authorities having jurisdiction.
- B Install in accordance with NFPA 90A.
- C Install gas fired furnaces in accordance with NFPA 54.
- D Install ground-mounted, compressor-condenser components on 4-inch-thick, reinforced concrete base; 4 inches larger on each side than unit. Place unit on premanufactured heat pump stand.
- E Provide vent connections in accordance with NFPA 211.
- F Mount counterflow furnaces installed on combustible floors on additive base.
- G Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
- H Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.
 - 1. Anchor furnace to substrate to resist code-required seismic acceleration.
- I Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect Polypropylene 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:
 - 4. Slope pipe vent back to furnace or to outside terminal.
- J Complete installation and startup checks and start units according to manufacturer's written instructions.
- K Verify proper operation of capacity control device.
- L Adjust airflow and initial temperature and humidity set points.
- M 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 and cooling performance and system efficiency.
- N Connect refrigerant tubing kits to refrigerant coil in furnace and to air-cooled, compressor-condenser unit.
 - 1. Flared Joints: Use ASME B16.26 fitting and flared ends, following procedures in CDA's "Copper Tube Handbook."
 - 2. 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.
 - 3. 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.

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- O After completing installation, clean furnaces internally according to manufacturer's written instructions.
- P Install new filters in each furnace within 14 days after Substantial Completion.

END OF SECTION 23 5400

SECTION 23 7200 - AIR-TO-AIR ENERGY RECOVERY EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A Energy recovery ventilators.

1.2 RELATED REQUIREMENTS

- A Section 23 0548 - Vibration and Seismic Controls for HVAC.
- B Section 26 0583 - Wiring Connections.

1.3 REFERENCE STANDARDS

- A AHRI 1060 (I-P) - Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment; 2018.
- B ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2025.
- C ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D ASHRAE Std 135 - A Data Communication Protocol for Building Automation and Control Networks; 2020, with Errata (2023).
- E NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.

1.4 SUBMITTALS

- A See Section 01 3000 - Administrative Requirements for submittal procedures.
- B Shop Drawings: Show design and assembly of energy recovery unit and installation and connection details.

1.5 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.
- B Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.

1.7 WARRANTY

- A See Section 01 7800 - Closeout Submittals for additional warranty requirements.
- B Manufacturer Warranty: Provide 1-year manufacturer warranty for equipment including parts, materials, workmanship, and operation commencing on date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

REGULATORY REQUIREMENTS

3.1 SUBJECT TO BABAA COMPLIANCE REQUIREMENTS. ALL PRODUCTS SHALL MATCH BASIS OF DESIGN QUALITY AND PERFORMANCE. ANY PRODUCT SUBSTITUTIONS SHALL BE PROVIDED WITH FULL BABBA COMPLIANCE DOCUMENTATION.

3.2 ENERGY RECOVERY VENTILATOR

- A ERV Equipment Performance Requirements: See Drawing Schedule
- B ERV Equipment Construction Requirements:
 - 1. Energy Recovery Exchanger Type: Membrane plate.
 - 2. Supply and Return Duct Connection Orientation: As indicated on drawings.
 - 3. Casing and Frame:
 - a. Frame: Formed single wall insulated metal cabinet to provide access to all internal components for maintenance.
 - b. Case walls and doors shall be fully insulated with 1", expanded polystyrene foam insulation faced with a cleanable foil face on all exposed surfaces.
 - c. Doors: Construct doors of same construction and thickness as wall panels. Include p-shaped extruded neoprene gasket, prop rod, chain with spring, exterior handle, and interior 3-point latching device. Label each door to identify equipment located within.
 - d. Access Panels: Provide access to components through a large, tightly sealed and easily removable hinged or screwed access panel.
 - e. Finish: Polyurethane enamel over weather-protected, corrosion-resistant assembly.
 - f. Nameplate: Permanent name plate listing manufacturer, model number, serial number, voltage with tolerance, and amp ratings mounted inside door near electrical panel.
 - 4. Supply and Exhaust Fans:
 - a. The fan shall be backward-curved statically and dynamically balanced
 - b. The supply and exhaust motors shall be electronically commutated (EC) motors with multispeed capability as standard.
 - 5. Filter Sections:
 - a. Outdoor-Intake and Exhaust Sides: 1 inch thick, pleated, MERV 11 filters, ASHRAE Std 52.2.
 - b. Filter Racks: Bolt-on rack constructed of aluminum with minimum size of 1/12 inch thick. Include hinged side access door and snap fasteners.
 - 6. Electrical: See Drawings schedule
 - 7. Unit Controls
 - a. Unit shall have capacity to operate continuously without the need for bypass, recirculation, pre-heaters, or defrost control.
 - b. The unit shall have internal 24 VAC transformer and relay
 - c. The ERV operated on low airflow until one of the following energizes the ERV to operate on high flow.
 - 1) Occupancy Sensor

- 2) Carbon Dioxide Sensor
- 3) IAQ Sensor
- 4) Boost Mode push button
- 5) Proportional Run Timer
- 6) Time clock
8. BAS, SCADA, or other Integrated Automation Link: ASHRAE Std 135 BACnet MS/TP.
9. Configuration: Adjust listed requirements in conformance with ASHRAE Std 90.1 I-P.
10. Certification: AHRI 1060 (I-P) labeled, include copy of published ratings for operating conditions.

PART 3 EXECUTION

4.1 EXAMINATION

- A Verify that structure is ready for installation including openings, ductwork, mechanical utilities, and electrical utilities.

4.2 INSTALLATION

- A Install equipment in accordance with manufacturer's written installation instructions.
- B Do not obstruct maintenance access to equipment piping, electrical conduit, or any other utility.
- C Vibration Isolation: Provide corrosion-resistant equipment isolation products; see Section 23 0548.
- D Electrical: Provide equipment raceway, wiring, and cables; see Section 26 0583.
- E Coordinate installation and fire alarm system interface of system compatible duct-mounted smoke detectors and other appurtenances following NFPA 90A guidelines.
- F Start system and adjust controls and equipment for satisfactory operation.

4.3 SYSTEM STARTUP

- A Provide services of manufacturer's authorized representative to provide start up of unit.

4.4 CLEANING

- A Clean filters, air plenums, interior and exposed-to-view surfaces prior to Substantial Completion.

END OF SECTION 23 7200

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 – GENERAL

1.1 DESCRIPTION

A. Specification Format

1. These Specifications are written in imperative and abbreviated form. This imperative language of the technical sections is directed at the Contractors, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "the Contractor shall", and "shall be", and similar mandatory phrases by inference in the same manner as they are applied to notes on the Drawings. The words "shall be" shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, perform all indicated requirements whether stated imperatively or otherwise.
2. Three Part Format
 - a. "Part 1.0 - General": Covers those areas which relate to the Work, and which define the general administrative and technical requirements specific to a particular section.
 - b. "Part 2.0 - Products": Defines, in detail, the acceptance equipment and materials to be incorporated into the Work.
 - c. "Part 3.0 - Execution": Describes, in detail, the manner in which items covered by Part 2 are to be incorporated into the Work.
3. Where Codes, Specifications and Drawings are in conflict, the Contractor will be deemed to have bid the more expensive method. Refer all such discrepancies immediately to the Engineer prior to commencing related work.

B. Definitions

1. "Furnish" - Supply equipment as required by these Drawings and Specifications, delivered to the job site for installation or use by others.
2. "Install" - Fix in position for total operational use all apparatus as shown, specified or required. Provide all miscellaneous fittings and wiring supplies.
3. "Or Approved Equal" - Equipment or materials selected by Contractor subject to Engineer's acceptance.
4. "Or Equivalent" - Equipment or materials selected by Contractor matching the function and performance of equipment or materials listed.
5. "Provide" - Furnish and install in place, total and operational.
6. "Manufacturer's Representative" – person properly trained/certified for the specific equipment and a regular employee of the Manufacturer, the Manufacturer's Representative Agency, a third party specializing company, or the selling distributor.
7. "Substantial Completion" - The date when the project has been completed, inspected, and accepted by the Engineer and Owner.

C. Work Included

1. Provide labor, equipment and materials in connection with Work specified and shown on Drawings.

2. Work of this Division is subject to requirements of Instructions to Bidders, General Conditions, Supplementary Conditions, Division One, and all other sections of this Specification.
 3. Examine site and all Contract documents prior to submittal of bid.
- D. Work Installed But Furnished Under Other Directives
1. Provide service for electrically operated equipment not specified in Division 26 & 27. Verify size and locations of such connections by securing all rough-in requirements from the equipment supplier.
 2. Equipment requiring electrical service shall be furnished with motors, special controls and remote electrical devices as specified in other Divisions.
 3. Verify extent of controls and devices furnished by referring to Divisions where Work is specified.
 4. Provide disconnects, starters, control devices, thermal units, fuses, switches and all necessary power and control wiring. Include the installation of remote electrical devices furnished separately with the equipment. Provide identification for remote devices as directed by the Engineer.
 5. Contractors of other Divisions providing electrically operated equipment shall verify with the Electrical Contractor the proper voltage and phase before releasing equipment for shipment.
 6. Unless otherwise specified, Contractor responsible for furnishing such equipment is also responsible for setting in place.

1.2 ALTERNATES

- A. General
1. The work of this Section is affected by the Alternates described in this Specification.
- B. Alternate E-1
1. The Owner wishes to know in advance the possible cost to
 2. Base Bid:
 3. Under Alternate Bid E-1 on the Bid Form, state the Contract Sum to

1.3 CONTINGENCY

- A. Use contingency only on issuance of Change Orders.
- B. Refer to Division 1 for the amount to include in the Electrical Bid.
- C. Money remaining in contingency at close of project will be credited to the Owner by Change Order.

1.4 SUBMITTALS

- A. Substitution and Prior Approval to Quote.

1. The reference to manufacturer's name and catalog or model numbers shall be interpreted as establishing a standard of quality, not as limiting competition.
2. Suppliers wishing to price material or equipment not referenced in Specifications or on Drawings shall apply in writing to Engineer for approval to quote. Electronic submittals shall be in PDF format. Include complete descriptive technical data on the proposed item consisting of: model numbers, type, size and performance characteristics. Procedure also applies to requests by Contractor. Self-addressed, stamped envelope required for return reply.
3. The request for prior approval to quote shall be received in Engineer's office no later than 192 hours (eight days) prior to bid opening. All substitute items approved for quotation will be listed in Addenda sent to all planholders in advance of bid opening.
4. Contractors choosing to use material or equipment other than those shown on Drawings or specified in detail, but approved for quotation, shall be responsible for physical dimensions and coordination. Architect, Engineer, or Owner will not be responsible for costs of necessary changes and additional work required by Contractor or any other trades.
5. Substitutions will not be permitted after bid opening.

B. Correspondence

1. Direct all correspondence concerning Division 26 & 27 submittals to:

CHARLES MONSON
PRAIRIE ENGINEERING, P.C.
1905 17TH ST SE
MINOT, ND 58701
cmonson@prairieengineeringpc.com

C. Shop Drawings

1. Before any of the materials are delivered to the job, submit to Engineer via the Prime Contractor complete Shop Drawings for each item indicated.
2. Include catalog numbers, performance data, dimensions and other descriptive information.
 - a. The actual part numbers and options for equipment to be utilized shall be highlighted to indicate exact equipment to be furnished.
 - b. Only include information relevant to the equipment being provided. Any extraneous materials shall be removed prior to submittal.
3. Shop Drawings shall be in electronic PDF format and shall include catalog sheets showing all necessary information. Shop drawings shall be separated by specification section, and equipment from separate specification sections shall not be combined.
4. Shop Drawings shall be submitted under the appropriate specification section of the electronic submittal service being used. The shop drawing file for each section shall include the specification section number, section name, and revision number. Example: "262726 Wiring Devices REV 01".

- a. If an electronic submittal service is not being used, shop drawings may be emailed to the Engineer at the email address indicated above. Emailed shop drawings shall not exceed 10 MB. If shop drawings exceed 10 MB, contact the Engineer to arrange for a file transmittal method.
5. Each Shop Drawing folder shall be **stamped, initialed, and dated**, on a cover sheet included in the PDF submittal by Division 26 Contractor to indicate they have thoroughly reviewed them in accordance with General Conditions. **Email message text not acceptable.**
 - a. If the Division 26 contractor is under a Prime Contractor, the Prime Contractor may also include a review stamp. However this does not relieve the Division 26 contractor from applying their review stamp.
6. Shop Drawings not in conformance with Specification will be returned to Prime Contractor without review.
7. A maximum of two reviews will be completed for each section. Additional submittals required due to lack of proper corrections being made may be subjected to review fees from the Engineer billed to the Division 26 contractor.

D. As-Built Drawings

1. Designate one set of clean blueprints at project site as As-Built Drawings. Make As-Built Drawings available to Engineer during project visitation.
2. As work progresses, Contractor's field supervisor shall mark As-Built Drawings in red pencil to indicate actual conditions of installation.
3. Show same general details as Drawings.
4. Give particular attention to marking actual locations of feeders and underground runs.
5. Affix all addendum and change order descriptions to appropriate as-built drawing sheet, utilizing spray adhesive.
6. Submit As-Built Drawings to Engineer along with Record Manuals at close of project in PDF format.
 - a. As-Built Drawings shall be submitted as one PDF file.
 - b. Record Manuals shall be submitted as one PDF file.
7. Provide minimum one hard copy of As-Built Drawings to the Owner.
8. Review Division 1 for additional requirements for hard copies of As-Built Drawings.

E. Record Manuals

1. Upon completion of Work of this Division and as condition of its acceptance, Contractor shall compile Record Manuals.
 - a. List project name, date, Contractor's name, address and telephone number on exterior label of each Record Manual.
 - b. Provide one electric PDF copy to Engineer for review.
 - 1) After electronic PDF copy is reviewed and approved, provide one hard copy of Record Manual to Owner. Include an index sheet indicating each major piece of equipment, supplier and supplier's telephone number. Provide tabbed dividers indicating major groupings of equipment.
 - 2) Review Division 1 for additional requirements for hard copies of Record Manuals.

- c. Record Manual information shall be included for all equipment/material where Shop Drawings are required. **Also include all installation, operation and maintenance data packaged with any equipment.**
2. Turn over to Owner all spare equipment and devices specified and shown. List quantities on contractor letterhead or invoice, obtain signature of Owner's representative acknowledging receipt, and include with each Record Manual.
3. Include one copy of formal instructional recordings, properly identified as to specification section.
4. Include copy of State Electrical Board Wiring Certificate in each Record Manual.
5. Include service equipment fault current calculation and step-down transformer fault current calculations in record manuals. Utility transformer fault current shall be calculated per Section 260553-3.3. Step-down transformer fault current shall be calculated per Section 262200-1.2. Provide in tabular form, as per the following example:

Transformer	kVA	Sec. Voltage	Phase	Impedance	Fault Current	Date Calculated
Utility	300	480	3	1.06%	34,043 amps	11/15/2016
T-1	150	208	3	3.8%	10,958 amps	11/15/2016

6. Calculate the available fault current (AFC) for the mechanical and electrical equipment listed and provide the information in tabular form, utilizing naming convention on the drawings.
 - a. HVAC Equipment 1HP and larger
 - b. Refrigeration Equipment
 - c. Elevator Equipment
 - d. Industrial Control Panels
 - e. Electrical Distribution Equipment
 - f. Branch Panelboards
 - g. MCC's.

7. Fault Current Table Format Example:

Equipment	Voltage	Phase	AFC at Equip.	Date Calculated
AH-1	480	3	5,289 amps	11/15/2016
CU-1	208	3	2,321 amps	11/15/2016

8. Transformer fault current table and equipment fault current calculation table shall be grouped together in the same tabbed section of the record manuals.

1.5 QUALITY ASSURANCE

A. Qualifications of Installers

1. For installation and testing, use only trained licensed and experienced workmen familiar with items required and manufacturer's recommended methods.
2. In acceptance or rejection of installed work, no allowance will be made for lack of skill on the part of the workmen.
3. To the maximum extent possible, retain the same supervisory personnel throughout the duration of the Work.

- B. Licenses, Permits, Codes and Standards
 - 1. Materials, workmanship and installation: comply with the latest editions of all applicable codes, local ordinances, industry standards, utility company regulations, insurance carrier requirements and these Specifications.
 - 2. Codes and standards shall include, but not necessarily be limited to, the following:
 - a. Underwriters Laboratories (UL) or other Nationally Recognized Testing Laboratory (NRTL)
 - b. National Electrical Code (NEC)
 - c. National Fire Protection Association (NFPA)
 - d. Occupational Safety and Health Act (OSHA)
 - e. State and local wiring standards
 - f. Building and fire codes
 - 3. The more stringent provisions shall govern where provisions of pertinent codes and standards conflict with these Specifications or Drawings. Where Codes, Specifications or Drawings differ with one another, the Contractor will be deemed to have bid the more expensive method. Refer all such discrepancies to the Engineer immediately.
 - 4. Pertinent codes and standards shall not be cited to furnish less than specifically shown or specified.
 - 5. Obtain and pay all permits, inspections, licenses and other charges pertaining to the Work. Upon completion of the Work, furnish proof of acceptance by proper agency having jurisdiction.

1.6 GUARANTEE AND WARRANTY

- A. Unless otherwise modified by other sections of this specification, contractor shall guarantee materials, workmanship and the proper operation of equipment for a period of one year. Warranty period shall begin at date of substantial completion, or date of specific equipment commissioning, whichever is later. Contractor shall correct all equipment, material and workmanship found to be defective or non-conforming to the contract documents without cost to Owner.
- B. Guarantee shall include trips to the project site by Contractor to adjust electrical equipment as required, ensuring it is operating as intended.
- C. Specified guarantee shall not relieve Contractor from liability arising from improper installation or non-compliance with applicable codes.
- D. Contractor shall include written warranty statement, indicating start and end dates of warranty period. Warranty statement shall be included with each copy of the Record Manuals.

1.7 CHANGES TO CONTRACT

- A. Any required changes to the contract after bid date shall be in accordance with General Conditions/Division 1 and this section. Where any discrepancies between the sections are encountered, the more restrictive section shall apply.
- B. Proposed changes shall be accompanied with complete substantiating documentation.

1. Provide an itemized list of quantities for materials, equipment, and supplies.
 - a. Include unit costs for each item and extended price.
 - b. Include unit labor for each item and extended time.
 2. Provide subcontractor proposals that include the same substantiating documentation.
 3. Provide quotations from suppliers for any specially ordered equipment.
- C. Material costs shall be actual costs to the contractor, obtaining the materials through normal supply channels, including trade and quantity discounts. Utilizing "suggested pricing" from national pricing organizations for unit costs shall not be accepted. Upon request, the contractor or subcontractor shall submit evidence to substantiate the costs.
- D. Labor units shall be industry accepted standard labor hours to perform one unit of work. If the work is being performed in a location that is not considered to be standard working conditions for that specific task, additional labor shall be itemized.
- E. Labor rates shall be the actual rate paid for the workman category along with associated labor burden. Labor burden shall consist only of the mandatory fringe benefits, labor taxes, and labor insurances as affected by payroll. The owner reserves the right to reject any labor burden which is inconsistent with other similar contractors or where the fringe benefit cost is in excess of established labor agreements.
- F. Allowable markups for contractor and subcontractors
1. Overhead on work performed by own forces: Refer to Division 1.
 2. Profit on work performed by own forces: Refer to Division 1.
 3. Commission on work performed by Subcontractors: Refer to Division 1.
 4. Sales tax.
 5. Bond and permit increases where applicable.
- G. No additional markups shall be allowed for:
1. Field and/or office supervision/administration time.
 2. Tool burden.
 3. Shop burden.
 4. Overhead/Profit applied to work performed by others.
- H. Additional costs for travel and subsistence shall only be allowed if the proposal includes a request for extension of the completion date. Furthermore, those costs shall be proportional to the number of working days of the extension.
- I. Subcontractors shall compute their costs in the same manner as the contractor. Subcontractors are subject to the same markup constraints as described herein.
- J. For changes resulting in credit to the costs, no restocking fees for materials shall be applied by the contractor or subcontractors.

1.8 TEMPORARY FACILITIES

- A. Refer to Special Conditions and/or Division 1 for details of temporary facilities.

1.9 APPLICATIONS FOR PAYMENT

- A. Refer to Division 1 "Applications for Payment".
- B. Provide one additional copy, sent directly to the Engineer.
- C. Format and content:
 - 1. When included with the Bid, the following categories shall be indicated on the application for payment:
 - a. *Project mobilization.*
 - b. *Demolition.*
 - c. *Service & Distribution* (all switchgear, panels, transformers, motor control centers, and loose control/disconnects, installed in place).
 - d. *Lighting* (all fixtures and lamps, installed in place, including pre-fabricated wiring system).
 - e. *Wiring Devices* (all switches, receptacles, and plates, except voice-data, installed in place).
 - f. *Equipment Connections* (HVAC, elevator, food service, etc, connected in place).
 - g. *Basic Materials* (all conduit, wire, boxes, supports, fittings, grounding materials, except special systems and voice-data cabling systems, installed in place).
 - h. *Fire Alarm & Detection* (all system equipment, installed in place).
 - i. *Special Systems* (all system equipment and cabling, installed in place, broken out by Specification Section. Examples include Clock and Program, Intercom, Nurse Call, Public Address, Sound Reinforcement, Rescue Assistance, TV Signal Cabling, Architectural and Theatrical Lighting Controls, and the like).
 - j. *Generator* (all system equipment, installed in place).
 - k. *Voice-Data Cabling Systems* (all system equipment, installed in place).

PART 2 – PRODUCTS

2.1 MATERIAL

- A. Material and equipment shall be as shown or specified. Provide material not specifically described but required for a complete and proper installation of the Work, subject to the acceptance of the Engineer.
- B. All material and equipment shall be new when delivered to the job and be listed by a Nationally Recognized Testing Laboratory (NRTL).
- C. Owner will not be liable for material installed in non-compliance with codes, standards, and these Contract Documents.

2.2 PRODUCT HANDLING

- A. Protection
 - 1. Use all means necessary to protect the materials of this Division before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements
 - 1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 3 – EXECUTION

3.1 GENERAL

- A. Engineer, Architect, or Owner shall not be responsible for the means, methods, techniques, sequences or procedures of construction selected by Contractor.
- B. Engineer, Architect, or Owner shall not be responsible for safety precautions and programs incidental to work of Contractor.
- C. It is the sole responsibility of Contractor to initiate, maintain, and supervise all safety precautions and programs in connection with the Work.

3.2 SURFACE CONDITIONS

- A. Prior to work of each Section of Division 26 & 27, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work of this Division may be installed in accordance with all pertinent codes, regulations and standards.

3.3 COORDINATION

- A. Order material in a timely fashion to assure it is on the job site when required.
- B. Coordinate installation of material with schedule of other trades to prevent unnecessary delay in construction schedule.

3.4 DISCREPANCIES, CONSTRUCTION CONFLICTS AND DRAWINGS

- A. Discrepancies
 - 1. Prior to submitting bid, Contractor shall refer any apparent discrepancies or omissions to Engineer for clarification.
 - 2. The Architect, Engineer or Owner will not be responsible for any oral instructions or modifications to the contract documents prior to opening of bids.

3. Written interpretation or clarification will be made by Addenda.

B. Construction Conflicts

1. Conflicts discovered during construction shall be immediately called to the attention of the Engineer for decision.
2. Do not proceed with installation in area of question until conflict has been fully resolved.
3. When so directed by Engineer, Contractor shall make minor adjustment to avoid interferences with other trades. Such minor adjustments shall be performed at no additional cost to the Architect, Engineer or Owner.

C. Drawings

1. Drawings indicate extent and general layout of electrical systems for project. Due to small scale, it is not possible to indicate all fittings and accessories that may be required. Provide such fittings and accessories as required to form a complete and operating system in general conformance with Specifications and Drawings.
2. Data indicated on Drawings and in these Specifications is as exact as could be secured, but absolute accuracy is not guaranteed.
3. Exact locations, distances, levels and other conditions will be governed by the structure. Field measurements shall take precedence over the Drawings. Use the Drawings and these Specifications for guidance. Secure the Architect's approval for all changes in locations.
4. Verify all measurements at site. No compensation will be made because of difference between locations shown on the Drawings and measurements at the building.
5. Refer to the architectural drawings for dimensions and locations of walls, partitions, doors, windows, ceiling heights, door swings and other details of construction.

3.5 UNDERGROUND UTILITIES

- A. Locations of existing underground utilities are based on available site information and are shown approximately. Contractor shall determine exact utility locations before commencing work and shall be responsible for repair of damages resulting from his construction activities.
- B. Trench and backfill for installation of underground conduits to depth shown or required. Remove any accumulated water in excavation by pumping. Shore and brace excavation as required by safety regulations. Provide temporary bridges to maintain normal traffic flow. Excavation and backfill required by electrical installations shall be accomplished in accordance with Earthwork Specifications by this Contractor.

3.6 CUTTING AND PATCHING

- A. Carefully lay out all work in advance to minimize cutting, channeling or drilling.
- B. Where necessary, all such cutting and patching shall be done in a manner approved by Architect.

- C. Restore damaged surfaces to their original condition by skilled mechanics of the trade involved. Contractor at fault shall assume all cost.
- D. Use only rotary type drilling tools to cut concrete.
- E. Do not endanger the stability of the structure. Do not at any time cut or alter work of any other Contractor without Architect's consent.

3.7 TESTS

- A. Perform all tests as required by Engineer during construction and as described in other Sections of these Specifications.
- B. Testing of entire installation shall be completed before final inspection.

3.8 INSTRUCTIONS

- A. After all required approvals of the Work have been obtained; demonstrate the operation and maintenance of all electrical equipment to the Owner's personnel.
- B. Provide written and oral operating and maintenance instructions to Owner's representatives. The oral instructions shall be given before the Owner occupies the buildings. Instructions to include all building's electrical systems and equipment.
- C. Copies of written operating and maintenance instructions shall be included with each Record Manual.
- D. Electrical Contractor shall coordinate with Owner at Owner's convenience, formal instruction time for contractor personnel to instruct Owner's Representatives on all equipment. Provide similar equipment supplier's instructions where specified thus. Formal instruction to occur with each Record Manual, being referenced to and a part of the Manual.
- E. Formal instructions shall be recorded when required by other Sections of this Specification by this Contractor. Format shall be digital media capable of being played on Windows or Mac operating systems, or shall be submitted on a USB storage device.
 - 1. Electronic PDF files for the as-built drawings and record manuals shall also be included on the USB storage device with the formal instructions.

3.9 CLEAN UP

- A. Remove all scrap material left on job during and after installation of Work.
- B. All equipment having finished paint surfaces shall be examined upon completion for scratches and other damage. Touch up all surfaces as required with paint of color to match factory finish.
- C. Perform all cleaning as required by other Sections of Division 26 & 27.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

END OF SECTION

SECTION 260505 - TEMPORARY FACILITIES & CONTROLS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Work Included
 - 1. Temporary electricity.

1.2 PRODUCT HANDLING

- A. Protection
 - 1. Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout the progress of Work.
- B. Replacements
 - 1. In the event of loss or damage, immediately make all repairs and replacements necessary at no additional cost to Owner.

PART 2 – PRODUCTS

2.1 UTILITIES

- A. Temporary Facilities
 - 1. General: all costs, including utility company charges, required for the performance of temporary electrical system, shall be paid by Electrical Contractor.
 - 2. Energy charges: Refer to Division 1 for requirements.
 - 3. Temporary Electricity: Electrical Contractor shall:
 - a. Furnish and install all necessary temporary wiring.
 - b. Provide area distribution boxes located so the individual trades may use their own construction type extension cords.
 - c. Provide GFCI protection on all temporary power per NEC.

END OF SECTION

SECTION 260519 - CONDUCTORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide a complete system of conductors enclosed in a raceway.

1.2 SUBMITTALS

A. Record Drawings

1. Maintain accurate record drawings in accordance with Section 260500.

PART 2 – PRODUCTS

2.1 CONDUCTOR

A. Copper

1. Soft drawn, annealed.
2. Conductivity of not less than 98% pure copper.
3. Insulated for 600 volt service.
4. #10 AWG and smaller: Solid, THWN/THHN.
5. #8 AWG and larger: Stranded, THWN/THHN.
6. Provide USE where required by Code.

B. MC Cable

1. MC cable is not acceptable for use as a wiring method.

2.2 SPLICES

- A. #10 AWG and smaller: Scotchlock Y, R or G as manufactured by 3M Company, or equivalent.
- B. #8 AWG and larger: Compression type, as manufactured by Anderson, Burndy, Thomas and Betts Company, or equivalent.

2.3 LUBRICANT

A. General

1. NRTL-listed.
2. Flame resistant
3. Compatible with conductor insulation.

- B. Acceptable Manufacturer
 - 1. As selected by Contractor.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General
 - 1. Install in accordance with Code, product listing, and manufacturer's recommendations.
 - 2. Install wire and cable in Code-conforming raceways after moisture and debris is swabbed from conduit.
 - 3. Refer to system specified for conductor's peculiar to that system.
 - 4. Conductor sizes: Standard AWG, #12 minimum unless otherwise indicated.
 - 5. Fixture taps: minimum #16 AWG.
 - 6. Conductor temperature ratings: Compatible with the equipment to which it is to be connected. Refer to product listing.
 - 7. Make conductor length for parallel feeders identical.
 - 8. Derate ampacities as required for high ambient temperatures or conductor fill.
- B. Color
 - 1. Multi-wire (shared neutral) circuits.
 - a. 120/208 volt
 - 1) Phase conductors: Black, red or blue.
 - 2) Grounded conductor (neutral): White.
 - 3) Grounding conductor: Green or bare.
 - 2. Separate neutral circuits:
 - a. 120/208 volt
 - 1) Phase conductors: Black, red or blue.
 - 2) Grounded conductor (neutral): White with stripe colored to match phase.
 - 3) Grounding conductor: Green or bare
 - 3. Switch legs: Same as phase conductors.
 - 4. 120 volt isolated ground circuits:
 - a. Phase conductor: Orange.
 - b. Grounded conductor (neutral): White with orange stripe.
 - c. Grounding conductor: Green with yellow stripe.
- C. Splices
 - 1. Eliminate wherever possible.
 - 2. Made only at outlet or junction boxes.
 - 3. Obtain special permission from Engineer for any splices in feeder conductors.
- D. Voltage Drop
 - 1. Increase size of circuit wiring in accordance with NEC 210.19(A)(1), fine print note, No. 4.

2. Use #10 AWG minimum for all home run conductors longer than 75 feet on 120/208/240 systems and 150 feet on 277/480 systems.

3.2 TESTS

- A. After equipment and wiring is installed, and before it is energized, test all power circuits with a megohmmeter for insulation resistance, phase-to-phase and phase-to-ground faults.
- B. Before testing, disconnect all equipment that might be damaged by the test voltages.

END OF SECTION

SECTION 2602526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Bond and ground all electrical equipment in accordance with National Electrical Code, State/Local Codes, these Specifications and as shown on Drawings.

B. Description of System

1. The service equipment, conduit systems, supports, cabinets and neutral conductor shall be solidly grounded and bonded in accordance with National Electrical Code to form a permanent effective and continuous grounded system.

PART 2 – PRODUCTS

2.1 GROUND RODS

- A. Steel with a metallically bonded outer layer of electrolytically applied copper.
- B. Minimum 1/2" diameter 10 foot length, unless otherwise indicated.
- C. Sectional rods not permitted.
- D. Manufacturer: ERITECH or equivalent.

2.2 GROUND ROD CLAMPS

- A. Ground rod clamps shall be high strength silicone bronze.
- B. Manufacturer: ERITECH or equivalent.
- C. At Contractor's option, exothermic welding (CADWELD) or impact compression (ERITECH Hammerlock) may be used in place of ground rod clamps.

2.3 WATER PIPE GROUND CLAMPS

- A. Steel U-bolt with bronze saddle.
- B. Thomas and Betts Company 3900 series or equivalent.

2.4 REBAR GROUND CLAMPS

- A. Bronze alloy construction.

- B. Sized as required by rebar stub out.
- C. Eritech RC or EK series as required by local authority. Equivalent products by Thomas and Betts acceptable.

PART 3 – EXECUTION

3.1 GENERAL

- A. **Grounding conductors not shown or included on floor plans.**
- B. **When required, increase trade size of raceway accordingly.**
- C. Aluminum not acceptable for use as a grounding conductor.

3.2 SYSTEM GROUNDING

- A. Provide grounding electrode system in accordance with NEC 250.50. If available, each of the items listed in 250.52(A)(1) through (A)(8) shall be bonded together to form grounding electrode system.
- B. Connect grounding electrode conductor to grounded service conductor.
- C. Provide raceway enclosing grounding electrode conductor. If metallic, bond as per NEC 250.64(E). Provide grounding bushing as required complete with jumpers same size as grounding electrode conductor.
- D. To comply with NEC 250.53, provide two ground rods spaced minimum 6'-0" apart.

3.3 EQUIPMENT GROUNDING CONDUCTOR

- A. Non-metallic conduit: Sized in accordance with NEC, except as further modified by this Specification.
- B. Flexible Metal Conduit, Liquidtight Flexible Conduit.
 - 1. Other than for connection of 120 volt recessed luminaires, not acceptable for use as means of grounding.
 - 2. Provide bonding jumper sized in accordance with NEC around all flexible conduits. Use fittings having lugs for termination of jumper.
 - 3. Spiral wrap not acceptable. Lay along surface, secured with cable ties.
 - 4. Bonding jumper maximum length: 6'.
 - 5. Bonding jumper not required where separate equipment grounding conductor is used.
- C. Branch Circuits
 - 1. **Separate equipment grounding conductor required for each raceway.**
 - 2. Size: per NEC 250.122.
 - 3. Bond to grounding bars, junction boxes and luminaire grounding screws.

4. Field install grounding screw in luminaire if not provided by factory.

D. Feeders

1. **Separate grounding conductor required.**
2. Bond to grounding bars in switchboards, panelboards and motor control centers.
3. Provide grounding bushing at both ends of all feeders utilizing metallic raceway.
 - a. Bond to grounding bars at both ends.
 - b. Size bonding jumpers to match equipment grounding conductor.
4. Feeder Equipment Grounding Conductor Size:
 - a. Size per NEC 250.122.
 - b. Copper equivalent ampacity when aluminum phase conductors utilized.
5. Do not splice grounding conductor.

E. Water Pipe System

1. Bond interior metal water piping per NEC Section 250.104(A) if water pipe system is not used as part of grounding electrode system.

END OF SECTION

SECTION 260533 - RACEWAYS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide all conduit systems as shown on Drawings or required by Codes and Specifications.

B. Description of System.

1. Provide code-conforming raceway system for all conductors unless specifically noted otherwise by phrase "not in conduit".

1.2 SUBMITTALS

A. Record Drawings

1. Maintain accurate record drawings for all raceway runs in accordance with Section 260500.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Metallic conduit and tubing: Allied Tube and Conduit, Republic Conduit, or equivalent.
- B. Non-metallic conduit: Carlon Schedule 40 or Schedule 80 where required, Allied Tube and Conduit, Cantex Inc., or equivalent.
- C. Flexible metal conduit: Aluminum.
- D. Liquidtight, flexible metal conduit: Anaconda Sealtite or equivalent.
- E. Fittings
1. Rigid metal conduit: Appleton, Crouse-Hinds, or equivalent. **Pot metal conduit fittings not acceptable.**
 2. EMT:
 - a. **Steel.**
 - b. Setscrew or watertight as required.
 - c. Thomas and Betts Company, or equivalent.
 - d. **Pot metal, "Sock-on" and indentor fittings not acceptable.**
 3. Flexible metal conduit: STEEL, Thomas and Betts Company XC-400 series, or equivalent.
 4. Liquidtight flexible metal conduit:
 - a. **Steel.**

- b. Straight or angled as required.
- c. Appleton, Thomas and Betts Company or equivalent.

F. Hangers and Supports

- 1. As required by Codes and Specifications.
- 2. Raco, Unistrut, or equivalent.
- 3. Erico conduit clips, Type 8-M, 12-M and K-8 acceptable for individual branch circuit runs.

G. Wireway

- 1. NRTL 870 listing throughout, including connectors and fittings.
- 2. Hinged cover construction.
- 3. Sealing capability where required.
- 4. Suitable for "lay-in" installation of conductors.
- 5. Rust inhibiting phosphatizing undercoat and baked enamel finish.
- 6. Plated hardware.
- 7. Square D "Square Duct" or equivalent.

H. Expansion Fittings

- 1. Metallic: OZ, Thomas and Betts Company, or equivalent.
- 2. Non-Metallic: Carlon, or equivalent.

I. Firestop Assemblies

- 1. Firestop systems shall consist of fittings and/or intumescent materials assembled as per UL (or other NRTL) System Details.
- 2. Product manufacturers: 3M, Chase Technology Corporation, Dow Corning Fire Stop, Hilti, International Protective Coatings Corp. (Flame Safe), Nelson Fire Stop Systems.

J. Thru Wall and Floor Seals

- 1. OZ-Gedney Type "FSK" or equivalent.

PART 3 – EXECUTION

3.1 INSTALLATION

A. General

- 1. Electrically continuous throughout.
- 2. Plumb and level.
- 3. Cut square and reamed smooth.
- 4. Use commercial bender for offsets and bends.
- 5. Cap to prevent debris from entering during construction.
- 6. Swab conduit prior to installation of conductor.
- 7. Provide pull cord in empty conduits.

8. Alter conduit routing to avoid structural obstructions, minimizing crossovers.
9. It is the intent of this Specification to provide reasonable provisions for future expansion of electrical use (See NEC 90.8 and 90.1(B), FPN). Therefore, **install all branch circuit home runs as shown on Drawings. Do not combine home runs or increase quantity of conductors therein.**
10. Install raceway, conduit and fittings in accordance with Code, NRTL listing and manufacturer's recommendations.

B. Concealed Interior Raceway

1. Conceal all raceway within building construction.
2. May be run in a direct line for Contractor's convenience.
3. For Contractor's convenience, **concealed** stubs from concrete-encased PVC conduit runs may extend to first **concealed** junction box.
4. Where applicable, center within insulation any electrical conduit routed in attic space. Provide sealing as per NEC 300.7(A) for all conduits exposed to different temperatures.

C. Exposed Interior Raceway

1. Use limited to mechanical and electrical equipment rooms, motor connections, and panelboards scheduled as surface.
 - a. Run parallel or perpendicular to building lines.
 - b. **Provide RGSC or EMT stubs for concrete-encased PVC conduit runs.** Extend stub from RGSC coupling set flush in floor.
 - c. Provide flexible conduit as required for motor and equipment connections.
2. Shall not be used in finished areas unless specific permission is obtained from Engineer.
 - a. Exposed interior raceway in finished spaces shall be Metal Surface Raceway. Metallic conduit and tubing NOT ALLOWED.

D. Concrete Encased Raceway

1. Shall not interfere with structural integrity of slab, column, or beam.
2. Installation subject to acceptance of Structural Engineer.
3. Maximum diameter 1/3 thickness of concrete member.
4. Install in center of section.
5. Provide expansion fitting when crossing building expansion joint. Grounding integrity of raceway to be maintained.

E. Exterior Raceway

1. Minimum 24" below grade.
2. PVC unless otherwise indicated.
3. **Exterior surface stubs for PVC conduit runs: RGSC, including final underground sweep.** Exterior surface stubs acceptable only where specifically shown.
4. Penetrating Watertight Walls or Floors: Provide block-out with 1/2" clearance around conduit for underground penetrations. Pack with Oakum and caulk with non-shrinking grout, or provide conduit entrance seal.
5. Penetrating Roof or Waterproofing Membranes: Provide flashing and pitch pocket.

6. Contractor responsible for providing a watertight penetration.
7. Coat RGSC penetrations with heavy asphaltic-base compound.
8. Unless otherwise indicated, route exterior conduits to interior distribution equipment concealed under slab.

F. Supports

1. Refer to NEC 300.11
2. **Tie wire supports not acceptable.**
3. Support Spacing: NEC.

G. Specific Locations

1. Allow 6" minimum clearance at flues, steam pipes and heat sources.
2. Conduit visible behind grills and registers: paint black.
3. Seal conduit where leaving heated area and entering unheated area.
4. Penetrating non-watertight walls or floors: Pack space between conduit and block-out on both sides with Oakum.
5. Penetrating fire rated walls or floors: Seal to prevent passage of fire or products of combustion.
6. From each flush mounted panel location, stub three additional 3/4" conduits into nearest accessible ceiling space.
7. Do not mount raceway on ductwork, cover access doors, panels, controls, or otherwise hinder normal maintenance and repair of the equipment.
8. Motors:
 - a. Connect to motor feeder or branch circuit by means of flexible metal conduit or liquidtight flexible metal conduit in moist areas.
 - b. Minimum flexible length: 18".
 - c. Where practical, feed floor mounted motors from raceway installed in or under slab.
 - d. When floor mounted motors are fed overhead, provide required support for raceway. Extend raceway to floor and provide a floor flange. Insert "T" conduit fitting at proper height and extend flexible conduit to motor.

3.2 SIZE

A. National Electrical Code, subject to stated minimums.

B. Minimum Size

1. Exterior raceway: 3/4".
2. In or under poured concrete (including precast concrete panels): 3/4".
3. Branch circuit home run: 3/4". Consider home run to include raceway length from panelboard, switchboard, or motor control center to nearest power consuming or switching device on that circuit.
4. Feeders: 3/4".
5. All others not listed: 1/2".

3.3 TYPE

A. Intermediate Metal Conduit (IMC)

1. May be used in place of rigid galvanized steel conduit for Contractor's convenience.
2. Comply with manufacturer's recommendations for bending, threading and cutting operations.
3. Install as specified for rigid galvanized steel conduit.

B. Rigid Galvanized Steel Conduit (RGSC)

1. Use:
 - a. Overhead electric and telephone service entrance. IMC or Aluminum not acceptable for this application.
 - b. All raceway exposed to weather. Aluminum not acceptable for this application.
 - c. Where required by national, state and local codes.
2. Fittings: Threaded except at KO type boxes where double locknut/bushing method acceptable.
3. Waterproof entire length with heavy asphaltic base compound when:
 - a. Embedded directly in earth.
 - b. Embedded in concrete directly in contact with earth, with or without vapor barrier.
 - c. Penetrations run directly from concrete with earth, to soil burial.
4. Factory applied PVC coating acceptable in place of asphaltic base compound.

C. Rigid Non-Metallic Conduit (PVC)

1. Use only in slabs and exterior underground locations. See 3.1 B3, C4 and E3 for limitations.
2. Provide insulating bushing at all terminal adapters.
3. Provide equipment grounding conductor within raceway.
4. Increase trade size accordingly for equipment grounding conductor.
5. Utilize commercial heating element type bending equipment. **Do not use torches to bend PVC conduit.**

D. Electrical Metallic Tubing (EMT)

1. Use in all areas not prohibited by NEC and this Specification.
2. Do not use in concrete slabs on or under grade, or walls under grade.
3. Do not use in exterior underground applications.

E. Flexible Metal Conduit

1. Use for connections to transformers, motors, fixed appliances, recessed luminaires and other equipment as required.
2. Use liquidtight conduit with liquidtight fittings in areas of high moisture content.

F. Fire Resistive Walls and Decks

1. Preserve integrity of fire rating through the use of UL (or other NRTL) Listed firestop assemblies of appropriate penetration type and rating time.
2. Install in accordance with manufacturer's recommendations.
3. All floor to floor penetrations and all wall penetrations into Mechanical, Electrical, and Communications Rooms shall be sealed with 1 hour firestop assemblies unless more stringent rating is required by building codes.
4. Include UL (or other NRTL) firestop assembly sheets and manufacturer product data sheets specifically used with the Project Closeout Documentation.

END OF SECTION

SECTION 260534 - OUTLET, PULL AND JUNCTION BOXES

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Work Included
 - 1. Provide all outlet, pull and junction boxes complete with associated covers and rings.
- B. Work Installed But Furnished Under Other Directives.
 - 1. Obtain manufacturer's backboxes or recommendations for special equipment.

1.2 SUBMITTALS

- A. Record Drawings
 - 1. Maintain accurate record drawings in accordance with Section 260500.

PART 2 – PRODUCTS

2.1 CEILING BOXES

- A. Flush and Surface
 - 1. 2-1/8" minimum depth.
 - 2. Square or octagon as required.
 - 3. Galvanized steel.
 - 4. Manufacturer: Appleton, Raco, Steel City or equivalent.

2.2 WALL BOXES

- A. Flush
 - 1. One and two gang wall boxes: 4" square box, 2-1/8" minimum depth with appropriate plaster or tile ring.
 - 2. More than three gang: Gangable 3-1/2" deep unless wall cavity limits depth to 2-1/2".
 - 3. Use 4-11/16" square boxes where required by Code.
 - 4. Single gang masonry boxes acceptable only for single conduit entrance. Feed-through circuiting not acceptable. Use 4" square box/tile ring for feed-through applications.
- B. Surface Mounted Devices
 - 1. 4" square box, 2-1/8" minimum depth with appropriate 1/2" raised cover.
 - 2. Manufacturer: Appleton, B-Line, Raco, Steel City, Wiegmann, or equivalent.
- C. **Sectional, through wall and handy boxes not acceptable.**

2.3 PULL AND JUNCTION BOXES

- A. Galvanized steel with cover.
- B. Size: National Electrical Code.
- C. Manufacturer: Appleton, Racor, Hoffman, Shallbetter, Steel City, Wadsworth or equivalent.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General
 - 1. Install in accordance with code, product listing and manufacturer's recommendations.
 - 2. Install boxes plumb, level and flush with finish surface.
 - 3. Support securely and rigidly.
 - 4. Verify wall depths to ensure adequate clearance for special backboxes.
 - 5. Provide barriers in ganged switch outlets where voltage between adjacent switches exceeds 300 volts.
- B. Location
 - 1. Governed by structural conditions and obstructions.
 - 2. Mount switch outlet on strike side of door, maximum 4" from door opening to first switch. Verify door swing with Architectural Plan.
 - 3. Coordinate equipment outlets prior to installation for proper concealment.
 - 4. Center outlets with respect to acoustical tile, paneling and furring trim.
 - 5. Adjust outlets in masonry or tile construction to horizontal and vertical mortar joints.
 - 6. Clear all piping, ductwork and other obstructions.
 - 7. For outlet boxes on opposite sides of walls or partitions with separation distances of 24" or less, pack all interconnecting conduits with Duxseal after conductor installation, to prevent sound transmission.
 - 8. Outlet boxes improperly located shall be corrected at Contractor's expense.
- C. Mounting Heights
 - 1. All device mounting heights shall conform to ADA Recommendations. Refer to Standard Electrical Symbol Legend for nominal mounting heights.
 - 2. Verify height of all outlets to ensure installation above top of radiation covers, mirrors, counters and any other obstructions that may alter nominal mounting height.
 - 3. **Measure from finish floor to centerline of outlet.**
 - 4. Mount exterior outlets horizontally. Measure height from nearest interior finish floor below outlet.
 - 5. Mount outlet designated AC (above counter) no less than 4" higher than top of countertop backsplash.

D. Fire Resistive Walls and Ceilings

1. Penetrations for steel electrical outlet boxes permitted, provided:
 - a. Boxes do not exceed 16 square inches in area.
 - b. Area of such openings shall not exceed 100 square inches for any 100 square feet of area.
 - c. Outlet boxes on opposite sides of walls or partitions separated by horizontal distance of 24 inches.

E. Pull and Junction Boxes

1. Pull and junction boxes are generally not indicated on Drawings.
2. Install in accordance with National Electrical Code and as required to facilitate wire pulling.
3. Do not install in finished spaces without approval of Engineer.

F. Identification

1. Identify pull and junction boxes containing system voltages in excess of 250 volts to ground with voltage markers.
2. Voltage markers: Not visible in finished areas.

END OF SECTION

SECTION 260553 - IDENTIFICATION

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Label electrical equipment as required by Codes and Specifications and as specifically directed by Engineer.

PART 2 – PRODUCTS

2.1 PANEL DIRECTORIES

- A. Include directory cards with panelboards.

2.2 NAMEPLATES

- A. Machine engraved black laminate with white core, except as otherwise indicated.
- B. Minimum letter size: 1/8".
- C. Minimum plate size: 1" X 3".

2.3 VOLTAGE MARKERS

- A. Vinyl impregnated cloth markers with legend as required.
- B. Manufacturer: Ideal #44-360, or equivalent.

2.4 PRESSURE SENSITIVE TAPE

- A. Use only when specifically referred to in other Sections.
- B. Manufacturer: Dymo, or equivalent.

2.5 UNGROUNDED CONDUCTOR IDENTIFICATION

- A. As per NEC 210.5(C) and 215.12(C).
- B. Typewritten cards behind plastic shield, affixed with double-stick carpet tape. Heat surface prior to affixing directory.

PART 3 – EXECUTION

3.1 GENERAL

A. Directory Cards

1. **Typewritten only.** Hand lettering unacceptable, except at "spares" and "spaces", where neat hand lettering with erasable pencil is required.
2. Indicate type of load and rooms where load occurs.
3. **Do not use room numbers as shown on Drawings, but refer to name and numbers on door.**
4. Do not identify until final load balancing is accomplished.

B. Nameplates

1. Apply plumb and level with two counter-sunk screws.
2. Glue, double-stick tape, or similar adhesive not acceptable.

C. Device Plates

1. Machine engrave directly on plate in lieu of separate nameplate.
2. Fill inscriptions with contrasting color.

D. Voltage Markers

1. Not visible in finished areas.

E. Junction Boxes

1. Mark all covers with indelible marker to indicate panelboard designation and circuit numbers for circuits contained within box.

3.2 EMERGENCY SYSTEM COMPONENTS

- #### **A.**
- All boxes and enclosures (including transfer switches, generators and power panels) for emergency circuits shall be permanently marked so they will be identified as a component of an emergency circuit for system.

3.3 SERVICE EQUIPMENT FAULT CURRENT NAMEPLATE

- #### **A.**
- Provide warning nameplate on each service disconnecting means enclosure indicating the fault current of the system.
- #### **B.**
- Fault current shall be calculated at the utility transformer, using an assumed infinite primary bus, and using the actual transformer impedance and kVa values.
- #### **C.**
- Red laminate with white core.

D. Letter height: minimum $\frac{1}{4}$ "

E. Legend

SERVICE AVAILABLE FAULT CURRENT: _____

TRANSFORMER KVA: _____

TRANSFORMER IMPEDANCE: _____

DATE: _____

END OF SECTION

SECTION 262416 - PANELBOARDS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide panelboards where indicated and scheduled.

1.2 SUBMITTALS

A. Shop Drawings:

1. Submit information in accordance with Section 260500. Show all details of:
 - a. Lugs.
 - b. Locations for grounding bar, neutral bar and directory.
 - c. Main bus amperage and arrangement.
 - d. Weight and physical dimensions of enclosures.
 - e. Cover and lock type.
 - f. Quantity of spaces.
 - g. Quantity, arrangement, amperage and short circuit withstand ratings in RMS amperes for all circuit breakers.
 - h. Any other pertinent data.
 - i. Applicable series rating for this particular riser/fault current combination.

B. Record Manuals

1. Submit information in accordance with Section 260500.
 - a. Include fault current available at buss. Fault current calculations shall be based on actual installation criteria (conductor lengths, raceway types, etc.)
2. Include installation and maintenance instructions accompanying equipment.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Product of same manufacturer.
- B. Sizing and design based upon Eaton equipment; Eaton catalog numbers utilized for reference.
- C. Other Acceptable Manufacturers.
 1. Approved equal units by Siemens or Square D.
- D. Contractor is cautioned to verify all physical dimensions of "equal" units prior to accepting quotation for bid.

2.2 GENERAL

- A. Provide sub-feed lugs, contactors, main breakers or other equipment as scheduled.
- B. Provide copper bus, copper isolated neutral bar and copper grounding bar in all panelboards.
- C. Use load centers only where specifically indicated. Provide copper bus with plated aluminum neutral and grounding bar.
- D. NRTL-listed, and "suitable for use as service equipment" when required.
- E. Feeder risers are schematic only and not intended to infer lug arrangements. Contractor to indicate desired lug arrangements and sizes on shop drawings.
- F. Connection from load side of main breaker to panel bus shall be bus bar. Insulated wire and backfed types not acceptable.
- G. NRTL-recognized series ratings acceptable, with minimum ratings as specified herein.

2.3 BRANCH CIRCUIT PANELBOARDS

- A. Circuit Breakers
 - 1. Bolt-on.
 - 2. Breaker Types:
 - a. Quick-make, quick-break, thermal magnetic unless otherwise indicated.
 - 3. Trip indicating.
 - 4. Common trip on multi-pole breakers; handle ties not acceptable.
 - 5. Minimum SCCR rating:
 - a. NRTL tested and certified series combinations acceptable.
 - 1) 10,000 for systems up to 240 volts.
 - 2) 35,000 for 277/480 volt systems.
 - 6. Single pole 15 and 20 ampere ratings to be NRTL-listed as "Switching Breakers" and carry SWD marking.
 - 7. FIRE ALARM EQUIPMENT
 - a. Circuit breakers feeding fire alarm control panels and/or other fire alarm equipment shall be equipped with a pad-locking device capable of locking the circuit breaker in the closed position.
- B. Bus Assembly and Temperature Rise
 - 1. Rating: As scheduled.
 - 2. 98 percent conductivity.
 - 3. "Distributed phase" or "Phase sequence" type bus bar connections.
 - 4. Adjacent single pole breakers connected to opposite polarities.
 - 5. Multi-pole breakers installable in any location.

6. Provisions for additional breakers such that field addition of connectors or mounting hardware will not be required.
- C. Wiring Terminals
 1. NRTL-listed as suitable for type of conductor specified.
- D. Circuit Numbering
 1. Starting at top, odd numbers in sequence down lefthand side and even numbers in sequence down righthand side.
- E. Cabinet
 1. Enclose bus assembly in steel cabinet.
 2. Wiring gutter sizes and steel gauge in accordance with NEMA and NRTL standards.
 3. Fabricate box from galvanized steel or equivalent rust resistant steel.
 4. Furnish **without** pre-punched knockouts.
- F. Fronts
 1. Code gauge, full finished steel with rust inhibiting primer and baked enamel finish.
 2. Not removable with door in locked position.
 3. Adjustable trim clamps.
 4. Concealed steel hinges.
 5. Door with tumbler-type cylinder lock, catch and spring-loaded door pull.
 6. Flush lock not to protrude beyond door front.
 7. Key all locks alike.
 8. Circuit directory frame and card with clear plastic covering on inside of door.
- G. Manufacturer
 1. Eaton Pow-R-Line series.

2.4 POWER DISTRIBUTION PANELBOARDS

- A. Circuit Breakers
 1. Bolt-on.
 2. Breaker Types:
 - a. Quick-make, quick-break, thermal magnetic.
 3. Trip indicating.
 4. Common trip on multi-pole breakers; handle ties not acceptable.
 5. Equipped with individually insulated braces and protected connectors.
 6. Front faces of all circuit breakers to be flush with each other.
 7. Affix large, permanent, individual circuit numbers to each breaker in uniform position.
 8. Minimum 35,000 SCCR rated.
 - a. NRTL tested and certified series combinations acceptable.

- B. Bus Assembly and Temperature Rise
 - 1. Rating: As scheduled.
 - 2. Insulated bus structure.
 - 3. 98 percent conductivity.
 - 4. "Distributed phase" or "phase sequence" type bus bar connections.
 - 5. Adjacent single pole breakers connected to opposite polarities.
- C. Wiring terminals
 - 1. NRTL-listed as suitable for type of conductor specified.
- D. Cabinet
 - 1. Enclose bus assembly in steel cabinet.
 - 2. Wiring gutter sizes and steel gauge in accordance with NEMA and NRTL standards.
 - 3. Fabricate box from galvanized steel or equivalent rust resistant steel.
 - 4. Furnish **without** pre-punched knock-outs.
- E. Fronts
 - 1. Minimum 12-gauge, full finished steel with rust inhibiting primer and baked enamel finish.
 - 2. Circuit directory frame and card with clear plastic covering.
- F. Safety Barriers
 - 1. As required by UL or other NRTL.
- G. Manufacturer
 - 1. Eaton Pow-R-Line series.

2.5 CABLE TIES

- A. Thomas and Betts Company "Ty-Rap" or equivalent.

2.6 PLYWOOD BACKING FOR SURFACE MOUNTED PANELBOARDS.

- A. 3/4" grade AD, fire-resistant, painted gray (including edges).

2.7 PANEL SKIRTS (COVERS)

- A. Required for all surface panelboards.
- B. Minimum 14-gauge.
- C. Primed and painted to match panelboard.
- D. Same width and depth as panelboard. Single skirt acceptable for double panels.

- E. To span distance between finish floor and bottom of panel, and top of panel to ceiling line, or 8'-0" AFF where no ceiling is shown.
- F. Same manufacturer as panelboard: Not outside vendor.

PART 3 – EXECUTION

3.1 STORAGE

- A. Store panelboards in a cool, dry area prior to installation.

3.2 INSTALLATION

A. General

1. Install where shown on Drawings, plumb and level.
2. Top of trim 6'-3" above finished floor for wall-mounted panelboard.
3. Adjust operating mechanism for free mechanical movement.
4. Conductors neatly dressed and banded with nylon cable ties after final load balancing.
5. From each flush installation, stub three additional 3/4" conduits into nearest accessible ceiling space to provide for future utilization of spare circuits.
6. Provide 3/4" plywood backing for all surface-mounted panelboards.
7. Tighten all lugs in accordance with manufacturer's recommendations.
8. For all fusible distribution panelboards, arrange devices in descending order such that bussed space is at top and largest devices are at bottom.
9. Provide individual terminal or lug for each wire. Multiple wires to common terminal, or several terminals for single stranded conductor not acceptable.

B. Identification

1. Identify panelboards and directories in accordance with Section 260553.
2. Provide nameplate similar to following example:

PANEL L6
120/208 VOLT 3Ø 4W
2" C – 4 #3/0
FED FROM SWBD #1

3. When required, provide identification as per NEC 210.5(C) at each branch circuit panelboard.

3.3 TESTS

A. Balancing Load

1. Circuiting shown on Drawings is designed to produce equal loading on all phases.
2. Under actual operating, check and make circuit adjustments as required to produce balanced condition.

3.4 CLEANING

- A. **Clean** and **vacuum interior** to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION

SECTION 262713 - ELECTRIC SERVICE

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide electrical service from Northern Plains Electric Cooperative's point of connection to main switch.

B. Description of System

1. 120/208 V, 1-Phase, 3 Wire, 400A General Power Service

PART 2 – PRODUCTS

2.1 METERING

A. Feed through metering

B. Utility company to furnish all instrument transformers and meters.

C. Meter Sockets: Provide as required by utility company.

2.2 CURRENT TRANSFORMER CABINETS

A. Construction

1. NEMA 3R.
2. 14-gauge galvanized steel.
3. Gray enamel finish, or as required by serving utility.
4. Single hinge cover with combination padlock and sealing wire.

B. Bus Assembly

1. Amperage as indicated on Drawings.
2. Copper bus bar.
3. Glaskyd insulator supports.
4. Combination disconnect/connector kit.
5. Window CT bus link kit.
6. Compression lugs.

- C. Combination Back Pan
 - 1. Galvanized steel
 - 2. Prepunched to accept bar type current transformers.
- D. Manufacturer: American Midwest Power, Inc., Electro Mechanical Industries, Inc., or States Electric Mfg. Co.

2.3 TRANSITION CABINETS

- A. Construction
 - 1. 12-gauge galvanized phosphated steel.
 - 2. Primed and painted one coat forest green enamel.
 - 3. Lift off covers - both sides.
 - 4. Padlocking handle with two point latch mechanism.
 - 5. Penta head sealing bolt.
 - 6. No trough openings, or furnish NEMA 3R cover plates.
- B. Bus Assembly
 - 1. Amperage as indicated on Drawings.
 - 2. Copper bus bar.
 - 3. Prepunched to NEMA standards for up to five utility company lugs.
 - 4. Compression lugs on load side.
 - 5. Ground stud.
 - 6. Provision for bar type CT's.
- C. Manufacturer: Shallbetter CB series, or approved equal by American Midwest Power, Inc., Electro Mechanical Industries, Inc., or States Electric Mfg. Co.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Verify with utility company prior to Bid all specific equipment requirements, installation requirements and fees particular to this service installation and make allowances thereto.
- B. Include in Bid all utility company fees and charges associated with service installation.
- C. Include in Bid all miscellaneous lugs, ground rods, site and pad conduits, sleeves, and other appurtenances required for service installation and not provided by utility company.
- D. Transformer and Equipment Pads
 - 1. Concrete pads provided by Division 26.
 - 2. Size per utility company requirements.

3. Coordinate installation.
- E. Contractor totally responsible for all utility company coordination, metering equipment placement, and transformer location, with respect to service installation.
- F. Service installation shall comply with utility company rules and regulations.
- G. Cabinets
 1. Install cabinets in accordance with Code, product listing and manufacturer's recommendations.
 2. Install where shown on Drawings.
 3. Plumb and level.
 4. Top of trim 6'-3" above finished floor.

3.2 IDENTIFICATION

- A. Identify cabinets with nameplates in accordance with Section 260553.
- B. Inscription as directed by Engineer.
- C. Provide available fault current calculations for cabinets based on actual installation criteria (conductor lengths, raceway types, etc.). Include calculation information in Record Manuals.

3.3 CLEAN UP

- A. **Clean** and **vacuum interior** to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION

SECTION 262726 - WIRING DEVICES AND DEVICE PLATES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide wiring devices complete with device plates of matching or specified color. Wiring devices include receptacles for the connection of portable equipment and switches used for the control of both lighting and fractional horsepower motor loads. Also included are dimmers, occupancy sensors, photoelectric switches and time switches.

B. Work Installed But Furnished by Others

1. Where indicated, install devices furnished by other Divisions of this Specification.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit information in accordance with Section 260500.

B. Record Manuals

1. Provide information in accordance with Section 260500.
2. Include installation and maintenance instructions accompanying the equipment.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Device color:** Gray or as selected by Architect. Verify with Architect. (Exception: Red devices on emergency circuits where applicable).
- B. All devices shall be of the same manufacturer, except where specifically noted otherwise with the phrase "NO SUBSTITUTION".**

2.2 SWITCHES

A. AC Toggle and Keyed Switches

1. 20-ampere 120/277 volt AC and HP rated.
2. Industrial Grade.
3. Color coded face or body by amperage.
4. Screw pressure plate back wire and side wire.
5. Federal Spec WS-896 listed.

6. Acceptable Manufacturers:
 - a. Cooper 2220 series
 - b. Hubbell 1220 series
 - c. Leviton 1220 series
 - d. Pass & Seymour PS20AC series
- B. Pilot Light Switches
 1. Neon lamp in red toggle handle, lit in "on" position.
 2. 20 ampere, 120/277 volt AC rated.
 3. Manufacturer: As listed above.
- C. Time Switches
 1. Two Circuit SPST switching, voltage rating as required.
 2. Digital display with 7-Day programming.
 3. Non-volatile program memory (battery backup unacceptable).
 4. Manufacturer: Intermatic #ET2725 series.
 5. Other acceptable manufacturer: Tork.
 6. Special units as shown on Drawings.
- D. Remote Photoelectric Switches
 1. Threaded swivel mounting with locking nut and neoprene gasket.
 2. Light level adjustment slide.
 3. Activation: 1-5 footcandle on, 3-15 footcandle off.
 4. Manufacturer: Intermatic #K4200 series, wattage and voltage as required.
 5. Other acceptable manufacturers: Paragon, Area Lighting Research, Precision, or Tork.
- E. Spring Wound Timer Switch
 1. As shown on Drawings.
 2. Manufacturer: Intermatic.
 3. Other acceptable manufacturers: Area Lighting Research, Rhodes Mark Time, or Tork.
- F. Occupancy Sensors
 1. Ceiling Mount – Line Voltage
 - a. Self-contained line voltage unit with no external relays or power packs required.
 - b. Passive dual technology sensing combining passive infrared and ultrasonic/microphonic technology. Selective for initial and maintained triggering.
 - c. Rating: 120 VAC @ 800 watts, 277 VAC @ 1200 watts, electronic ballast rating. No minimum load requirements.
 - d. Ceiling-mount with 360° conical pattern coverage.
 - e. Adjustable time delay, from 5 to 20 minutes.
 - f. Automatic adjustment option for continuous time of day usage monitoring with automatic off delay adjustment.

- g. Integral light level sensor to prevent turning lights on at selected light level between 10 and 300 footcandles.
 - h. LED activity Indicator.
 - i. Manufacturer: WattStopper #DT-355, Sensorswitch CMR-PDT series, Leviton ODC series, Hubbell OMNIDT-BP series, or approved equal.
- 2. Wall Mount
 - a. Self-contained line voltage unit with passive infrared sensing.
 - b. Rating: 120 VAC @ 800 watts, 240/277 VAC @ 1200 watts, electronic ballast rating. No minimum load requirements
 - c. PIR collector beams view out horizontally 35 feet in a wall-to-wall pattern, with a 20-foot effectiveness for small hand or body motions.
 - d. Adjustable time delay, from 5 to 20 minutes, with "OFF" override switch.
 - e. Automatic adjustment option for continuous time of day usage monitoring with automatic off delay adjustment.
 - f. Bypass mode to allow override button to act as a standard on-off switch in case of sensor failure.
 - g. Vandal resistant lens.
 - h. LED activity Indicator.
 - i. Multi-way version:
 - 1) Simultaneous load control from up to four device locations.
 - j. Dual-level version (ab switching):
 - 1) Two separate relays with dual override switches.
 - 2) Independent Auto or Manual mode per relay.
 - k. Manufacturer: WattStopper PW series, Sensorswitch WSX series, Leviton OSSMT series, Hubbell LHIR series, or approved equal.
- 3. Wall Mount with 0-10V Dimming (Type D)
 - a. Self-contained line voltage unit with passive infrared sensing.
 - b. Rating: 120 VAC @ 800 watts, 240/277 VAC @ 1200 watts. No minimum load requirements.
 - c. Class 1 control of 0-10 Volt LED dimming for full range dimming control.
 - d. PIR collector beams view out horizontally 35 feet in a wall-to-wall pattern, with a 20-foot effectiveness for small hand or body motions.
 - e. Adjustable time delay, up to 30 minutes, with "OFF" override switch.
 - f. Multi-location capable.
 - g. Manufacturer: WattStopper PW-311, Sensorswitch WSX-D, Hubbell LHD-IRS series, or approved equal.

2.3 RECEPTACLES

A. General Purpose

- 1. 20 ampere, self-grounding, NEMA 5-20R, industrial specification grade.
- 2. Nylon face with finger grooves and compact body.
- 3. Minimum 0.032" triple wipe brass contacts.
- 4. Corrosion resistant steel strap interlocked with face and body.
- 5. Screw pressure plate back wire and side wire.
- 6. Tamper resistant.

7. Federal Spec WC-596 listed.
8. Acceptable Manufacturers:
 - a. Arrow Hart TR5362xx
 - b. Hubbell HBL5362xxTR
 - c. Leviton 5362-SGxx
 - d. Pass & Seymour TR5362xx

B. GFCI

1. 20 ampere, feed-through type.
2. Two utilization points per device, with vertical orientation.
3. Tamper Resistant.
4. Manufacturer: As listed above.

C. Combination Duplex and USB Charging

1. 20 ampere, Decora style.
2. Two utilization points per device, with vertical orientation.
 - a. Includes one USB-A port.
 - b. Includes one USB-C port.
3. 5 ampere, 5 Volt USB output.
4. Tamper resistant.
5. Manufacturers:
 - a. Arrow Hart TRUSBAC20
 - b. Hubbell USB20ACPD
 - c. Leviton M58AC
 - d. Pass & Seymour TR20USBAC6.

D. Damp & Wet Locations

1. All 15 and 20 ampere, 125 and 250 volt non-locking receptacles shall be listed weather-resistant type as per NEC 406.9(A) and 406.9(B)(1).
2. Manufacturer: As listed above.

2.4 DIMMERS

A. LED

1. Control of 0-10 Volt LED dimming for full range dimming control.
2. Wattage as required by luminaire count in room.
3. Integral power pack for positive off.
4. Provide separate power pack if required by total room wattage.
5. Manufacturer: Lutron Diva Series #DVSTV.

2.5 DEVICE PLATES

- A. Flush Interior
 - 1. Opening for device intended.
 - 2. 430 or 302/304 stainless steel, or as selected by Architect.
 - 3. Where plastic plates are selected by Architect, provide thermoplastic type.
 - 4. Manufacturer: Cooper, Hubbell, Leviton and Pass & Seymour.
- B. Surface Interior
 - 1. 1/2" raised cover
- C. Damp & Wet Locations
 - 1. Damp locations:
 - a. Refer to NEC 406.9(A).
 - b. Die-cast aluminum construction with stainless steel springs.
 - c. Unless indicated otherwise on the Drawings, Manufacturer: Pass & Seymour #4500 series or equivalent.
 - 2. Wet locations:
 - a. Refer to NEC 406.9(B).
 - b. Unless indicated otherwise on the Drawings, Manufacturer: Red Dot #CKMU (horizontal) or #CKMUV (vertical), or approved equal by Hubbell.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General
 - 1. Install device and plates where shown on Drawings in accordance with Code, product listing and manufacturer's recommendations.
 - 2. Refer to Section 260534-3.1C for mounting heights.
 - 3. Plumb and level.
 - 4. Tight to wall.
 - 5. Thoroughly cover wall opening around device.
 - 6. Replace all devices and plates that become discolored or burned during construction.
 - 7. Provide blank plates for unused openings.
 - 8. Connect wiring devices by means of single conductor tails. Multiple wire connections not acceptable.
 - 9. Tighten unused connection screws.
- B. Identification
 - 1. Identify wall switches which control lighting or equipment not in sight.
 - 2. Refer to Section 260553-3.1C.

C. Receptacles

1. Vertical mounting with grounding pole at bottom.
2. Provide GFCI receptacles at NEC 210.8 locations.

D. Dimmers

1. No common neutrals.
2. Individually mounted: No gang mounting.
3. Do not remove any fins.

E. Photoelectric Switches

1. Install on roof, in center of structure where viewing from ground is minimal.
2. Verify exact location with Architect.
3. Penetrate roof with 3/4" RGSC, securely fastened to structure.
4. Provide flashing to maintain roof integrity.
5. Mount 18" above finished roof surface.
6. Make connections in weatherproof junction box.

F. Occupancy Sensors

1. Provide adequate supports to any structures, ceilings and grid system to safely attach sensors.
2. Mount external power packs (required only for low voltage sensors) within junction box in accessible ceiling space.
3. Verify operating parameters with Engineer.

3.2 TESTS

A. Proper operation of lighting switches, dimmers and occupancy sensors.

B. Duplex Receptacles

1. Proper connections.
2. Test all receptacles with NRTL listed receptacle circuit tester similar to Bryant #5266-PT, or Ideal #EZ Check.

3.3 INSTRUCTIONS

- A. Instruct Owner's personnel in proper operation, setting, and maintenance of time switches, dimmers, occupancy sensors, and GFCI receptacles.

END OF SECTION

SECTION 262813 - FUSES

PART 1 – GENERAL

1.1 DESCRIPTION

- A. Work Included
 - 1. Provide all fuses as required.
- B. Work Furnished But Not Installed
 - 1. Provide spare fuses for all sizes and classes required.
 - 2. Quantity: 10%, with a minimum of three each rating, including motor starter control transformer fusing.

1.2 SUBMITTALS

- A. Record Drawings
 - 1. Indicate actual class, type and size of fuse installed in each device.
- B. Record Manuals
 - 1. Submit information in accordance with Section 260500.

PART 2 – PRODUCTS

2.1 FUSES

- A. Larger than 600 amperes.
 - 1. UL-listed, Class L.
 - 2. Manufacturer: Bussmann Limitron KLU or "Hi-Cap" KRP-C, Littelfuse KLP-C, or Brush LCL.
- B. 600 Amperes and Less Protecting Feeders or Combination Motor/Branch Circuit Loads.
 - 1. UL-listed, Class RK-1.
 - 2. Manufacturer: Bussmann LPN-RK/LPS-RK, Littelfuse LLN-RK/LLS-RK, or Brush LEN-R/LES-R.
- C. Elevators
 - 1. UL-listed, Class J.
 - 2. Manufacturer: Bussmann LPJ-SP or Littelfuse JTD-ID.
- D. Motor Starter Control Transformers

1. As recommended by manufacturer.

E. Plug Fuses

1. Dual element, UL-listed Type S with adapter.
2. Use only as indicated on Drawings for fused toggle switches.

2.2 SPARE FUSE CABINET

A. Construction

1. Welded steel or .080 gauge aluminum.
2. Gray enamel finish.
3. Locking handle/cylinder lock.
4. Integral shelving.

B. Size: Minimum 30" H x 24" W X 12" D.

C. Acceptable Manufacturers: American Midwest Power SFC 36, B-Line 243012FC, Bussmann SFC, Gould Shawmut GSFC, or Littelfuse LSFC.

2.3 PLYWOOD BACKING

A. 3/4" grade AD, fire resistant, painted gray (including edges).

PART 3 – EXECUTION

3.1 STORAGE

A. Store fuses in a cool, dry space prior to installation.

3.2 INSTALLATION

A. General

1. Install fuses in accordance with Code, product listing and manufacturer's recommendations.
2. Verify equipment fuse sized for load prior to installation.
3. All fuses shall be of same manufacturer.
4. Do not mix fuse classes in individual applications.
5. Fuses are not required for switchboard devices marked "Spare".

B. Spare Fuse Cabinet

1. Top of trim 6'-3" above finished floor.
2. Provide 3/4" plywood backing.

C. Identification

1. Indicate on inside cover with pressure sensitive tape the size, voltage and type of fuse furnished for each device.

END OF SECTION

SECTION 262816 - ENCLOSED SWITCHES & CIRCUIT BREAKERS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide disconnects where shown on Drawings or required by Code.
2. Provide enclosed circuit breaker where shown on the Drawings.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit information in accordance with Section 260500.
2. Indicate on submittal exact motor or equipment served.
3. Show all details including electrical ratings, enclosure dimensions and other pertinent data.

B. Record Manuals

1. Submit information in accordance with Section 260500.
2. Include installation and maintenance instructions accompanying the equipment.

PART 2 – PRODUCTS

2.1 DISCONNECT SWITCHES

A. Switch Interior

1. Positive "off" position.
2. Lugs: NRTL-listed for aluminum and copper cable.
3. Plated current carrying parts.

B. Switch Mechanism

1. Quick-make, quick-break operating handle and mechanism.
2. Integral part of box.
3. Enclosures: Code gauge sheet steel (NEMA 1) or Code gauge galvanized steel (NEMA 3R).
4. Treat with rust-inhibiting phosphate primer.
5. Finish: Baked enamel.

C. Ratings

1. 240 or 600 volt.
2. Heavy duty.

3. Horsepower rated.
4. NRTL-listed "Suitable for Use as Service Equipment" when required.

D. Fusing

1. NRTL-listed rejection feature.
2. Reject all fuses except UL-listed Class R.

E. Manufacturer: Panelboard manufacturer.

2.2 ENCLOSED CIRCUIT BREAKERS

A. Breaker Types:

1. Quick-make, quick-break, thermal magnetic unless otherwise indicated.

B. Manufacturer: Panelboard manufacturer.

2.3 PLYWOOD BACKING FOR SURFACE MOUNTED SWITCHES

- A. For interior locations, mount on 3/4" AD, fire-resistant, painted gray (including edges).

PART 3 – EXECUTION

3.1 STORAGE

- A. Store disconnect switches or enclosed circuit breakers in a cool, dry space prior to installation.

3.2 INSTALLATION

A. General

1. Install all required disconnect switches or enclosed circuit breakers in accordance with Code, product listing and manufacturer's recommendations.
2. Plumb and level.
3. Tighten lugs in accordance with manufacturer's recommendations.

B. Identification

1. Identify disconnect switches or enclosed circuit breakers in accordance with Section 260553.
2. Nameplate required for all disconnect switches. Nameplate to include load served, voltage, horsepower or MCA rating, and fuse size. Nameplate to be installed inside of cover on exterior disconnect switches.

Example:

RT-1
480 Volt, 3 Ø
35 MCA, 40 A Fuses

3. Do not use schedule number, but indicate load served.
4. Pressure sensitive tape identification for disconnect switches containing fuses.
5. Voltage markers on all disconnect switches containing system voltages in excess of 250 volts to ground.

3.3 CLEANING

- A. **Clean** and **vacuum interior** to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION

SECTION 264313 - SURGE PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide integral Surge Protective Device in panelboards and switchboards where indicated and scheduled.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit information in accordance with Section 260500.

B. Record Manuals

1. Submit information in accordance with Section 260500.
2. Include installation and maintenance instructions accompanying equipment.

PART 2 – PRODUCTS

2.1 TYPE 2 SURGE PROTECTIVE DEVICE (SPD)

A. Provided only in panelboards and switchboards as indicated on the drawings.

B. The panelboard/switchboard manufacturer shall internally install SPD protection within the panelboard and the entire assembly shall be UL 67 listed.

C. SPD requirements:

1. Listed and component recognized in accordance with latest editions of UL 1449, UL 96A and UL 1283.
2. Minimum surge capacity ratings as indicated on the drawings. Operating voltage and configuration as indicated on the drawings
3. 200kA Short Circuit Current Rating (SCCR). SPD devices obtaining SCCR using upstream over current protection are prohibited.
4. 20kA nominal discharge current.
5. EMI/RFI noise filtering attenuation up to 50dB for 10kHz – 100MHz.
6. Self contained module design, with each suppression element metal-oxide varistor (MOV) based incorporating thermal protection. End of life mode shall be open circuit.
7. Surge current diversion paths between each phase conductor and the neutral conductor, between each phase conductor and the ground and between the neutral conductor and ground. For delta configured systems, the SPD shall have components connected between each phase conductor and between each phase conductor and ground.

8. UL 1449 latest edition listed and recognized component voltage protection rating (VPR) shall not exceed:

VOLTAGE	L-N	L-G	N-G	L-L
240/120 1Ø	700V	700V	700V	1200V
208Y/120	700V	700V	700V	1200V
240D/120	700/1200V	700/1200V	700V	1800V
480Y/277	1200V	1200V	1200V	2000V

9. Designed to withstand a maximum continuous operating voltage (MCOV) of not less than 115% of nominal RMS voltage.
10. Equipped with on board visual and audible diagnostic monitoring devices mounted on the front cover of the SPD.
- Indicating lights shall provide full time visual diagnostic monitoring of the operational status of each phase of the surge current diversion module.
 - Audible diagnostic monitoring shall be by way of audible alarm. This alarm shall activate upon a fault condition. An alarm on/off switch shall be provided to silence the alarm.
 - LCD display surge counter located on the front cover of the SPD. Counter shall be equipped with a manual reset with protection from accidental operation and utilize non-volatile memory.
 - A set of Form "C" dry contacts shall be provided for remote annunciation.
11. Warranty: The panelboard manufacturer shall warranty the SPD for full replacement if destroyed by transients, including lightning, for a period of ten (10) years.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. SPD protection modules shall be factory installed by the panelboard/switchboard manufacturer integral to the panelboards/switchboards indicated on the drawings. Each entire assembly shall be UL 67 listed.

3.2 TESTS

- A. Verify all SPD equipment is active and in proper working condition prior to final project inspection.

3.3 CLEANING

- A. **Clean** and **vacuum interior** to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION

SECTION 265100 - LUMINAIRES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Furnish and install a complete luminaire for each lighting outlet.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit information in accordance with Section 260500 including voltage, housing and door frame material, lens type, diffuser thickness, lumen output, and color temperature.

B. Record Manuals

1. Provide information in accordance with Section 260500.

1.3 COORDINATION

- A. Confirm compatibility and interface of luminaire with other materials and job conditions prior to ordering. Report discrepancies to Engineer and defer ordering until clarified.
- B. Provide frames, trim rings, and backboxes as required.
- C. Coordinate with work of all other Divisions to avoid conflicts between luminaires, supports, fittings and mechanical equipment. Ceiling clearances are minimal. It is imperative that Contractors coordinate conduit and duct runs to facilitate luminaire installation as shown on reflected ceiling plans. Engineer will not be responsible for interferences arising from lack of field coordination between trades.

PART 2 – PRODUCTS

2.1 LUMINAIRES

A. General

1. UL or other NRTL listed.
2. Where shown to be installed in fire-rated assemblies, luminaires shall be listed in accordance with UL Standard 1598. Supplemental penetration protection (tenting) will be accomplished by General Contractor in accordance with UL Fire Resistance Directory. Coordinate installation with General Contractor. Supplemental protection shall be spaced minimum 1/2" away from the luminaire, per UL Standard 1598.
3. Verify ceiling finishes and equip all recessed luminaires with appropriate frames as required.

4. Furnish luminaires intended for use in lay-in grid ceilings with proper clips for compliance with NEC.
5. Refer to Section 260500 for "Prior Approval to Quote" procedure.

B. LED Lighting Systems

1. General: All LED lighting system components must be UL or other NRTL listed.
2. Light Engines:
 - a. Meets or exceeds 70% lumen maintenance at 50,000 hours based on IESNA LM-79-2008.
 - b. Minimum 80+ CRI rating.
 - c. 4000K color temperature, or as scheduled on drawings.
 - d. Minimum delivered lumens as scheduled on drawings.
3. Electronic drivers for LED's:
 - a. Factory installed.
 - b. Multi-volt for use on either 120v or 277v systems.
 - c. THD: < 20%.
 - d. Factory installed quick-disconnect plug internal to the luminaire for driver removal.
 - e. Rated for a minimum of 50,000 hours.
 - f. 0-10 Volt dimming standard. Provide non-dimming drivers only as scheduled.
 - 1) Controls and wiring as per manufacturer's recommendations. Provide power packs for wall-box dimmers as required for positive luminaire off.
4. Downlights shall incorporate integral diffuser type lens. Exposed modules not acceptable.
5. Emergency battery packs:
 - a. Include self-testing/self-diagnostics with audible alarm option.
 - b. Factory installed.
 - c. Minimum lumens as scheduled.
6. Spare Drivers:
 - a. Luminaire manufacturer shall keep reasonable driver stocks on hand for replacement of defective drivers under guarantee period.
7. Guarantee period: Minimum 60 months from date of substantial project completion.
 - a. Guarantee shall include all parts and labor required to bring luminaire to complete operation.
 - b. Labor shall be performed by an Owner approved Electrical Contractor licensed in the area the work is to be performed.
 - c. Any costs for equipment rentals required to service luminaires under warranty shall be the responsibility of luminaire manufacturer.

PART 3 – EXECUTION

3.1 STORAGE

- A. Store luminaires in a cool, dry space prior to installation.

3.2 INSTALLATION

A. General

1. Install luminaires plumb and true, free of light leaks, warps, dents and other irregularities.
2. Equip any outlets not specifically labeled with a luminaire the same as those in rooms used for similar purposes.
3. Run all directional lenses the same direction in rooms, corridors and other adjacent areas that contain square luminaires.
4. Continuous row luminaires: Hang level in straight line and butt tightly together.
5. Verify exact location of luminaires with reflected ceiling plan. Any discrepancies between the lighting plan, reflected ceiling plan, or installed ceilings shall be brought to the attention of the Engineer for clarification prior to installation.
6. Coordinate with Mechanical Contractor in advance of installation to prevent space conflicts.
7. Connect recessed luminaires to branch circuitry by means of single flexible metal conduit 6'-0" in length.

B. Barriers

1. Required where recessed luminaires are installed in insulated ceilings.
2. Suitable material to satisfy NRTL requirements.
3. Provided by Division 26 when not indicated otherwise.
4. Coordinate installation.

C. Luminaire Supports

1. Provide adequate supports to any structures, ceilings and grid systems to safely suspend or attach luminaires.
2. General Contractor to provide ceiling support systems as required by that portion of the Specifications. Electrical Contractor to provide any additional supports on an "as needed" basis to prevent ceiling from sagging or developing other irregularities.
3. Contractor responsible for providing proper suspension and mounting devices and to safely support all luminaires shown on Drawings, regardless of ceiling systems.
4. Rigidly support surface suspended ceiling system with anchors, hangers or clips designed for the purpose.
5. Support surface-mounted luminaires at four-foot intervals.
6. Install recessed luminaires in accordance with manufacturer's recommendations.
7. Rigidly support recessed luminaires to structural members or properly supported ceiling system with hangers, clips or fasteners designed for the purpose.
8. Support pendant and stem-hung luminaires at four-foot intervals.

D. 0 – 10 Volt Dimming Control Circuits

1. Installed in accordance with NEC Article 725.
2. Class 1 systems
 - a. #14 AWG THWN/THHN solid conductors installed in the same raceway as associated power wiring.

3. Class 2 systems
 - a. #18/2 non-shielded cable unless otherwise indicated on the drawings.
 - b. Plenum rated where required.
 - c. Cable shall be installed in raceway when concealed within walls, in mechanical rooms, and rooms without ceilings.
 - 1) DO NOT INSTALL IN SAME RACEWAY AS POWER CIRCUITRY.
 - d. Cable not required to be enclosed in raceway when installed above accessible ceilings.
 - 1) Route cables parallel or perpendicular to building construction.
 - 2) Support cables from building structure utilizing approved methods.
 - 3) Neatly coil excess cable length of pre-terminated assemblies.
 - 4) All cable runs shall be continuous between devices. NO SPLICING.

3.3 TESTS

- A. Upon completion of this portion of the Work and prior to its acceptance by Owner, check for proper alignment and operation of all lighting equipment.

3.4 CLEAN UP

- A. Clean all luminaires immediately prior to final inspection.

END OF SECTION

SECTION 266530 - ELECTRIC HEATING EQUIPMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Furnish and install all electric heating equipment as scheduled on Drawings.

1.2 SUBMITTALS

A. Shop Drawings

1. Provide information in accordance with Section 260500.

B. Record Manuals

1. Provide information in accordance with Section 260500.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Size, wattage and control as scheduled.

PART 3 – EXECUTION

3.1 STORAGE

- A. Store electric heating equipment in a cool, dry space prior to installation.

3.2 INSTALLATION

- A. Install in accordance with Code, product listing, and manufacturer's recommendations.
- B. Mount baseboard heaters above Architectural base.

END OF SECTION

SECTION 270500 - DIVISION 27 GENERAL PROVISIONS

PART 1 – GENERAL

1.1 DESCRIPTION

- A. The provisions and requirements of Section 260500 shall be applicable to Division 27.
- B. All Division 27 work shall be included under the Division 26 contract.
- C. The Contractor shall take special note that any conflicts between the Contractor and any Division 27 subcontractors shall not become an issue of the Engineer or Owner. It shall be the Contractor's responsibility to coordinate with the Division 27 subcontractor/s to determine where their work leaves off and where the subcontractor's work begins. The Contractor shall be responsible for all specified work including the operations of work under Division 27.

END OF SECTION

SECTION 270528 - NETWORK SYSTEMS ROUGH-IN

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide raceways for network systems as shown on the Drawings.

B. Work furnished and installed by others.

1. Local serving telephone utility shall place the service entrance cable to the point of presence, install circuit protection cabinet, protectors, and ground the entrance cable as needed to the service grounding conductor provided under this contract.

PART 2 – PRODUCTS

2.1 GENERAL

- A. Main telephone terminal boards (TTB): ¾" grade AD fire-resistant plywood, painted gray (including edges). Dimensions as required by serving utility company.

B. Voice/data terminal board (TTB):

1. ¾" grade AD fire-resistant plywood, painted gray (including edges). Dimension as required by Owner's network system supplier. May be included with main telephone terminal board for single board installation.

C. Raceways:

1. As specified in Section 260533 and sized as shown on Drawings, minimum 3/4".

D. Boxes:

1. 2-1/8" deep unless restricted by wall thickness.
2. As specified in Section 260534 and 260540.

E. Blank plates:

1. As specified in Section 262726, yoke-mounted. Box-mounted plates not acceptable.

F. Firestop Assemblies

1. NRTL listed 4" square pathway with intumescent material designed to seal out fire, smoke, and toxic gases.
2. Quantity shall equal or exceed the width of the associated cable tray. i.e. a 6" wide tray requires two pathways.

3. Include mounting accessories as required by application specifics.
4. Manufacturer: EZ Path Series 44, 3M Model PT4SD or approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Serving Communications Utility Requirements

1. Raceways:
 - a. Provide telephone service entrance conduit, stubbed to terminal board from property line.
 - b. Verify service entrance conduit size and quantity, and property line location with serving utility.
 - c. Provide bushing or connector at each conduit stub.
 - d. Provide pull wire in each telephone conduit run.
2. Provide surface double-duplex receptacle at main telephone terminal board, fed from dedicated spare circuit breaker. Receptacles to be isolated ground type, with separate grounding conductor connected to panelboard grounding bar.
3. Provide telephone board communication grounding bus as required by serving utility, minimum #6 solid SDBC in conduit, extended shortest and most direct route to ground bar at main switch. Terminate in ground bar affixed to telephone terminal board, location as directed by serving utility.
4. Entire installation to comply with serving utility company requirements.

B. Raceways:

1. Stub from rough-in location into nearest accessible ceiling space, or location as indicated on Drawings.
2. Provide bushing or connector at each conduit stub.
3. Provide pull wire in each voice/data raceway.
4. Provide raceway system where concealed in walls, in mechanical rooms and rooms without accessible ceilings.

C. Provide blank plates for all rough-in boxes not concealed by Owner's voice/data equipment.

D. Entire installation to comply with Owner's network systems supplier requirements.

END OF SECTION

SECTION 271513 - NETWORK CABLING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work Included

1. Provide Network Cabling System as shown and described.

B. Work furnished and installed by others.

1. Voice: The Owner will provide all telephone handsets.
2. Data: The Owner will provide all end-user software, programming, computer servers, terminals and personal computers.
3. Surveillance: The surveillance system cameras, servers, switches and storage equipment will be provided and installed either by the Owner or under other Sections of this specification.

C. Description of System

1. Voice: Work shall include, but not be limited to, devices, faceplates, cables and cable assemblies, connecting blocks, cable management, terminations, and final acceptance testing.
2. Data: Work shall include, but not be limited to, devices, faceplates, cables and cable assemblies, cable management, patch panels, data racks, terminations, and testing.
3. Surveillance: Work shall include, but not be limited to, devices, cables and cable assemblies, cable management, patch panels, data racks, terminations, and testing.

1.2 SUBMITTALS

A. Shop Drawings

1. Submit information in accordance with Section 260500.
2. Indicate:
 - a. Mounting details.
 - b. Connection diagrams.
 - c. Description of devices.
 - d. Name of installation Contractor/Subcontractor.

B. Record Manuals

1. Provide information in accordance with Section 260500.
2. Include manufacturer's data for adjustment, operation and maintenance of equipment and name of service organization.

PART 2 – PRODUCTS

2.1 MANUFACTURER/SUPPLIER

- A. The system specified is based on equipment as manufactured by General Cable, Panduit, Commscope and other manufacturers as listed. All reference to model numbers and other pertinent information is intended to establish the standards of operational concepts, performance, quality and appearance which must be met. Backboards, conduit, cable tray, and rough-ins shall be by Electrical Contractor.
- B. Contractors/Subcontractors performing Section 271500 work shall have personnel trained/certified in communications cabling installation via equipment manufacturers' or industry standards' training programs. Refer to Section 260500-1.5 Quality Assurance.
- C. Acceptable installers:
 - 1. Computer Store, 1100 S Broadway, Minot, ND 58701, 701/838-3967.
 - 2. Data Connections, 4016 37th Avenue NW, Mandan, ND 701/426-8771.
 - 3. Dell-Comm, Inc. 812 S 18th St., Bismarck, ND 58504, 701/222-2887.
 - 4. ECSI, 1711 12th Ave SW, Minot, ND 58701, 701/838-8401
 - 5. Gefroh Electric, 100 45th Ave NW, Minot, ND 58703, 701/838-0225.
 - 6. Innova Integrated Systems, 1800 22nd Ave SW, Minot, ND, 701/837-0131.
 - 7. Main Electric, 2626 Valley St., Minot, ND 58701, 701/852-3315.
 - 8. Muth Technology, 600 E Benson Rd, Sioux Falls, SD 57104, 800/888-1597.
 - 9. RBB Electric, 1123 N 1st St., Grand Forks, ND 58208, 701/775-7404.
 - 10. Wheeler Construction, 1720 South Broadway, Minot, ND, 58701, 701/852-5584.
 - 11. Installers not listed above and wishing to quote shall refer to Specification 260500-1.4 for approval procedure. No consideration shall be given to any installer not pre-approved.

2.2 DEVICES AND FACEPLATES

- A. Data jacks: Single outlet RJ45, eight-pin/eight wire, modular construction, TIA/EIA-568.2-D Category 6 compliant, T568A and T568B identification, Panduit Mini-Com #CJ688TG, Commscope #MGS400 series, Leviton #61UJK series, or approved equal.
- B. Voice jacks: Same as data jacks.
- C. Voice wall-mount face plate/jack assembly: Stainless steel with Category 6 keystone jack, Panduit #KWP6, Commscope #630B8, Leviton #4108W1SP series, or approved equal.
- D. Faceplates
 - 1. Single gang with ID windows and two or four modular inserts as dictated by jack count shown on the drawings.
 - 2. 430 or 302/304 stainless steel, or as selected by Architect.
 - a. Panduit #CFPL2/4 series, Commscope #M12/14SP-L series, Leviton #43080-1L2/4 series, or approved equal.

3. Where plastic plates are selected by Architect.
 - a. Panduit #CFPE2/4 series, Commscope #M12/14L series, Leviton #42080-2/4 series, or approved equal.
- E. Provide blank modules as required. Panduit #CMB, Commscope #M81, Leviton #41084 series, or approved equal.
- F. Color: Devices as selected by Owner, faceplates as selected by Architect.
- G. Surveillance Cameras
 1. Jack assembly for cameras mounted to accessible ceilings shall utilize Panduit Model #CBXQ1IW-A enclosure mounted to building structure above the ceiling. Surveillance system provider shall be responsible for patchcord between camera and jack.
 2. Cameras mounted directly to rough-ins or surface boxes shall utilize cable terminated to RJ45 Plug, Panduit Model #FP6X88MTG field terminating type or approved equal. Provide minimum 12" extra cable length within rough-in or camera mounting equipment.

2.3 CABLES AND CABLE ASSEMBLIES

- A. Station cables (voice and data): Four unshielded, twisted pair, #23 gauge, Category 6 – 350 MHz, solid copper conductor, cable tray and plenum rated.
 1. General Cable #7131900, Commscope #2088B, Berk-Tek #10032094 or equivalent meeting the following characteristics at 250 MHz.
 - a. ACR: 10.5 dB min. @ 100m
 - b. PS-ACR: 8.5 dB min. @ 100m
 - c. ELFEXT: 24.5 dB min.
 - d. PS-ELFEXT: 21.5 dB min.
 - e. NEXT: 43 dB min.
 - f. PS-NEXT: 41 dB min.
 - g. ATTEN.: 32.8 dB max. @ 100m
 - h. LCL: 26 dB min.
 - i. Return Loss: 20 dB min.
- B. Extended Range cable: Four unshielded, twisted pair, #22 gauge, Category 6, solid copper conductor, cable tray and plenum rated.
 1. Limited power listed for up to 90 Watts (PoE Type 4)
 2. Certified for 10 Mbps transmission up to 250 meters.
 3. Certified for 1 Gbps transmission up to 200 meters.
 4. General Cable #8131800, Paige #258300336, or equivalent meeting the following characteristics at 250 MHz.
 - a. Insertion Loss: 30.6 dB/100m max.
 - b. Return Loss : 17.3 dB/100m min.
 - c. NEXT: 38.3 dB/100m min.
 - d. PSNEXT: 36.3 dB/100m min.

5. Use only where indicated on the Drawings.
- C. Outside Plant cable: Four unshielded, twisted pair, #23 gauge, Category 6, solid copper conductor, gel filled water block for underground/wet applications and UV resistant insulation.
 1. General Cable #7136100, Commscope #1572A, Berk-Tek #10139885 or equivalent meeting the following characteristics at 250MHz.
 - a. Insertion Loss: 32.8 dB max.
 - b. Return Loss : 17.3 dB min.
 - c. NEXT: 38.3 dB min.
 - d. PSNEXT: 36.3 dB min.
- D. Outside Plant Extended Range cable: Four unshielded, twisted pair, #22 gauge, Category 6, solid copper conductor, gel filled water block, wet listed, and extended range.
 1. Limited power listed for up to 90 Watts (PoE Type 4)
 2. Certified for 10 Mbps transmission up to 250 meters.
 3. Certified for 1 Gbps transmission up to 200 meters.
 4. General Cable #8146100, Paige #258330804, or equivalent meeting the following characteristics at 250 MHz.
 - a. Insertion Loss: 30.6 dB/100m max.
 - b. Return Loss : 17.3. dB/100m min.
 - c. NEXT: 38.3 dB/100m min.
 - d. PSNEXT: 36.3 dB/100m min.

2.4 WIRELESS ACCESS POINT (WAP) CABLING

- A. Cabling for WAP's shall be Limited Power Listed CAT 6A.
 1. Data jacks: Single outlet RJ45, eight-pin/eight wire, modular construction, TIA/EIA-568.2-D Category 6A compliant, T568A and T568B identification, Panduit Mini-Com #CJ6X88TG, or approved equal.
 2. Above Ceiling Installation: Panduit #CBXQ2IW-A, or Approved Equal surface termination box attached to building structure.
 3. Station cables: Four unshielded, twisted pair, #23 gauge, Category 6A – 500 MHz, solid copper conductor, cable tray and plenum rated. UL Listed CMP-LP (0.7A).
 - a. General Cable #7151850 or Approved Equal meeting the following characteristics per 100 meters at 500 MHz.
 - 1) ACRF: 13.8 dB min.
 - 2) PSACRF: 10.8 dB min.
 - 3) PSAACRF: 32.0 dB min.
 - 4) NEXT: 33.8 dB min.
 - 5) PSNEXT: 31.8 dB min.
 - 6) PSANEXT: 60.0 dB min.
 - 7) Return Loss: 15.2 dB min.

2.5 MISCELLANEOUS PRODUCTS

- A. Cable management:
 - 1. 6" die-cast aluminum distribution rings: Allen Tel #GB13C or equivalent.
 - 2. Plenum velcro cable ties: Panduit #HLSP series or equivalent.
 - 3. Cable hooks with retainers: B-Line #BCH series or equivalent.
- B. Patch Panels
 - 1. Patch panels shall have modular jack-style termination connectors, be 24-port or 48-port in size, one or two standard EIA rack spaces in height. The panels shall have separate port and panel designation strips. Panduit #CP24BL or #CP48BL, Commscope #M2400-1U-GS, Leviton #49255-H24 or #49255-H48, or approved equal.
 - 2. Quantity: As required by station cable count.
- C. Data Rack (DTR)
 - 1. 16U, Secure compact wall-mounted, EIA/TIA 19" rack assembly. Blackhawk Labs #MRQQ351S16, or equivalent, quantity as shown on Drawings.
 - 2. Provide Blackhawk Labs #S12 Pro Kit, or equivalent, Professional Accessory kit that includes Fantray, Brush Plates and Screws.
- D. Identification:
 - 1. Panduit #LS8E or Pan-Mark labeling systems or equivalent. Hand lettering not acceptable.
- E. Power Strip:
 - 1. 19" rack-mounted surge suppression strip with twelve NEMA 5-20 receptacles.
 - 2. UL1449 listed. 30kA Maximum Surge. EMI/RFI Filtration.
 - 3. Manufacturer: CyberPower #CPS1220RMS or equivalent.
 - 4. Quantity: One per data rack.

2.6 COLOR

- A. All cables shall match their associated jack color for type of system served unless otherwise indicated.
- B. Verify cable and jack color configuration with Engineer/Owner's Rep.
- C. Typical color configuration.
 - 1. Voice Jacks – Match Faceplate (Yellow cable)
 - 2. Data Jacks – Yellow
 - 3. WAP – Orange
 - 4. Cameras – Purple

PART 3 – EXECUTION

3.1 STORAGE

- A. Store system equipment in cool, dry space prior to installation.

3.2 GENERAL

- A. Securely install components where shown on Drawings.
- B. Contractor shall adjust and provide all other assistance required at final inspection to bring the system satisfactorily on-line.
- C. Install in accordance with NEC, EIA/TIA Standards, NRTL listing, and manufacturer's recommendations and instructions.
- D. All cables that extend underground shall be listed for use in wet locations. See Outside Plant cables in Part 2 for requirements.
- E. Cable:
 - 1. Install cables in raceways as required by Section 270528 and in cable tray (communications type) where cable tray is specified.
 - 2. Route open air cables (where not in raceway or cable tray) parallel or perpendicular to building construction supporting with specified products, maximum 4'-0" on center.
 - 3. Bundle multiple open air cable runs located in TTB/TB rooms together with velcro cable ties
 - 4. Identify ends of cables with room designations as directed by Owner.
 - 5. Bending radius shall be minimum 1".
 - 6. All cable runs shall be continuous, **NO SPLICING**.

3.3 DATA

- A. Provide Data Rack(s) as shown and specified.
- B. Install patch panels and cable management system in Data Rack.
- C. Install data station cable from patch panel to data outlet locations as shown on the Drawings. Cable length not to exceed 295 feet.
- D. Terminate cables according to T568A or T568B wiring scheme as determined by Owner's system requirements.
- E. Extended range cable to only be used where indicated on the Drawings, or where approved by the Engineer. Use of this cable is not permitted as an alternative to change or alter network system distribution locations or quantities.

- F. Identify cable at both ends according to Owner's convention. Arrange patch panels and patch panel jacks as per Owner's convention. Identify all patch panels, patch panel jacks, and faceplate jacks according to Owner's convention.
 - 1. If no convention is available, room numbers shall be incorporated into the identification.
Ex: For room 120, use 120-1 for first cable, 120-2 for second cable, etc.

3.4 SURVEILLANCE

- A. Install separate dedicated patch panels in Data Rack for the camera cables.
- B. Install station cable from patch panel to camera locations as shown on the Drawings. Cable length not to exceed 295 feet. Verify exact camera location and mounting configuration with Surveillance System installer.
 - 1. Extended range cable to only be used where indicated on the Drawings or where approved by the Engineer.
- C. Terminate cables according to T568A or T568B wiring scheme as determined by Owner's system requirements.
- D. Identify cable at both ends according to Owner's convention. Arrange patch panels and patch panel jacks as per Owner's convention. Identify all patch panels, patch panel jacks, and faceplate jacks according to Owner's convention.
 - 1. If no convention is available, camera numbers shall be incorporated into the identification.
Ex: For camera 21, use C-21.

3.5 GROUNDING

- A. For each data rack, provide one #10 AWG solid copper conductor from data rack to nearest panelboard with equipment ground bus.
- B. Where multiple data racks are located in single room (more than 2), provide isolated communication grounding bus in room. Extend #6 solid SDBC in conduit, extended shortest and most direct route to ground bar at nearest panelboard with equipment ground bus. Extend one #10 AWG solid copper conductor from each data rack to communication grounding bus in room.

3.6 TESTING REQUIREMENTS

- A. All terminated voice and data cables shall be tested and certified for TIA/EIA-568.2-D. Category 6 standards. The test shall be performed on the permanent link configuration (from station jack to patch panel jack). These standards require the following when tested at 250 MHz:
 - 1. Return Loss shall be no less than 10.0dB.
 - 2. Insertion Loss (Attenuation) shall not exceed 31.1dB.

3. Near End Cross Talk (NEXT) shall be no less than 35.3dB.
 4. Power Sum Near End Cross Talk (PSNEXT) shall be no less than 32.7dB.
 5. Attenuation to Crosstalk Ratio Far-end (ACRF) shall be no less than 16.2dB.
 6. Power Sum ACRF (PSACRF) shall be no less than 13.2dB.
 7. Propagation Delay shall be less than 490 nanoseconds.
 8. Propagation Delay Skew shall be less than 44 nanoseconds.
- B. All terminated WAP cables shall be tested and certified for TIA/EIA-568.2-D. Category 6A standards. The test shall be performed on the permanent link configuration (from station jack to patch panel jack). These standards require the following when tested at 500 MHz:
1. Return Loss shall be no less than 8.0dB.
 2. Insertion Loss (Attenuation) shall not exceed 43.8dB.
 3. Near-end Cross Talk (NEXT) shall be no less than 26.7dB.
 4. Power Sum Near-end Cross Talk (PSNEXT) shall be no less than 23.8dB.
 5. Attenuation to Crosstalk Ratio Far-end (ACRF) shall be no less than 10.2dB.
 6. Power Sum ACRF (PSACRF) shall be no less than 7.2 dB.
 7. Propagation Delay shall be less than 490 nanoseconds.
 8. Propagation Delay Skew shall be less than 44 nanoseconds.
 9. Power Sum Alien Near-end Cross Talk (PSANEXT) shall be no less than 49.5 dB.
 10. Power Sum Alien Attenuation to Crosstalk Ratio Far-end (PSAACRF) shall be no less than 23.7 dB.
- C. Additional testing shall include line mapping and cable length before final acceptance by Owner.
1. DC resistance shall be less than 3% or less than 150 milli-Ohms.
- D. All permanent link cable runs shall be documented with a hard copy print-out of the test results. Compile one copy of test results in a loose-leaf binder, similar to manual references in Section 260500, 1.04E. Submit at project completion with referenced Record Manual.
- E. Field tester to be Level III and conform to TIA/EIA 568.2-D Annex A & B requirements.

3.7 CLEANING

- A. **Clean** and **vacuum interior** to remove all wire and insulation scraps, dust and dirt.
- B. Clean all exposed surfaces immediately prior to final inspection.

END OF SECTION

SPECIAL PROVISION No. 1 STORM WATER DISCHARGE REQUIREMENTS (GENERAL)

Before work can begin on this Contract, the G.C. or CM must comply with the U.S. Environmental Protection Agency (EPA) requirements and the ND Pollutant Discharge Elimination System (NDPDES), as follows:

1. The Contractor must file a "Notice of Intent to Obtain Coverage Under NDPDES General Permit for Storm Water Discharge Associated with Construction Activity" (NOI). This form must be filed with the EPA / ND DEQ per the permit requirements before construction begins.
2. The Contractor must also submit a Storm Water Pollution Prevention (SWPP) plan to the ND DEQ at least *five* days before construction begins.
 - a. Items which must be include in the SWPP plan are listed in Part II of the General Permit for Storm Water Discharge Associated with Construction Activities.
 - b. A list of subcontractors must accompany the NOI and SWPP plan. If late subcontractors are added, those names shall be forwarded to the Department of Health by letter.
3. The monitoring, recording and reporting requirements listed in Part III of the General Permit must be followed.
4. Compliance responsibilities and general requirements are found in Part IV and Part V of the General Permit.
5. Notice of Termination (see Part I, Para. F. of the General Permit).
6. Copies of all submittals to the EPA shall also be sent to the engineer.

Copies of the Notice of Intent form and General Permit forms may be obtained from:

<https://www.epa.gov/npdes/submitting-notice-intent-noi-notice-termination-not-or-low-erosivity-waiver-lew-under#submit>

<https://deq.nd.gov/WQ/Forms.aspx>

DOCUMENT 00 3132 - GEOTECHNICAL DATA

1.1 GEOTECHNICAL DATA

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. A geotechnical investigation report for Project, prepared by Material Testing Services, LLC dated January 29, 2026 is available for viewing by request from Owner / Architect.
- C. Related Requirements:
 - 1. Document 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Document 003119 "Existing Condition Information" for information about existing conditions that is made available to bidders.
 - 3. Document 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.

END OF SECTION 00-3132

SECTION 02-4113 SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Removal of structures, obstructions, surfacing, and miscellaneous items.

1.02 RELATED REQUIREMENTS

- A. Section 31-2500 – Erosion and Sedimentation Controls.
- B. Section 31-2213 – Earthwork- Rough Grading.
- C. Section 1500 of the City of Minot Standard Specifications and Details, 2025 edition.
- D. Sections 107.10 and 202 of the NDDOT Standard Specifications for Road and Bridge Construction 2014 edition.

1.03 DEFINITIONS

- A. Remove: To eliminate or take away from the Project Site.
- B. Salvage: To save from loss or destruction so the item can be used again in a workable condition equal to the existing condition before removal.
- C. Abandon: To fill, bulkhead, or close off pipes and structures so no sediment or flow can occur.

1.04 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to be salvaged or to remain Owner's property, removed materials shall become the Contractor's property and shall be removed from the Project Site.

1.05 PROJECT CONDITIONS

- A. Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during demolition and construction operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required.
- B. Utility Locator Service: Contractor to notify North Dakota One Call prior start of construction/demolition work.
- C. Do not commence Demolition work until temporary erosion and sediment control measures and in place.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. Execution shall be in accordance with Section 1500, Part 3 of the City of Minot Standard Specifications and Details except as herein modified.

3.03 REMOVE UTILITIES

- A. Locate, identify, disconnect and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut of indicated utilities.
 - 2. Contact utilities 48 hours before any work is completed on existing water mains or sanitary sewers.
 - 3. Contractor shall remove and/or abandon all utilities in a manor approved by the utility companies.
- B. Excavate for and remove underground utilities indicated to be removed.
- C. Remove water and sewer service lines to a point at least 5 feet outside of the proposed building perimeter line. Permanently cap utilities and abandon in place.

3.04 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation is full for all work necessary to complete the Bid Item including removal, salvage, storage, disposal, and stockpiling.
- B. Measurement shall conform to Section 1500, Part 3.14 of the City of Minot Standard Specifications and Details and as herein noted.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 02 4113

SECTION 31 1000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing site utilities.
7. Temporary erosion and sedimentation control.

1.2 REFERENCES

- A. American Society of Testing and Materials, Current Edition, Hereafter referred to as ASTM.
- B. Sections 1500 and 1600 of the 2025 City of Minot Standard Specifications and Details.
- C. Sections 202, 210, 708, and 709 of the NDDOT Standard Specifications for Road and Bridge Construction

1.3 DEFINITIONS

- A. Abandon: To fill, bulkhead, or close off pipes and structures so no sediment or flow can occur.
- B. Brush: All bushes, shrubs, and other vegetation including small isolated trees with a diameter of 4 inches or less as measured at a point 2 feet above the ground.
- C. Remove: To eliminate or take away from the Project Site.
- D. Salvage: To save from loss or destruction so the item can be used again in a workable condition equal to the existing condition before removal.
- E. Tree Trimming/Pruning: Cutting broken, damaged, or obstructing branches and installing wound dressing.
- F. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil or other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

- A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.
- B. Submit for review and approval Temporary Tree Protection Fence.
- C. Record Drawings, according to Division 1 Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing. North Dakota One-Call: 1-800-795-0555.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

1.7 SEQUENCE AND SCHEDULING

- A. Contractor shall obtain Notice to Proceed from Owner before beginning any work.

PART 2 - PRODUCTS

2.1 TEMPORARY TREE PROTECTION FENCE.

- A. Provide temporary fence for protection of work areas and trees as directed by Owner's Representative and as shown on the Drawings.
- B. Fencing shall be a woven, highly visible, plastic fabric with metal posts as approved such as Tenax® Guardian Economy Round Mesh Orange Safety Fence or approved equal:
 - 1. Temporary Tree Protection Fencing: High-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi ; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.
 - 2. Height: 4 feet
 - 3. Color: High-visibility orange, nonfading.

2.2 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earthwork."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation control and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
 - 1. Do not store construction materials, debris, or excavated material within fenced area.
 - 2. Do not permit vehicles, equipment, or foot traffic within fenced area.
 - 3. Maintain fenced area free of weeds and trash.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Engineer.

3.4 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 - 1. Arrange with utility companies to shut off indicated utilities.
 - 2. Owner will arrange to shut off indicated utilities when requested by Contractor.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Engineer's written permission.
- C. Excavate for and remove and relay underground utilities indicated to be salvaged.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
 4. Use only hand methods for grubbing within tree protection zone.
 5. Remove tree branches and other waste materials and dispose of off-site.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
1. Place Approved fill material in horizontal layers not exceeding a loose depth of 6 inches, and compact each layer to 95% of Standard Proctor Density, within -3% to +3% of optimum moisture content.
- C. Clearing and Grubbing shall be considered incidental to all other items.

3.6 TOPSOIL STRIPPING

- A. Execution shall be in accordance with Section 1600 Part 3.04 – Stripping of the 2019 City of Minot Standard Specifications and Details except as herein modified.
1. After Clearing and Grubbing have been completed, strip topsoil in areas of proposed improvements to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
 2. Do not strip topsoil within the drip line of trees that are to remain.
 3. Remove subsoil and non-soil materials from topsoil, including but not limited to trash, debris, weeds, roots, and other waste material.
 4. Stockpile sufficient topsoil to re-spread to a uniform depth of 6 inches to all disturbed areas to be seeded or sodded.
 5. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Water periodically to prevent windblown dust.
 6. Topsoil stockpiles to remain in place for more than 7 days shall be temporary seeded.
 7. Silt fence shall be placed around the perimeter of all stockpiles.

3.7 SITE IMPROVEMENTS

A. Saw Cut Pavement

1. Bituminous and Concrete Pavement: Saw pavement full depth, along the removal line. Saw cuts shall be marked by the Engineer.
 - a. Bituminous pavement may be coultter cut as long as the edges of the cut are straight and uniform.
2. Saw curb and gutter full depth, along the removal line. Saw cuts shall be marked by the Engineer.

B. Remove Asphalt Pavement

1. Remove in accordance with NDDOT Spec 202.02E except as modified herein:
 - a. Prior to restoring trench areas, all bituminous edges of the trench shall be sawcut.
 - b. Remove asphalt in a manner such that remaining surfacing is not damaged.

C. Remove Pipe

1. Remove existing pipe encountered during excavation as indicated on the plans or as directed by the Engineer.
2. Bulkhead the ends of existing lines to be abandoned but not removed. Use the appropriate caps or plugs. Formed concrete or brick and mortar can be used on gravity lines.
3. The removal of portions of previously abandoned utility lines or conduits when required for new construction will be considered incidental work and no direct compensation will be paid.

3.8 DAMAGE

- A.** Contractor shall be responsible for any damage that may occur to existing utilities and features necessary for operations during the Work and will be required to make repairs to or replace any damaged items at no expense to Owner.

3.9 FIELD QUALITY CONTROL

- A.** Contractor shall establish and maintain quality control for work under this section to assure compliance with contract requirements and maintain records of his quality control for all construction operations including but not limited to the following:
- B.** Clearing.
- C.** Grubbing and backfilling holes.
- D.** Disposal.

- E. Protection of vegetation and trees outside the clearing limits.
- F. A copy of the quality control records, including inspections and tests, as well as the records of corrective action taken, shall be furnished the Government as directed by the Contracting Officer.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

3.11 MEASUREMENT AND PAYMENT

- A. Measurement and payment shall be in accordance with the City of Minot Standard Specifications and Details Section 1500.3.14 and 1600.3.07 and as follows:
- B. **Clear & Grubbing.** No measurement will be made. Any required clearing and grubbing will be incidental to other bid items.

END OF SECTION 31 1000

SECTION 31 2000 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for walks pavements
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete pavements.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 REFERENCES

- A.** Sections 1800, 1900, and 2000 of the 2025 City of Minot Standard Specifications and Details.
- B.** Sections 203, 210, 230, and 234 of the NDDOT Standard Specifications for Road and Bridge Construction, latest edition.

1.3 DEFINITIONS

- A.** Backfill: Soil material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B.** Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C.** Bedding Course: Aggregate layer placed under and alongside the pipe that provides structural support and secures the pipe true line and grade.
- D.** Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E.** Common Excavation: Shall include all excavations not otherwise classified.
- F.** Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

- G. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
 - H. Fill/Embankment: Soil materials used to raise existing grades.
 - I. Improved Pipe Foundation: Material used when unsuitable materials are encountered and added pipe support is needed.
 - J. Pipe Foundation: Soil material below the pipe that provides support.
 - K. Pipe Zone: The area of the trench measured from 1 foot above the pipe to the bottom of the excavation.
 - L. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material $\frac{3}{4}$ cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
 - M. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 - N. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
 - O. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
 - P. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Compaction test results
 - B. Gradation test results

- C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

1.6 FIELD CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating. North Dakota One-Call: 1-800-795-0555.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 3 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

- E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
 - 1. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1 inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.
- H. TRENCH BACKFILL MATERIALS
 - 1. Suitable excavated material from trench excavation shall be used.
 - 2. Material shall be free of organic materials, frozen clumps, large rocks, concrete and bituminous chunks, rubbish, and other material deemed unsuitable.
 - 3. Questionable materials shall be reviewed by the Engineer before backfilling shall begin. The Contractor shall proceed at their risk if the Engineer was not consulted.
- I. IMPROVED PIPE FOUNDATION
 - 1. Conform to NDDOT Standard Specification 816.01 Class 2 Aggregates.
 - a. No onsite granular material may be used for improved pipe foundation.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 5 inches Wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 GENERAL

- A. Execution shall be in accordance with Sections 1800 – Part 3, 1900 – Part 3, and 2000 – Part 3 of the 2025 City of Minot Standard Specifications and Details except as herein modified.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls during earth-moving operations which are specified in Division 2 Section "Site Clearing," during earthwork operations. Comply with the North Dakota Pollution Elimination System requirements.
- D. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.3 DEWATERING

- A. Sump and Surface pumps may be required to control groundwater in excavated areas. Pumped water shall be routed to proposed detention basins or filtered prior discharging from the site.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Provide dewatering system if necessary.
- C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Dewatering, if required, shall be in accordance with Section D.1.d. "Excavation Dewatering" of the Geotechnical Evaluation Report.

3.4 EXPLOSIVES

- A. Explosives shall not be used.

3.5 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Excavation shall be in accordance with Sections 1800 and 2000 of the 2025 City of Minot Standard Specifications and Details except as herein modified.
- C. Remove all materials classified as lignite (LI) from within 4 vertical feet below any structure or road. Lignite shall be removed from the site and shall not be used as fill material. Note that the Lignite is waterbearing and will be difficult to remove without a proper dewatering plan.

3.6 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 - 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 - 1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.8 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
 - 1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- E. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.9 SUBGRADE INSPECTION

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Initial Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
- E. Warning Tape: Install warning tape 24" directly above utilities.
- F. Trench backfill: Materials classified as silt (ML) or silty clay (CL-ML) should not be reused as backfill within 3 vertical feet below the pavement subgrade

3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 3 percent of optimum moisture content.
 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698 and ASTM D 1557:
 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade at 100 percent Standard Proctor.
 2. From bottom of excavation up to 12 inches below subgrade compact each layer of backfill or fill soil material at 95 percent Standard Proctor.
 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
 4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch.

2. Walks: Plus or minus 1/2 inch.
 3. Pavements: Including Gravel, Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 1. Shape subbase course and base course to required crown elevations and cross-slope grades.
 2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 100 percent of maximum dry unit weight according to ASTM D 698 and ASTM D 1557.

3.17 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform inspections:
- B. Testing Agency: Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.18 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.19 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

3.20 MEASUREMENT AND PAYMENT

- A. Measurement and payment shall be in accordance with City of Minot Standard Specifications and Details Sections 1800.03 and 1900.03 and as follows;
- B. **Remove, Stockpile, and Relay Topsoil.** Topsoil shall not be measured. Payment will be for the lump sum at the Contract Price to restore all disturbed areas.
- C. **Trench Excavation.** Excavation and backfill of trench and pipe bedding shall be included in the price of pipe provided.
- D. All other work shall be considered incidental to the Project.

END OF SECTION 31 2000

SECTION 31-2213 – EARTHWORK-ROUGH GRADING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 1 and Division 2 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades, pavements, lawns and grasses.
 - 2. Geosynthetics
 - 3. Aggregate base for pavements.
 - 4. Aggregate Surface Course.
 - 5. Excavating and backfilling for utility trenches.
 - 6. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
- B. Related Sections include the following:
 - 1. Section 00-3132 "Geotechnical Data"
 - 2. Section 31-1000 "Site Clearing" for temporary erosion and sedimentation control measures, site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
 - 3. Section 32-9200 "Turf and Grasses" for finish grading, including preparing and placing topsoil and planting soil for lawns.

1.3 DEFINITIONS

- A. Aggregate Base: Granular base course placed above the subgrade.
- B. Aggregate Surface Course: Granular surface course for gravel roads.
- C. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- D. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.
- E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation (Over-Excavation): Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material $\frac{3}{4}$ cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by an independent geotechnical testing agency, according to ASTM D 1586.
- I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Each type of plastic warning tape.
 - 2. Geosynthetic Material Product data.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 of borrow soil materials proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site and borrow soil material proposed for fill and backfill.
 - 3. Aggregate Gradation in accordance with the NDDOT Standard Specifications for Road and Bridge Construction.
- C. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, as documented according to ASTM D 3740 and ASTM E 548.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Handle, store and deliver all aggregate in a manner that prevents segregation and contamination

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.
 - 3. Contact utility-locator service for area where Project is located before excavating. North Dakota One-Call: 1-800-795-0555.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory (Suitable) Soils: AASHTO M 145 Soil Classification Groups A-1, A-2-4, A-2-5, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory (Unsuitable) Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within -3% to +3% of optimum moisture content at the time of compaction.
- D. Aggregate Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting the specifications of North Dakota Department of Transportation Class 5. At the Contractor's option, the existing asphalt to be removed may be milled and incorporated into a salvaged base material that meets the requirements of the Standard Specifications for Road and Bridge Construction of the North Dakota Department of Transportation.

- E. Aggregate Surface: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, meeting the specifications of North Dakota Department of Transportation Class 13.
- F. Bedding Course: Refer to the appropriate utility trench detail.
- G. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.
- H. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 5 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored according to the following:
 - 1. Red: Electric.
 - 2. Yellow: Gas, oil, steam, and dangerous materials.
 - 3. Orange: Telephone and other communications.
 - 4. Blue: Water systems.
 - 5. Green: Sewer systems.
- B. Geosynthetic Fabric: Fabric shall conform to NDDOT Type R1 standards.

2.3 SOURCE TESTING

- A. Provide one gradation test for each 750 tons (500 cubic yards) or portion thereof of material delivered to site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."
- C. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations. Comply with the North Dakota Pollution Elimination System requirements.
- D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Provide dewatering system if necessary.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Remove rock necessary to facilitate the construction of permanent improvements.
- B. Rock Excavation: Rock Excavation consists of excavating hard solid rock in ledges and bedded deposits which is so hard or firmly cemented that it must be blasted before it can be excavated and removed; or that heavy duty dozer-mounted rippers or dozer blades must be used to break the material into chunks. Material that breaks or shatters into pieces of less than one cubic foot in size during breaking operations (excluding blasting) will be classified as shale. Rock excavation includes all boulders and other detached rock having a volume of 1/2 cubic yard or more.
- C. Shale Excavation: Shale Excavation includes the excavating of shale material consisting of laminated, fissile, sedimentary material composed principally of fine-grained particles. The Contractor must demonstrate to the Engineer that the material is shale and cannot be removed by conventional scrapers and dozers and must be ripped by use of heavy-duty rippers of a type normally rear-mounted on dozers or similar equipment. If the material can be ripped using a motor grader equipped with ripper/scarifying teeth, it will be paid for as Common Excavation.
- D. Muck Excavation: Muck Excavation consists of the removal and disposal of deposits of saturated or unsaturated mixtures of soils and organic matter unsuitable for use as embankment material; and cannot be removed by use of conventional scrapers and dozers, but must be removed by equipment such as draglines, shovels, or excavators which operate outside the area being excavated.
- E. Borrow Excavation: Borrow Excavation consists of excavation, haul, placement, and compaction of embankment material obtained from locations outside the Right of Way.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 6 inches higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: As indicated on the Drawings.
- C. Trench Bottoms: Excavate 6 inches below bottom of pipe and install bedding material. Shape bedding material to provide uniform bearing and support of pipes and conduit. Shape bedding material to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

3.6 SUBGRADE INSPECTION

- A. Notify Engineer when excavations have reached required subgrade.
- B. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below proposed pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to the first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons, or other equipment approved by the Engineer.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.7 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation as directed by Engineer.

3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Water to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of existing trees to remain.

3.9 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Place and compact bedding material of satisfactory soil, to heights indicated on the Drawings.
 - 1. Carefully compact bedding under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- D. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Install warning tape directly above utilities, as indicated on the Drawings.

3.11 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations using satisfactory soil material.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within -3% to +3% of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 3 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 6 inches in loose depth for material compacted by heavy compaction equipment, and not more than 3 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than 98 percent of the maximum dry unit weight according to ASTM D 698 (Standard Proctor).
 1. For utility trenches, compact each layer of bedding material at 95 percent and backfill remaining soil material to not less than 98 percent of the maximum dry unit weight according to ASTM D 698 (Standard Proctor).

3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Lawn or Unpaved Areas: Plus or minus 1 inch.
 2. Pavements (Including Gravel): Plus or minus ½ inch.

3.15 AGGREGATE BASE COURSE

- A. Place aggregate base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place aggregate base course under pavements and walks as follows:
 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends a minimum of 12 inches.
 2. Place aggregate base course material over geotextile fabric where indicated.
 3. Shape aggregate base course to required elevations and cross-slope grades.
 4. Place aggregate base course in layers of equal thickness, with no compacted layer more than 6 inches thick.
 5. Compact aggregate base course to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight within 3 percent of optimum moisture content according to ASTM D 698.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Paved Areas (Including Gravel): At subgrade and at each compacted fill and backfill layer, at least 1 test for every 10,000 square feet or less, but in no case fewer than 3 tests. At finished grade, at least 1 test for every 5,000 square feet or less, but in no case fewer than 3 tests.
 - 2. Unpaved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 15,000 square feet or less, but in no case fewer than 3 tests.
 - 3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for each 150 feet or less of trench length, but in no case fewer than 3 tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris. Water to prevent wind-caused erosion.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.
- B. Disposal: Remove excess topsoil from the site or shape into landscaping berms to the satisfaction of the Owner.

3.19 MEASUREMENT AND PAYMENT

1. **Import Fill.** Imported Fill shall be measured by the cubic yard (CY) compacted. The Bid Item will include all labor and costs to excavate, load, haul and place the materials. Payment will be for the total quantity measured at the contract unit price.
2. **Salvage & Relay Aggregate.** This item shall be measured by the square yard (SY). Salvage and relaying of assumed 6" depth existing gravel included in this bid item. Payment will be for the total quantity measured at the contract unit price.
3. **Cl. 5 Aggregate Base.** Aggregate Base will be measured by the Ton. The Contractor shall supply the Engineer with certified haul tickets from each hauling vehicle for each load of material hauled to the site. Payment will be for the total quantity measured at the contract unit price.
4. **Cl. 13 Aggregate Surface.** Aggregate Surface will be measured by the Ton. The Contractor shall supply the Engineer with certified haul tickets from each hauling vehicle for each load of material hauled to the site. Bid item to include new material for existing gravel roadways and new access roads. Payment will be for the total quantity measured at the contract unit price.
5. **Geotextile Fabric.** Geotextile fabric shall not be measured. Fabric to be used under asphalt patches.
6. **Remove & Replace Topsoil.** Topsoil replacement will not be measured. Topsoil shall be placed at an optimum depth of 4". Payment will be a Lump Sum (LS) at the Contract Price.

END OF SECTION 31-2213

SECTION 31-2316.13 – TRENCHING-EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Trenching, backfilling, and compacting of underground infrastructure.

1.02 RELATED REQUIREMENTS

- A. Section 2000 of the City of Minot Standard Specifications and Details, 2025 edition.
- B. NDDOT Standard Specifications for Road and Bridge Construction 2022 edition.

1.03 SUBMITTALS

- A. Gradation of each granular borrow material.
- B. Compaction test results.

1.04 DEFINITIONS

- A. Bedding Material: Soil material surrounding the pipe that provide structural support, and secures the pipe true line and grade.
- B. Pipe Foundation: Soil material below the pipe that provides support
- C. Improved Pipe Foundation: Material used when unsuitable materials are encountered and added pipe support is needed.
- D. Pipe Zone: The area of the trench measured from 1 foot above the pipe to the bottom of the excavation.
- E. Sand Cushion: Aggregate bedding used around the pipe in the trench.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All products shall be in accordance with Section 2000, Part 2 of the City of Minot Standard Specifications and Details.

PART 3 - EXECUTION

3.01 GENERAL

- A. Execution shall be in accordance with Section 2000, Part 3 of the City of Minot Standard Specifications and Details.

3.02 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation is full for all work necessary to complete the Bid Item including labor, cost to excavate, load, haul, place, and dispose of materials.

- B. Measurement shall conform to Section 2000, Part 3.05 of the City of Minot Standard Specifications and Details.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 31-2316.13

SECTION 31-2319 DEWATERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes construction dewatering.
- B. Related Sections include the following:
 - 1. Section 31-2000 Earth Moving -Excavation and Embankment
 - 2. Section 31-2213 Earthwork-Rough Grading
 - 3. Section 31-2316.13 Trenching-Excavation and Backfill

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
 - 1. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Accomplish dewatering without damaging existing buildings adjacent to excavation.
 - 4. Remove dewatering system if no longer needed.

1.4 SUBMITTALS

- A. Shop Drawings for Information: For dewatering system. Show arrangement, locations, details and means of discharge and disposal of water.
- B. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.
 - 1. Note locations and capping depth of wells and well points, if used.

- C. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Engineer and then only after arranging to provide temporary utility services according to requirements indicated.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
 - 2. The geotechnical report is included elsewhere in the Project Manual.
- C. Survey adjacent structures and improvements, employing a qualified professional engineer or land surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
 - 1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Engineer and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
1. Maintain piezometric water level a minimum of 24 inches below surface of excavation.
- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

3.3 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation in full for all work necessary to complete the Bid Item.
- B. Measurement shall conform to Section 2000, Part 4 of the City of Minot Standard Specifications and Details.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION

SECTION 31 2500 – EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Erosion and Sedimentation Controls:
 - 1. Water control.
 - 2. Dust control.
 - 3. Erosion and sediment control.
 - 4. Noise control.
 - 5. Pollution control.
- B. Removal of utilities, facilities, and controls.

1.2 REFERENCES

- A. Section 1200 of the 2025 City of Minot Standard Specifications and Details.
- B. Sections 107.10 and 856 of the NDDOT Standard Specifications for Road and Bridge Construction.

1.3 SUBMITTALS

- A. Temporary Erosion Control Plan for use during construction activities.
- B. Permanent Erosion Control Plans for site restoration after construction activities.
- C. Storm Water Pollution Prevention Plan (SWPPP).
- D. "Notice of Intent to Obtain Coverage Under NDPDES General Permit for Storm Water Discharge Associated with Construction Activity" (NOI).

1.4 PERMITS

- A. NDPDES General Permit
 - 1. Prior to the commencement of any work, the Contractor shall file a "Notice of Intent" to obtain coverage under NDPDES General Permit for stormwater discharges associated with construction activity (NDR10-000) with North Dakota Department of Environmental Quality. The Contractor shall pay all fees associated with acquiring and maintaining the permit.

1.5 VEHICULAR ACCESS

- A. Construct temporary construction access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
- C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.
- D. Locate as indicated on Drawings.
- E. Provide means of removing mud from vehicle wheels before entering streets.

1.6 PARKING

- A. Location approved by Owner.
- B. Use of existing streets and driveways is not permitted. Tracked vehicles are not allowed on paved areas.
- C. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.7 WATER CONTROL

- A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

1.8 DUST CONTROL

- A. Execute Work by methods that minimize raising dust from construction operations.
- B. Provide positive means to prevent airborne dust from dispersing into the atmosphere.

1.9 EROSION AND SEDIMENT CONTROL

- A. Complete a SWPPP and file the Notice of Intent.
- B. All temporary erosion control devices shall be installed before any construction may begin and shall remain in place and be maintained at all times, at the Contractors expense.
- C. As the work progresses, the Contractor shall install and maintain the erosion control measures as indicated in the following implementation schedule:

EROSION CONTROL IMPLEMENTATION SCHEDULE		
Item	Installation	Removal
Proposed sedimentation basins	As soon as practicable	Clean upon project completion
Temporary Construction Entrance	Prior to any construction	By Contractor upon Final Stabilization
Bale Checks w/ Silt Fence	As flow areas are shaped	By Contractor after turf is established
Proposed silt fence	Prior to any construction	By Contractor and after turf is established, and as directed by Engineer
Construction limits barrier	Prior to any construction	By Contractor
Right of way diversion	As street is graded	By Contractor
Revegetation	As areas are complete & topsoil spread	Permanent

- D. Permanent erosion control shall be installed as soon as construction allows.
- E. The Contractor is responsible for establishing permanent turf to avoid excessive soil erosion and for installation of landscaping and final project site stabilization.
- F. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

1.10 POLLUTION CONTROL

- A. 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.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Clean and repair damage caused by installation or use of temporary Work.
- B. Restore existing and permanent facilities used during construction to original conditions. Restore permanent facilities used during construction to a specified condition.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products shall be in accordance with Section 1200, Part 2 of the City of Minot Standard Specifications and Details except as herein modified.

2.2 EROSION CONTROL BLANKET

A. Straw Mat

- 1. Straw Mat shall be ECB Type 1 and conform to Section 856.01 of the NDDOT Standard Specifications for Road and Bridge Construction.

B. Turf Reinforcement Mat

- 1. Turf Reinforcement Mat shall be TRM 1 and conform to Section 856.02 of the NDDOT Standard Specification for Road and Bridge Construction.

PART 3 - EXECUTION

3.1 GENERAL

- A. Execution shall be in accordance with Sections 1200 and 2700 of the City of Minot Standard Specifications and Details Section except as herein modified.

3.2 INSTALLATION

A. Straw Mat

- 1. Installation shall be in conformance with Section 255 of the NDDOT Standard Specifications for Road and Bridge Construction.
- 2. Straw Mat shall be required on all slopes of 4:1 or greater, located on all detention basin side slopes (toe of slope to top of bank), and in locations shown on the plans.

B. Turf Reinforcement Mat

- 1. Installation shall be in conformance with Section 255 of the NDDOT Standard Specifications for Road and Bridge Construction.

3.3 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

A. Erosion Control

1. The Permittee(s) shall use, where possible, horizontal slope grading, construction phasing, and other construction practices that minimize erosion.
2. Unless precluded by snow cover, all exposed soil areas* with a continuous positive slope within 100 lineal feet from a water of the state, or from a curb, gutter, storm sewer inlet, temporary or permanent drainage ditch or other storm water conveyance system, which is connected to a water of the state, shall have temporary protection or permanent cover for the exposed soil areas within the following time frames:

Steeper than 3:1	7 days
10:1 to 3:1	14 days
Flatter than 10:1	21 days

*For the purposes of this provision, exposed soil areas do not include stockpiles or surcharge areas of sand, gravel, aggregate, concrete or bituminous.

3. The bottom of any temporary or permanent drainage ditch constructed to drain water from a construction site must be stabilized within 100 lineal feet from a water of the state. Stabilization must be initiated within 24 hours of connecting the drainage ditch to a water of the state, existing gutter, storm sewer inlet, drainage ditch, or other storm water conveyance system which discharges to waters of the state and completed within five calendar days.
4. Prior to connecting any pipe to a water of the state or drainage ditch, the pipe's outlet must be provided with temporary or permanent energy dissipation to prevent erosion.

B. Sediment Control

1. Sediment control best management practices (BMPs), which prevent sediment from entering a water of the state, gutter, storm sewer inlet, ditch or other storm water conveyance system, shall be established on all down-gradient perimeters before any up-gradient land disturbing activities begin, and shall remain in place until final stabilization has been established.
2. The Permittee shall minimize vehicle tracking of sediment or soil off site at locations where vehicles exit the construction site onto paved surfaces.

3.4 BEST MANAGEMENT PRACTICES

A. The Contractor shall incorporate best management practices (BMPs) throughout construction. The following BMPs shall be followed as a minimum:

1. Land grading and excavating shall be kept at a minimum to reduce the possibility of creating runoff and erosion problems which require extensive control measures.
2. Topsoil shall be removed and stockpiled before grading begins.
3. Land exposure shall be minimized in terms of area and time.
4. Exposed areas subject to erosion shall be covered as quickly as possible by means of mulching or vegetation.
5. Natural vegetation shall be retained whenever feasible.
6. Appreciation structural or agronomic practices to control runoff and sedimentation shall be provided during and after construction.

7. Early completion of stabilized drainage system (temporary and permanent systems) will substantially reduce erosion potential.
8. Roadways and parking lots shall be paved or otherwise stabilized as soon as feasible.
9. Clearing and grading shall not be started until a firm construction schedule is known and can be effectively coordinated with the grading and clearing activity.

3.5 TEMPORARY EROSION AND SEDIMENT CONTROL MAINTENANCE

- A. Conform to Section 708 for the NDDOT Standard Specifications for Road and Bridge Construction, latest edition and Section 1200 Part 3.03 for the City of Minot Standard Specifications and Details, latest edition except as herein modified.
 1. Inspection of on-site erosion control measures shall be completed in accordance with the North Dakota Department of Health and the NDPDES General Permit.
 2. Inspections shall occur once per week and/or within 24 hours after a 0.5 inch rainfall.
 3. The contractor shall repair any damaged erosion control measures found during inspection and remove sediment built up against erosion control measures as required to maintain the devices in proper working order.
 4. It shall be the contractor's responsibility to clean sedimentation from existing and constructed storm drains prior to final acceptance.

3.6 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation in full for all work necessary to complete the Bid Item including installation, maintenance, sediment removal, repairs, and removal.
- B. Measurement shall conform to Section 1200, Part 3.04 of the City of Minot Standard Specifications and Details and as herein modified.
 1. **Erosion Control.** No measurement will be made. The cost of installation of additional erosion control measures not shown on the plans shall be incidental to the contract.
 2. **Erosion Control Maintenance.** No measurement will be made. Payment will be a Lump Sum at the contract Unit Price for Erosion Control.
 3. **Remove Erosion Control.** No measurement will be made. Payment will be a Lump Sum at the contract Unit Price for Erosion Control. Payment shall include removal of all temporary erosion control features upon final site stabilization.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 31 2500

SECTION 32-0515 – SUBGRADE PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Scarifying, shaping, compacting, and maintaining the subgrade.
- B. Geotextile Fabric

1.02 RELATED REQUIREMENTS

- A. Section 31-2213 Earth Work-Rough Grading
- B. Section 1900 of the City of Minot Standard Specifications and Details, 2025 edition.
- C. Sections 203, 210, 230, 234 and 858 of the NDDOT Standard Specifications for Road and Bridge Construction latest edition.

1.03 DEFINITIONS

- A. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

1.04 SUBMITTALS

- A. Geotextile Fabric product information.

1.05 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications shall preform all test as required in the City of Minot Standard Specifications and Details, Section 600.

PART 2 PRODUCTS

1.01 GEOTEXTILE FABRIC

- A. Conform to NDDOT Standard Specification 858 type R1.

PART 3 EXECUTION

3.01 GENERAL

- A. Execution shall be in accordance with Section 1900, Part 3 of the City of Minot Standard Specifications and Details Section except as herein modified.

3.02 GEOTEXTILE FABRIC INSTALLATION

- A. Geotextile Fabric shall be installed in accordance with Section 709 of the NDDOT Standard Specifications.

3.03 COMPACTION OF SUBGRADE

- A. Areas under proposed pavement shall be prepared in accordance with the Geotechnical Report except that the top 1' of material below the aggregate base shall be compacted to 100 percent per Section 1900 of the City of Minot Standard Specifications and Details.
- C. Subgrade shall be test rolled in accordance with section 1900.3.03A of the City of Minot Standard Specifications and Details. Soft spots shall be stabilized prior to placing base course.

3.04 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation is full for all work necessary to complete the Bid Item including labor and costs to excavate, load, haul, place, and dispose of materials.
- B. Subgrade Preparation: Shall be measured by the square yard (SY) for the paved surface and extend 1 foot behind curbs or beyond the proposed edge of pavement.
- C. Geotextile Fabric: Shall be measured by the square yard (SY). No payment shall be made for the required overlap.
- D. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 32-1000

SECTION 32 1123 – AGGREGATE BASE AND SURFACE COURSE

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Aggregate Base Course
 - 2. Aggregate Surface Course

1.2 REFERENCES

- A. Section 2900 of the 2025 City of Minot Standard Specifications and Details
- B. Sections 302 and 816 of the NDDOT Standard Specifications for Road and Bridge Construction 2022 Edition

1.3 SUBMITTALS

- A. Submit gradation sample report for aggregate a minimum of 10 calendar days prior to incorporation into project.

PART 2 – PRODUCTS

2.1 AGGREGATES

- A. Class 5 Aggregate shall conform to NDDOT Standard Specifications Section 816.02.
- B. Class 13 Aggregate shall conform to NDDOT Standard Specifications Section 816.02.

2.2 GEOSYNTHETIC MATERIAL

- A. Reinforcement fabric (Type R1) shall conform to NDDOT Standard Specifications Section 858.01.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Before installation of aggregate base course, the subgrade shall be prepared as specified in Section 31 2000 – Earthwork. The subgrade must be test rolled for conformance to Specifications. The test must be witnessed by the Engineer. The subgrade must also be checked using the stringline technique to check for line and grade tolerances.
- B. Geosynthetic fabric of type specified on the Plans or in the details shall be installed per NDDOT Standard Specifications Section 709.04.

3.2 AGGREGATE INSTALLATION

- A. Conform to NDDOT Standard Specifications Section 302 except as modified herein:
 - 1. Aggregate that does not conform to required specifications shall be removed and replaced at the Contractor's expense. No price reductions will be allowed.
 - 2. Aggregate base shall be compacted to 100 Percent of AASHTO T-99.
 - 3. Finished aggregate base surface shall not vary from proposed elevation by more than 0.04 feet.
- B. Weight tickets and haul sheets shall be delivered daily to the Engineer for aggregate brought to the site. Missing tickets shall not be paid.
- C. If the aggregate base is being wasted or placed excessively, the Owner will deduct quantities that are in excess of Plan dimensions for aggregate base.

3.3 FIELD QUALITY CONTROL AND TESTING

- A. The Owner will have an independent laboratory test the material for conformance to specifications. The Engineer will determine the test locations and the minimum number of tests according to Section 01 45 00 – Quality Control.
- B. Line and grade will be checked by the Engineer using the stringline method. The grade shall not vary by more than 0.04 feet from plan elevation. Contractor shall provide the Engineer notice when tolerances need to be checked.

3.4 SITE PROTECTION

- A. Contractor shall be responsible to protect the aggregate base from damage until it is covered by pavement. Aggregate base shall be free of ruts or other damage. Any damage shall be repaired prior to being paved at the Contractor's expense.

3.5 MEASUREMENT AND PAYMENT

- A. **Class 5 Aggregate Base.** Shall be measured by the Ton of material compacted in place as determined by weight tickets delivered to the engineer.

END OF SECTION 32 1123

HOT MIX ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold milling of existing asphalt pavement.
2. Hot-mix asphalt patching.
3. Hot-mix asphalt paving.
4. Hot-mix asphalt overlay.

B. Related Requirements:

1. Section 31 20 00 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 32 13 73 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.2 REFERENCES

- A.** Section 3000 of the 2025 City of Minot Standard Specifications and Details.
- B.** Sections 400 and 818 of the NDDOT Standard Specifications for Road and Bridge Construction.

1.3 DEFINITIONS

- A.** Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.
- B.** NDDOT: North Dakota Department of Transportation.

1.4 SUBMITTALS

- A.** Submit mix designs to Engineer for approval prior to construction.

1.5 INFORMATIONAL SUBMITTALS

- A.** Material Certificates: For each paving material. Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by the NDDOT.
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NDDOT for asphalt paving work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.
- C. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, as documented according to ASTM E 548

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet, excessively damp, not firm, or if the following conditions are not met:
 - 1. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 - 2. Asphalt Surface Course: Minimum surface temperature of 50 deg F at time of placement.
 - 3. Seal Coat: Minimum surface temperature of 70 deg F at time of placement.
 - 4. Refer to the standard specifications for other environmental limitations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Products shall be in conformance with Sections 3000 of the 2025 City of Minot Standard Specifications and Details except as herein modified.

2.2 AGGREGATES

- A. Coarse Aggregate: ASTM D 692/D 692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- B. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
- C. Mineral Filler: ASTM D 242/D 242M or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

2.3 ASPHALT MATERIALS

- A. Asphalt Binder: ASTM D 6373 or AASHTO M 320 binder designation PG 58-28.
- B. Tack Coat: SS-1h emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

2.4 AUXILIARY MATERIALS

- A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.
- B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

2.5 MIXES

- A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes designed according to procedures in AI MS-2, "Asphalt Mix Design Methods"; and complying with the following requirements:
 - 1. Base Course: NDDOT Superpave FAA 42.
 - 2. Surface Course: NDDOT Superpave FAA 42.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

3.2 PATCHING

- A. Asphalt Pavement: Patching Areas shall be marked by the Engineer. Saw cut perimeter of patch and excavate existing pavement section to sound base. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.10 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

- C. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix in lifts of not more than 2 inches, in the required number of lifts for a resulting desired thickness of patch and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

- A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.
- C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.10 gal./sq. yd.
 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 PLACING HOT-MIX ASPHALT

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.
 1. Spread mix at a minimum temperature of 250 deg F.
 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 1. Complete compaction before mix temperature cools to 185 deg F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041/D 2041M, but not less than 90 percent or greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.
- H. Finished surface shall be 1/8 inch above all curb edges, manholes, gate valves, and inlets.

3.7 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/4 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.
- B. Replace and compact hot-mix asphalt where core tests were taken.
- C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 WASTE HANDLING

- A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.
 1. Do not allow excavated materials to accumulate on-site.

3.10 MEASUREMENT AND PAYMENT

- A. **FAA 42 Hot Mix Asphalt Patch.** The item will be measured by the ton. PG 58-28 Oil, and HMA installation per detail shall be included in this bid item. The Contractor shall supply the Engineer with certified haul tickets from each hauling vehicle for each load of material hauled to the site. The payment will be for the total quantity measured at the contract unit price.

END OF SECTION 32 1216

SECTION 32 1313 – CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. City of Minot Standard Specifications Sections 3200 and 3300

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Curbs and gutters.
 - 2. Driveways and sidewalks.
 - 3. Parking lots
 - 4. Concrete Pavement
- B. Related Sections include the following:
 - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with fly ash.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Qualification Data: For manufacturer and testing agency.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 1. Cementitious materials.
 2. Fly Ash
 3. Steel reinforcement and reinforcement accessories.
 4. Fiber Reinforcement
 5. Admixtures.
 6. Curing compounds.
 7. Applied finish materials.
 8. Bonding agent or epoxy adhesive.
 9. Joint fillers.
- F. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All Concrete shall be in accordance with the 2022 NDDOT Standards Specifications for Road and Bridge Construction.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Conform with NDDOT Section 836 except as herein modified:
 - 1. All dowel bars and tie bars shall be epoxy coated.

2.4 CONCRETE MATERIALS

- A. Conform to NDDOT Section 802 except as herein modified
 - 1. Cement shall be Type 1 or Type 1A
 - 2. Concrete shall be class AE

2.5 FLY ASH

- A. Conform to NDDOT Section 820

2.6 ADMIXTURES

- A. Air Entrainment
 - 1. Conform to AASHTO M 182
 - 2. Air content shall be between 5 and 8 percent by volume of the freshly mixed concrete. Concrete with air content below 5 percent or above 8 percent will be rejected.

2.7 CURING MATERIALS

- A. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

2.9 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi.
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.40.
 - 3. Slump Limit: 3 inches max. for slabs. 1 inch max. for curbs.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 5 percent to 8 percent.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements as follows:
 - 1. Fly Ash: 20 percent on Concrete driveways and sidewalks
 - 2. Fly Ash: 15 percent on Curb and Gutter.

2.10 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94 and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
 - 2. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and aggregate base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared aggregate base surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding.
 - 1. Completely proof-roll aggregate base in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel tandem-axle dump truck weighing not less than 15 tons, or other equipment approved by Engineer.
 - 3. Aggregate base with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch require correction according to requirements in Division 2 Section "Earthwork."
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and aggregate base and subgrade are ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted aggregate base surface immediately before placing concrete.

3.1 STEEL REINFORCEMENT

- A. Conform to NDDOT Section 550.04.E

3.2 UNCONTROLLED CRACKING

- A. Conform to NDDOT Section 550.04.F

3.3 JOINTS

- A. Conform to NDDOT Section 550.04.G

3.4 CONCRETE PLACEMENT

- A. Conform to NDDOT Section 550.04 D except as herein modified:

3.5 CONCRETE PROTECTION AND CURING

- A. Conform to NDDOT Section 550.04.I.1

3.6 PAVEMENT TOLERANCES

- A. Conform with NDDOT Section 550.04.M.2

3.7 PAVEMENT MARKING

- A. Conform to NDDOT Section 762 except as herein modified:
- B. Do not apply pavement-marking paint until layout, colors, and placement have been verified with the Engineer.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: The Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least 1 composite sample for each 2000 square feet or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days, 1 specimen at 14 days, and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 250 psi.
- D. Test results shall be reported in writing to Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for 7-day, 14-day and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 3.9 REPAIRS AND PROTECTION
- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

3.10 MEASUREMENT AND PAYMENT

- A. **Curb & Gutter:** This item will be measured by the lineal foot (LF). Curb and gutter installation includes all materials, labor and equipment to install curb & gutter of all types. Curb and Gutter shall be installed per 2022 NDDOT Standards and Specifications section 748. Payment will be at the bid unit price.
- B. **6" Reinforced Concrete Pavement:** This item will be measured by the square yard (SY). Reinforced concrete pavement installation includes all materials, labor, and equipment to install. Reinforced concrete pavement shall be installed per 2022 NDDOT Standards and Specifications section 550 and 612. Payment will be at the contract unit price.
- C. **6" Concrete Approach:** This item will be measured by the square yard (SY). Approach installation shall include all materials, labor and equipment to install 6" concrete approaches. Sidewalks that fall within the approach will be considered part of the approach and shall be 6" in depth. Concrete approaches shall be installed per 2022 NDDOT Standards and Specifications section 750. Payment will be at contract unit price.
- D. **4" Concrete Sidewalk:** This item will be measured by the square yard (SY). Approach installation shall include all materials, labor and equipment to install 4" concrete sidewalks. Concrete sidewalks shall be installed per 2022 NDDOT Standards and Specifications section 750. Payment will be at contract unit price.

END OF SECTION 32 1313

SECTION 32 1723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This work consists of furnishing and installing pavement markings.
- B. Related Sections
 - 1. Section 01 55 26 – Traffic Control
 - 2. Section 32 12 16 – Hot Bituminous Pavement

1.2 REFERENCES

- A. North Dakota Department of Transportation "Standard Specifications for Road and Bridge Construction," 2020 Edition, hereafter referred to as the NDDOT Standard Specifications.
 - 1. Section 762 – Pavement Marking.
 - 2. Section 880 – Pavement Markings.
- B. Manual on Uniform Traffic Control Devices (2009 Edition, as revised).

1.3 SUBMITTALS

- A. Provide certificate of compliance for pavement marking material.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. All pavement marking materials used shall be in conformance with Section 762 and Section 880 of the NDDOT Standard Specifications except as modified herein:
 - 1. Pavement Marking Paint: Per Section 880.01.
 - 2. Epoxy Pavement Marking Paint: Per Section 880.02
 - 3. Preformed Patterned Pavement Marking Film: Per Section 880.03.
 - 4. Short-Term Pavement Marking: Per Section 880.04.
 - 5. Raised Pavement Markers: Per Section 880.05.

2.2 EQUIPMENT

- A. All equipment used for the installation of pavement markings shall be in compliance with section 762.02 of the NDDOT Standard Specifications.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install pavement marking per the layout shown on the Plan or in the details. If no plan or detail is provided, a project layout of the pavement marking shall be prepared and submitted to Engineer for approval 48 hours before any installation work.

3.2 PREPARATION

- A. Surfaces to which pavement markings are applied shall be prepared in accordance with NDDOT Standard Specifications Section 762.03 A.

3.3 TRAFFIC CONTROL

- A. All equipment and devices used for traffic control during pavement marking operations shall be in accordance with NDDOT Standard Specifications Section 762.04.

3.4 APPLICATION

- A. Permanent Pavement Marking
 - 1. The application of Permanent Pavement Marking shall be in accordance with the NDDOT Standard Specifications Section 762.04.C.
- B. Short-Term Pavement Marking
 - 1. The application of Short-Term Pavement Marking shall be accordance with NDDOT Standard Specifications Section 762.04 D.

3.5 QUALITY CONTROL AND ACCEPTANCE

- A. The acceptance of pavement markings shall be in accordance with the NDDOT Standard Specifications Section 762.

3.6 MEASUREMENT AND PAYMENT

- A. **Pavement Marking:** Pavement marking will be measured by the lineal foot (LF). Pavement marking shall include all materials, labor and equipment. Pavement marking shall be installed per 2020 NDDOT Standard Specifications Section 762. Payment will be at the contract unit price.

END OF SECTION 32 1723

SECTION 32 3113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Chain-link fences.
 - 2. Swing gates.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of fence and gate assembly.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Delegated-Design Submittal: For structural performance of chain-link fence and gate frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

- A. Product certificates.
- B. Product test reports.
- C. Sample warranty.

1.4 WARRANTY

- A. Special Warranty: Manufacturer and installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7:
 - 1. Design Wind Load: As indicated on Drawings.
 - a. Minimum Post Size: Determine according to ASTM F1043 for post spacing not to exceed 10 feet for Material Group IA, ASTM F1043, Schedule 40 steel pipe.
 - b. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
 - 1. Fabric Height: As indicated on Drawings.
 - 2. Steel Wire for Fabric: Wire diameter of 0.125 inch.
 - a. Mesh Size: 9 gauge, 2 inch.
 - b. Zinc-Coated Fabric: ASTM A392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied before weaving.
 - c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
 - 3. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

- A. Posts and Rails: ASTM F1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 based on the following:
 - 1. Fence Height: As indicated on Drawings.
 - 2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
 - a. Line Post: As determined by Delegated Design.
 - b. End, Corner, and Pull Posts: As determined by Delegated Design.

3. Horizontal Framework Members: Intermediate, top, and bottom rails according to ASTM F1043.
4. Brace Rails: ASTM F1043.
5. Metallic Coating for Steel Framework:
 - a. Type A zinc coating.
 - b. Type B zinc with organic overcoat.
 - c. External, Type B zinc with organic overcoat and internal, Type D zinc-pigmented coating.
 - d. Type C, Zn-5-Al-MM alloy coating.
 - e. Coatings: Any coating above.

2.4 TENSION WIRE

- A. Metallic-Coated Steel Wire: 0.177-inch-diameter, marcelled tension wire according to ASTM A817 or ASTM A824, with the following metallic coating:
 1. Type II: Zinc coated (galvanized) with minimum coating weight matching chain-link fabric coating weight.

2.5 SWING GATES

- A. General: ASTM F900 for gate posts and swing gate types.
 1. Gate Leaf Width: As indicated.
 2. Framework Member Sizes and Strength: Based on gate fabric height as indicated.
- B. Pipe and Tubing:
 1. Zinc-Coated Steel: ASTM F104; protective coating and finish to match fence framework.
 2. Gate Posts: As indicated.
 3. Gate Frames and Bracing: As indicated.
- C. Frame Corner Construction: Welded.
- D. Hardware: See Drawings.

2.6 FITTINGS

- A. Provide fittings according to ASTM F626.
- B. Finish:
 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.

- a. Polymer coating over metallic coating.

2.7 GROUT AND ANCHORING CEMENT

- A. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.
- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- C. Terminal Post and Line Post Setting: Set posts by mechanically driving into soil at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Mechanically Driven Posts: Drive into soil to depth of 48 inches for line post, 60 inches for terminal posts. Protect post top to prevent distortion.

- A. Gate Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
 - a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
 - b. Concealed Concrete: Place top of concrete 2 inches below grade to allow covering with surface material.
 - c. Posts Set into Sleeves in Concrete: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
 - d. Posts Set into Holes in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed according to anchoring material manufacturer's written instructions. Finish anchorage joint to slope away from post to drain water.
- B. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.
- C. Line Posts: Space line posts uniformly at as determined by Delegated Design.
- D. Tension Wire: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric. Provide horizontal tension wire at the following locations:
 - 1. Extended along top and bottom of fence fabric.
 - 2. As indicated on Drawings.
- E. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

3.4 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 32 8500 SITE RESTORATION

PART 1: GENERAL

1.01 SUMMARY

- A. Work covered under this Section includes providing all materials, equipment, and labor to restore all disturbed areas, and includes final grading, soil preparation, seeding, hydromulching, mulching, and all other work as may be necessary, all in accordance with the Contract Documents including, but not limited to:
 - 1. Restoring all areas disturbed as a result of Contractor's performance of the Work.
 - 2. Topsoil, seed, sod, plant, and mulch all disturbed areas as specified herein.
 - 3. Areas disturbed by Contractor for access purposes of or used as laydown areas to be restored in kind at the Contractor's expense.
 - 4. Site cleanup.
- B. Related Sections
 - 1. Section 31-2500 - Erosion and Sedimentation Controls
 - 2. Section 31-2213 - Earthwork- Rough Grading

1.02 REFERENCES

- A. The following are complete titles of references cited in this Section:
 - 1. American Society for Testing and Materials, Current Edition, hereafter referred to as ASTM.
 - 2. North Dakota Department of Transportation (NDDOT) Erosion and Sediment Control Handbook, June 2004 Edition. Best Management Practices (BMPs) for erosion control.
 - 3. North Dakota Department of Transportation Standard Specifications for Road and Bridge Construction, 2014 Edition, hereafter referred to as hereafter referred to as NDDOT Specifications.
 - 4. FSA - Federal Seed Act.
 - 5. AOSA - Association of Official Seed Analysis: Rules for Testing Seeds, Journal of Seed Technology, 1991 Edition.
 - 6. ICBN - International Code of Botanical Nomenclature.

7. Authorization to Discharge Under the North Dakota Pollutant Discharge Elimination System (Erosion Control Permit for construction activity) for the site from the North Dakota Department of Health (NDDH) Division of Water Quality, Permit No. NDR10-0000, including the Stormwater Pollution Prevention Plan (SWPPP) for the Work.

1.03 SUBMITTALS

- A. Contractor shall submit to Engineer for approval all product information a minimum of two weeks prior to the work including:
 1. Product Data and Specifications:
 - a. Seed labels from each seed type.
 - b. Seed affidavit: Written affidavit certifying composition of seed mixtures, percent live seed, year harvested, and integrity of plant materials with respect to species, variety and source.
 2. Seeding and Planting Schedule (start and completion dates).
 6. Hydro mulch composition and source/supplier.
 7. Contractor shall furnish a copy of any tickets, tags, or manifests for purchased and/or harvested plant materials.
 8. Proposed Equipment Specifications and Literature
 - a. Seeding equipment for prairie seed planting and for turf seed planting
 - b. Hydro mulch blower.
 9. Hydraulic Soil Stabilizer product information, product composition, application method and application rate.
 10. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.04 QUALITY ASSURANCE

- A. Inspection: The Engineer reserves the right to inspect the live plants at their place of growth and upon delivery for conformity to specification requirements. Approval of material at those times does not preclude the right of inspection and rejection during progress of the planting work.
- B. Contractor's installation supervisor (Foreman) shall have a minimum of five years of experience in landscape installation, restoration and maintenance supervision and have horticultural training with experience in tree planting, prairie restoration, soils, fertilizers and plant identification. Contractor's labor force shall be familiar with planting procedures and be under the supervision

of a qualified foreman. Foreman must be able to take direction from and communicate with the Engineer.

- C. The Foreman shall directly supervise the labor force and be on site for the duration of all soil preparation, seeding and planting work.
- D. Contractor's labor force shall be thoroughly familiar with and trained in the work to be accomplished and perform in a competent, efficient manner acceptable to the Engineer.
- E. Contractor shall furnish seeding, plants and products as shown on the Drawings and as specified in these Specifications. No plant or product substitutions shall be allowed without prior authorization from Engineer.

1.05 SEQUENCING AND SCHEDULING

- A. Seed application and turf establishment shall conform to NDDOT Specification 251 for type of application associated with seeding type.
- B. Contractor to coordinate the seeding and planting work with topsoil and site grading work, with the goal of minimizing lag time between grading and restoration work.
- C. Contractor shall notify Engineer when seeding and planting operations will occur, a minimum of three (3) days in advance.
- D. Seeding application shall be coordinated to provide erosion control as outlined in the SWPPP.
- E. Contractor shall continue erosion control methods and maintain previously installed materials, and to install where necessary additional protection to control erosion and sedimentation during their work on the site. Contractor shall verify that conditions on the site are suitable to receive work prior to commencing. Contractor shall be responsible to repair all subsequent soil erosion after site condition verification extending for a period of three months after receipt of preliminary acceptance. Contractor shall repair all erosion rills greater than one inch. Contractor shall repair all eroded areas within 48 hours of receipt of notification from Engineer. Additional erosion control repairs and/or measures shall be considered incidental to the plant installation.

1.06 WARRANTY

- A. Contractor shall warranty all containerized herbaceous plants under this contract for a minimum of one full year from the time of Owner acceptance.
 - 1. Replacements: At the end of the Warranty Period, all plants shall fulfill all the requirements of these specifications with regard to quality and condition; further, they shall be free of dead material and shall bear a minimum of 80% of the foliage present when planted having normal density, size, shape and color as determined by the Engineer. Any plants failing to satisfy all these conditions shall be replaced as soon as possible. Plants may be replaced prior to the end of their Warranty Period if such an agreement exists between the Contractor and the Engineer. Replacement stock shall be subject to all requirements as to selection, inspections, preparation, planting and maintenance operations.

2. Replacement Guarantee: Replacement stock shall not be guaranteed.
 3. Final Acceptance and Payment: A final inspection will be held after the end of the Warranty period and after all replacements are complete. Final acceptance will be submitted in writing by the Engineer and payment will be issued for the amount of the retainage.
- B. Contractor shall warrant that prairie grasses will meet the Condition and Coverage standards defined below for a three-year period after seeding and planting is complete.
- C. Coverage Standards

Growth and coverage of seeding shall meet the following standards:

1. STAGE 1 (End of 1st full growing season or later):
 - a. Seedlings of at least three native grass species shall be widely dispersed through seeded area. No areas of bare soil larger than four square feet shall exist.
 2. STAGE 2 (End of 2nd full growing season or later):
 - a. No bare patches of soil larger than two square feet shall exist. Seedlings of at least four native grass species shall be widely dispersed through seeded area.
 3. STAGE 3 (End of 3rd full growing season or later):
 - a. No bare patches of soil shall exist. Seedlings of at least four native grass species shall be widely dispersed through seeded area.
- D. Inspection and Reporting During Warranty Period:
1. Upon completion of the seeding and seedling establishment work, request a review by the Engineer to determine whether the work conforms to the requirements of the specifications.
 2. Request a review by the Engineer 40 days after seed is planted to confirm seed establishment success.
 3. The Engineer will review all seeded and planted areas for acceptance at the end of each growing season and for final acceptance at the end of the three-year warranty period.
 4. If the condition and coverage criteria listed above are met by the growth of acceptable species, then the work will be accepted on an annual basis.
 5. Following each review the Engineer will submit to Contractor written notification of acceptance or of corrective action required.
- E. Corrective Work During Warranty Period:

1. Reseed, replant, and otherwise correct work which does not meet the Condition and Coverage standards during each year and at the end of the three-year Warranty Period, without cost to the Owner.
 2. Perform corrective work in conformance with the requirements of this Specification.
- F. Delays: Delays in completion of planting operations, which extend the planting into more than one planting season, shall extend the Warranty period correspondingly.
- G. Exceptions: Contractor shall not be held responsible for failures due to vandalism.

1.07 MAINTENANCE AND ESTABLISHMENT OF TURF SEED

- A. The Contractor is responsible for maintaining all seeded areas by watering, weeding, etc. until it is evident that the seed so placed has germinated and will establish an adequate protective cover. In the event of seeding failures, the Contractor will be required to correct and reseed such areas at no expense to the Owner until adequate turf is established.

1.09 BASIS FOR COMPENSATION

- A. Compensation for all Work covered under this Section of these Specifications shall be as set forth in Section 01 22 00 Measurement and Payment.

PART 2: PRODUCTS

2.01 TOPSOIL

- A. Refer to Section 31 1000 Site Clearing

2.02 SEED (TURF)

A.

Common Name	Scientific Name	% of Mix by Weight
Kentucky Bluegrass - Elite; Adelphi, Alexa II, Arrowhead, Aspen, Black Jack, Blue Note, Cadet, Columbia, Corsair, Diva, Dynamo, Elipse, Estate, Fielder, Fylking, Ginney, Glade, Guinness, Jefferson, Merit, Midnight, Midnight II, Mongoose, Monopoly, Mystere, NuGlade, Parade, Princeton P- 105, Prosperity, Rambo, Rhythm, Touchdown, Victa, Volt	<i>Poa pratensis</i>	25%
Kentucky Bluegrass – Improved; Apollo, Appalachian, Arc, Atlantis, Baron, Bedazzled, Blue Angel, Chateau, Dragon, Geronimo, Limosine, Moonlight SLT, Odyssey, Rockstar, Rugby II, Shamrock, Shiraz, Washington, Wildwood	<i>Poa pratensis</i>	25%
Kentucky Bluegrass – Low Maintenance; Acceptable varieties: America, Aquila, Argyle, Caliber, Camas, Certified Park, Challenger, Impact, Kenblue, Nassau, Newport, Ram 1, Nugget, Sydsport, South Dakota	<i>Poa pratensis</i>	25%
Red Rescue; Acceptable varieties: Boreal, Cardinal, Cindy, Cindy Lou, Dawson, Epic, Gotham, Longfellow II, Marker, Navigator, Penlawn, Rosita, Seabreeze, Wendy Jean, Wintergreen	<i>Festuca rubra</i>	8%
Perennial Rye Grass	<i>Lolium perenne</i>	17%
	Total	100%

Turf seeding applied at 120 pounds per acre for permanent cover shall be:

2.03 SEED AND PLANT SUBSTITUTIONS

- A. Species to be planted shall be those specified on the Drawings. Any substitution or change shall be approved prior to use in writing by the Engineer.
- B. If Contractor submits proof to Engineer that any seed or plant specified is not obtainable, due to conditions beyond the control of the Contractor and for reasons other than cost changes, the Engineer will consider a Contractor's proposal for use of the nearest equivalent variety with corresponding deduct from the Contract price.
- C. Contractor shall substantiate such proof in writing no later than 30 days after award of Contract.
- D. The above provisions shall not relieve Contractor of the responsibility for obtaining specified seed and plants in advance.
- E. Replacement Plants:
 - 1. Plant and seed substitutions must be approved by the Engineer.

2.04 HYDROMULCH (HYDRAULIC SOIL STABILIZER)

- A. All seeded areas shall be stabilized with hydraulic soil stabilizer after the seed has been planted.
- B. Hydraulic Soil Stabilizer shall be a Bonded Fiber Matrix (BFM) Hydraulic Soil Stabilizer (Hydromulching):
 - 1. Such as Profile Products® EcoAegis Wood and Bonding Tackifiers, with minimum 10% tackifier by composition, installed at a rate of 3500 lbs/acre, or other Engineer-approved equal.

2.05 FERTILIZER

- A. Fertilizer shall meet requirements as stated according to NDDOT Specification 251G.
- B. Provide slow-release fertilizer with the following characteristics:
 - 1. Specifically processed to release nitrogen at a slow rate over a growing season;
 - 2. Containing nitrogen, phosphorus, and potassium;
 - 3. The primary nitrogen sources shall be in a coated, prilled urea form;
 - 4. At least 70 percent of the nitrogen component shall be slow-release water-soluble nitrogen
 - 5. In granular or granulated form;
 - 6. Provided in closed containers, clearly marked with the following information:
 - a. The weight,
 - b. The type of nutrients, and
 - c. The manufacturer's guaranteed analysis.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Contractor shall coordinate the seeding and vegetation establishment work with the grading (see Section 31 10 00 Site Clearing and Section 31 20 00 Earthwork) and finishing operations to provide protection as soon as possible after areas have been graded and to comply with requirements of the Stormwater Pollution Prevention Plan (SWPPP) for the Work.
- B. Protection of Existing Conditions: Contractor shall use every reasonable precaution to prevent damage to existing conditions such as structures, utilities, plant materials and walks on or

adjacent to the site of the work. Any damage caused by the Contractor shall be repaired at the Contractor's expense.

- B. Barriers: Contractor shall provide barricades, fences or other barriers as necessary to protect existing conditions from damage during installation operations.
- C. Contractor shall not store materials or equipment, nor operate or park equipment under the branches of existing trees and shrubs.
- D. Notification: Contractor shall submit to Engineer written notification of any damage to existing plants and/or structures.

3.02 TOPSOIL

- A. Topsoil shall be installed in accordance with Section 31 10 00, Site Clearing.

3.03 EXAMINATION AND PREPARATION OF TOPSOIL

- A. Verification of Conditions: Contractor shall examine site and verify to the Engineer that conditions are suitable to receive work and that no defects or errors are present which would cause defective installation of products or poor performance of plantings.
- B. Unsuitable Conditions: Before proceeding with seeding work, Contractor shall notify the Engineer in writing of all unsuitable conditions.
- C. Contractor shall perform Weed Eradication:
 - 1. Between 14 to 21 days prior to seeding date Contractor shall apply herbicide containing glyphosate. Apply 2-4D upon notification from the Owner or the Engineer.
 - 2. If weeds are not dead after 10 days, Contractor shall spray once more, at least three days prior to any soil work.
 - 3. If seeding is delayed and perennial weeds grow back, Contractor shall repeat steps one and two.
- D. Prepare the soil surface to provide a smooth, moist, and evenly textured foundation immediately before sowing seed or placing sod. Complete the tilling after applying soil amendments to the soil. Use cultivating equipment such as disks, harrows, field diggers, or tillers capable of loosening the soil to a depth of at least 3 in [75 mm] on all areas except for slopes steeper than 1:2 (V:H). Till the soil surface to remove track imprints from wheeled or tracked equipment. Operate cultivating equipment on slopes at right angles to the direction of surface drainage. Soil clods, lumps, and tillage ridges 3 in [75 mm] high may remain in place for seeding operations.

Soil clods, lumps and tillage ridges 1.5 inch (40 mm) high may remain in place for sodding operations. Multiple passes of the equipment may be needed to meet these requirements.

3.04 SEEDING

- A. Prior to starting work, Contractor shall calibrate and adjust seeding equipment to sow seeds at the proper seeding rate. Equipment shall be operated in a manner to insure complete coverage of the entire area to be seeded. Contractor shall steam clean or thoroughly wash all equipment prior to starting work to prevent contamination from outside seed sources.
- B. Seed shall be planted at an appropriate depth for each species.
- C. Immediately follow seeding with hydro-mulching
- D. Contractor shall be responsible for watering plants (regardless of notification) during entire warranty period. Contractor shall water plants within 24 hours of receipt of notification from Engineer. Watering will be considered incidental to seeding.
- E. Seeding application shall be coordinated to provide erosion control as outlined in the SWPPP.
- F. Permanent seeding for prairie grasses shall be performed using a Truax drill or approved equivalent.
- G. Permanent seeding for wildflowers shall be performed using an Earthway spreader or approved equivalent.

3.05 HYDRAULIC SOIL STABILIZER (HYDROMULCHING)

- A. Hydraulic Soil Stabilizer shall be installed using blower equipment to place mulch at a target application rate of 3500 pounds per acre. Apply the mulch at an actual rate as directed by the Engineer to match varying material or project conditions. Apply the mulch to ensure 95 percent coverage of the soil surface and in accordance with the product manufacturer's recommendations.
- B. Seeding and mulching are separate operations.
- C. Following the mulching operation, precautions shall be taken to prohibit pedestrian or vehicular traffic over the mulched area. Any mulch which is displaced or soil rutted by such activities shall

be regraded, reseeded, and remulched at once. Mulching activities will be suspended or altered as directed by Engineer when soil conditions become excessively wet or dry.

- D. Mulch will be placed over all seeded areas as shown on the Drawings.

3.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Labeling

1. Contractor shall furnish standard products in unopened manufacturer's standard containers.
2. Seed analysis shall be attached to outside as well as inside container, showing species, germination, purity, name of certified testing agency and date of test.
3. No seed will be accepted unless test date is within 12 months of planting date.

B. Delivery and Storage

1. Seed and mulch shall be shipped and stored with protection from weather or other conditions that would damage the product or impair its effectiveness.
2. All plants will be inspected by the Engineer and items that have become moldy, overly wetted, or otherwise damaged in transit or in storage will be rejected.
3. Contractor shall time delivery so that all plants will be planted within 24 hours of delivery. Contractor shall protect plants against drying and damage prior to planting.
4. Each species shall be handled and packed in the manner approved for that plant, having regard for the soil and climatic conditions at the time and place of digging and delivery, and to the time that will be consumed while in transit or delivery. All precautions that are customary in good trade practice shall be taken to insure the arrival of plants in good condition.

3.07 CLEAN UP

- A. Clean-up the entire area around planting operations and restore to its original condition. This work shall include replacement of sod damaged by Contractor's planting operations.

3.08 INSPECTION AND ACCEPTANCE

- A. Contractor to request an inspection by Engineer of completed work. Engineer will produce a punch list following the inspection. The punch list will note all repairs, replacements, or work completions which may appear at the time to be necessary in the judgment of the Engineer. Engineer will deliver a copy of the punch list to the Contractor. Upon completion of all work identified on the punch list, a second inspection will be made. Such procedure will continue until all items of the punch list are corrected. Upon completion of a satisfactory inspection, the

Engineer will recommend that the Owner accept the work as complete, provided all requirements of the extended maintenance and guarantee are met.

- B. Performance Standards: Contractor shall be responsible for the satisfactory growth of plants on all areas seeded and/or planted under the Contract until final acceptance of the work that shall be:

Stage 1: Installation Acceptance = 60 days for cover crop establishment (following last spring frost for fall plantings).

Stage 2: Guarantee of Work Acceptance for Seeding = 12 months

Stage 3: 80% ground cover of acceptable species, including germination of desirable seed bank flora, and minimum 50% ground cover of species that were planted or seeded, the seeding work will receive acceptance of guaranteed work.

Where inspected seeding work does not comply with the requirements, Contractor shall replace rejected work until inspected again by the Owner and found to be acceptable. Contractor shall re-sow at half the original seeding rate within 2 weeks of Owner's notification.

3.09 MEASUREMENT AND PAYMENT

- A. Payment will be considered compensation is full for all work necessary to complete the Bid Item including all labor and costs to excavate, load, haul, place, and dispose of materials.
- B. Measurement shall conform to Section 3700, Part 4 of the City of Minot Standard Specifications and Details and as herein noted.
- C. All other work and costs of this Section shall be incidental to the Project.

END OF SECTION 32 8500

SECTION 32 9200 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fertilizing
 - 2. Seeding.
 - 3. Sodding.
 - 4. Mulching
 - 5. Maintenance

1.2 REFERENCES

- A. 2022 City of Minot Standard Specifications Section 3700
- B. Section 251 and 253 of the 2025 NDDOT Standard Specifications for Road and Bridge Construction.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- C. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.
- D. Weeds: Vegetative species other than specified species to be established in given area.
- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- F. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.4 INFORMATIONAL SUBMITTALS

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

- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
- C. Planting Schedule: Indicating anticipated planting dates for each type of planting.

1.5 SCHEDULING

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 - 1. Spring Planting: April 15 – June 15
 - 2. Fall Planting: September 1 – October 15
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. Do not seed when the wind exceeds 15 MPH, on standing water or when the soil is excessively wet.
- C. Temporary Cover Crop NDDOT Class IV: The contractor shall plant a temporary cover crop of NDDOT Class IV cover crop from June 1 to September 1 on all replaced topsoil. The permanent planting shall then take place after September 1. The Temporary cover crop shall be placed for erosion control measures. This Temporary cover crop shall be seeded within 2 weeks of topsoil placement.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 - 2. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Lawncare Manager.
 - c. Landscape Industry Certified Lawncare Technician.
 - 3. Pesticide Applicator: State licensed, commercial.
- B. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.
- C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.
- B. Grass-Seed Mix: NDDOT Class 2 – Late Season seed mix as follows:

Common Name	Variety	Rate (lb/ac)	% of Mix by Weight
Western Wheatgrass	<i>Rodan, Rosana, Walsh, Flintlock, W.R. Poole, Recovery</i>	27	27%
Switchgrass	<i>Dacotah, Forestburg, Sunburst, Summer</i>	5	5%
Green Needlegrass	<i>Lodorm, AC Mallard, Fowler</i>	10	10%
Canada Wild-rye	<i>Mandan</i>	15	15%
Slender Wheatgrass	<i>Revenue, Primar, Adanac, Pryor, Firststrike</i>	14	14%
Oats		10	10%
	Total	100	100.00%

Rates are drilled rate, double seeding rate for broadcast seeding

2.2 TURFGRASS SOD

- A. Sod Complying with NDDOT Standard specifications for Road and Bridge Construction Section 252.

2.3 FERTILIZERS

- A. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
- B. Fertilizer shall be in conformance with Section 251 of the NDDOT Standard Specifications.

2.4 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley Conforming to Section 708.02.C.4 NDDOT Standard Specifications.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Hydro-Mulch
 - 1. In all urban areas where a manicured lawn will be installed, the seed must be covered with hydro-mulch conforming to Section 708.02.C.3 of the NDDOT Standard Specifications.

2.5 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

PART 3 - EXECUTION

3.1 TURF AREA PREPARATION

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 3700 of the City of Minot Standard Specifications.
- B. Reduce elevation of planting soil to allow for soil thickness of sod.

- C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- D. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- E. Limit lawn subgrade preparation to areas to be planted.
- F. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding overspray.
- G. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 15 mph.
 - 1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate as specified above.
- C. Rake seed lightly into top 1/4 inch or 3/4 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
- E. Hydro-mulch
 - 1. Seed must be covered with hydro-mulch conforming to section 253 of the NDDOT Standard Specifications

3.3 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 - 1. Lay sod across slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 3 inches below sod.

3.4 LAWN RENOVATION

- A. Renovate existing areas damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 - 1. Re-establish vegetation where settlement or washouts occur or where minor regrading is required.
- B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury in soil.
- C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

3.5 MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
- B. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings.

3.6 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Engineer:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 6 by 6 inches.
 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.
- C. Remove erosion-control measures after grass establishment period.

3.8 MEASUREMENT AND PAYMENT

- A. **Seeding.** Seeding as specified will be measured by the Square Yard (SY). Payment will be for the quantity measured at the Contract Unit Price to restore all disturbed areas.

END OF SECTION 32 9200

SECTION 33-0513 ADJUSTMENT OF STRUCTURES

PART 1: GENERAL

1.1 SUMMARY

- A. Section includes the adjustment of manholes and gate valves to plan grade.
- B. Related Sections
 - 1. Section 33 1413 Water Distribution
 - 2. Section 33 3111 Sanitary Sewer

1.2 REFERENCES

- A. The following are complete titles of references cited in this Section.
 - 1. American Society of Testing Materials (ASTM)
 - a. A48 – Specification for Gray Iron Casting.
 - b. C6 – Specification for Normal Finishing Hydrating Lime.
 - c. C150 – Specification for Portland Cement Concrete (Rings and Mortar).

PART 2: PRODUCTS

2.1 ADJUSTMENT UNITS

- A. Concrete
 - 1. Units shall be precast and a minimum of 2 inches and a maximum of 6 inches thick.
 - 2. Units shall have a minimum compressive strength of 3000 psi and shall be steel reinforced.
 - 3. Units shall be adhered to the structure and casting by using either Portland Cement Concrete or Non-Shrink Hydrated Lime.
- B. Manhole Sections
 - 1. The maximum number of adjusting rings permissible on a manhole structure is six. If the required adjustment cannot be achieved through the use of adjusting rings alone, the Contractor shall remove and / or install precast manhole sections meeting the requirements specified in other sections that will allow the rim elevation to be installed as indicated on the Drawings. All costs shall be included in the prices bid for adjusting structures.

PART 3: EXECUTION

3.1 GENERAL

- A. All finish grades of castings shall be 1/4 inches to 3/8 inches below the adjacent finish grade.
- B. Perform work on adjustments after construction is to a point that the work will not become damaged by other construction activities.
- C. Clean all structures after adjustment to remove any sediment or mortar from the structure.
- D. All manhole and gate valve pick holes must be cleaned and accessible after completion of adjacent work.

3.2 ADJUST CASTING

- A. Clean the top of the structure to allow the concrete mortar to bond.
- B. Add or remove adjusting rings as needed to achieve finished grade. A minimum of 2 and a maximum of 6 adjusting rings will be allowed.
- C. Apply mortar to the top and bottom of the adjusting units a minimum of 1/4 inch to a maximum of 1/2 inch thick. Wipe the inner surfaces of the units clean. Seal around and underneath all castings with mortar.
- D. All adjustment units exterior shall be wrapped with Geotextile fabric except sanitary sewer, which shall be wrapped with an exterior chimney seal meeting the recommended standards for wastewater facilities.
- E. No shims of any kind will be allowed for adjustment.
- F. Clean all excess mortar from the structure.

END OF SECTION

SECTION 33 1413 – WATER DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Water Distribution Piping
 - 2. Tapping Sleeves and Valves
 - 3. Water Services

1.2 RELATED DOCUMENTS

- A. City of Minot Standard Specifications Sections 2100 & 2200

1.3 DEFINITIONS

- A. The following are industry abbreviations for plastic materials:
 - 1. PVC: Polyvinyl chloride plastic
 - 2. HDPE: High Density Polyethylene

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Valves and accessories.
 - 4. Yard hydrants.

1.5 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of piping and specialties and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
- B. Regulatory Requirements:

1. Comply with requirements of the City of Minot, and the North Dakota Department of Environmental Quality.
- C. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- D. NSF Compliance:
 1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.
 2. All products that may come in contact with water intended for use in a public water system shall meet American National Standards Institute (ANSI) and National Sanitary Foundation (NSF) standards. A project shall be considered meeting these standards if they are certified by NSF, UL, or other organizations accredited by ANSI to test and certify such products.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 1. Ensure that valves are dry and internally protected against rust and corrosion.
 2. Protect valves against damage to threaded ends and flange faces.
 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver piping 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.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.
- G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Engineer not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.

1.8 COORDINATION

- A. Coordinate connections to water mains with City of Minot Public Works.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All products shall be in conformance with the City of Minot Standard Specifications Sections 2100 and 2200 except as herein modified:

2.2 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified.

2.3 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

2.4 PIPE

- A. Open Cut Water Mains: AWWA C900, Class 235, DR-18 with bell end with gasket and spigot end.
- B. Restrained Joint PVC Pressure Pipe
 - 1. Restrained joint PVC pressure pipe shall be IPS outside diameter with a working pressure as specified on the plans, the pipe shall be manufactured by Certa-Lok "Yellowmine" or

approved equal. The Restrained joint shall be joined together as per the manufacturer's specifications.

- C. HDPE: Per NDDOT Standard Specifications. May be used for directional drilling only.

2.5 SERVICES

- A. ASTM D2239 High Density Polyethylene (NSF approved), SDR -7 with 200 psi working pressure. Used for service lines 1-inch to 2-inch diameter IPS.
- B. PVC DR-18 shall be used for all water service lines 4-inch diameter or larger. Pipe and fittings shall conform to requirements of water mains.

2.6 FITTINGS

- A. All fittings shall conform to AWWA C110 Ductile-Iron fittings standard pattern or AWWA C153 Ductile-Iron compact pattern and shall be mechanical joint with mega-lug restraints.
- B. Glands, Gaskets and Bolts: AWWA C11, ductile-iron or gray-iron glands, rubber gaskets, and stainless steel bolts.
- C. All fittings shall be Ductile Iron with 250 psi working pressure.
- D. All fittings shall be fusion bonded epoxy coated, 6-8 mil nominal thickness and shall conform to AWWA C550 and AWWA C116/A21.16.
- E. Fittings shall be wrapped with polyethylene in accordance with AWWA C105.
- F. All nuts and T-bolts for mechanical joint fittings shall be 304 Stainless Steel suited for underground use.

2.7 JOINING MATERIALS

- A. Transition Couplings:
 - 1. Underground Piping, NPS 1-1/2 and Smaller: Manufactured fitting or coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
 - 2. Underground Piping, NPS 2 and Larger: AWWA C219, metal, sleeve-type coupling same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
 - a. Manufacturer: Hymax or approved equal.

2.8 GATE VALVES

- A. AWWA, Cast-Iron Gate Valves:
 - 1. Manufacturers:
 - a. American Cast Iron Pipe Co.; American Flow Control Div.
 - b. Grinnell Corporation; Mueller Co.; Water Products Div.
 - 2. Nonrising-Stem, Resilient-Seated Gate Valves: AWWA C515, ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - a. Minimum Working Pressure: 250 psig.
 - b. End Connections: Mechanical joint: Complying to AWWA C111/A21.11.
 - c. O-ring seals.
 - d. All surfaces shall be fusion-bonded epoxy coated conforming to AWWA C550.
 - e. All exposed nuts, bolts, springs and washers shall be stainless steel.
 - f. Valves shall be wrapped with Polyethylene pipe encasement material and taped.
 - g. Boxes shall be 3 piece cast iron, screw type. For excessive depths, provide extended key with 2" square operating wrench in gate valves where depth from finished grade to top of nut exceeds 9 feet.
 - h. Gate valve adaptor by Adaptor, Inc. or approved equal.
 - i. Adjustment for 8'-6" of cover.
 - j. No lockable lids.
 - k. Drop-style covers marked "WATER".

2.9 PIPE ENCASEMENT

- A. Shall be polyethylene and conform to AWWA C105/A21.5, black in color, 8 mil thick, tube form.

2.10 INSULATION

- A. Extruded polystyrene insulation shall conform to ASTM C578 Type X.

2.11 TRACER WIRE

- A. Conform to the applicable requirements of NEMA W70.
- B. Wire shall be blue in color and conform to the following:
 - 1. Direct Bury: Solid 12 awg fully annealed carbon-steel conductor, copper-clad, with minimum 450 lb. break load rating, insulated with minimum 30 mil thick HDPE insulation.
 - 2. Boring/Directional Drilling: Solid 12 awg hard drawn high carbon-steel conductor, copper-clad, minimum 4,700 lb. break load rating, with minimum 50 mil thick HDPE insulation.

- C. Wire shall be identified by markings on its surface indicating manufacturer's identification, conductor size, and other appropriate information.
- D. In-line splices shall be made with DryConn Direct Bury Lug Aqua, Copperhead SnakeBite Locking Connector, or approved equal. Wire nut splices are not allowed.
- E. Access points shall be blue in color, be manufactured by Copperhead Industries, and conform to the following:
 - 1. Terminations at hydrants: Cobra T3 Test Station access point with Hydrant Flange, part # T3-*FLPKG-5/8 for hydrants with 5/8-inch bolts or T3-*FLPKG-3/4 for hydrants with 3/4-inch schedule 40 PVC conduit below the test station to protect the wire from weed whips, mowers, etc.
 - 2. Terminations in non-paved areas: At-grade SnakePit Lite Duty Adjustable Access Point with Tow-Terminal Switchable Lid, part # LD14*2T-ADJ-SW where * equals B for Blue.
- F. Ground Rods
 - 1. Drive in Magnesium Ground Rod: Part # ANO-12 (1.5 lb) or approved equal.
- G. Marker Posts
 - 1. TriView Plus by Rhino Markers and Protection Systems, blue in color, 66 inches long, with custom decal reading "City of Mohall Public Works Utility Locating Station".

2.12 MARKING TAPE

- A. Non-detectable or detectable polyethylene, min. 4.5 mil thickness.
- B. Blue in color, marked continuously "CAUTION WATER LINE BELOW".

PART 3 - EXECUTION

3.1 GENERAL

- A. All work shall be in conformance with the City of Minot Standard Specifications Section 2100 and 2200 except as herein modified.

3.2 EARTHWORK

- A. Bedding material for the water line shall be clean, native soils with a maximum 1/2" rocks for the materials within 12" of the pipe. Warning tape shall be installed 24" above the water line.

3.3 PIPING APPLICATIONS

- A. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.
- B. Do not use flanges, unions, or keyed couplings for underground piping.

3.4 VALVE APPLICATIONS

- A. General Application: Use mechanical-joint-end valves for underground installation.

3.5 JOINT CONSTRUCTION

- A. Make pipe joints according to the following:
 - 1. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
 - 2. Dissimilar Materials Piping Joints: Use adapters compatible with both piping materials, with OD, and with system working pressure.

3.6 PIPING INSTALLATION

- A. Install PVC, AWWA pipe according to AWWA M23 and ASTM F 645.
- B. Bury piping with depth of cover over top as indicated on the appropriate profiles. Minimum depth of cover is 8 feet 6 inches, where a profile is not shown.
- C. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.
- D. Fences, poles, mailboxes, culverts and all other property shall be protected unless the removal is authorized by the Engineer. If any item is damaged the Contractor shall restore these items to the satisfaction of the Engineer and at no cost to the Owner.

3.7 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box set plumb.

3.8 INSULATION

- A. Insulation shall be installed where shown on the Plans or as directed by the Engineer such that butt-joints of insulation layers are staggered by at least 18 inches.

- B. Shall have a 6-inch sand cushion above and below the board.

3.9 FIELD QUALITY CONTROL

- A. Piping and Hydrostatic Tests: Testing shall be from valve to valve. The Contractor is responsible for installing all necessary connections to facilitate testing of mains. Testing shall be considered incidental to all other items. The water line shall be tested at 150 PSI for a minimum of 2 hours with no pressure loss. Each section shall be slowly filled with water; care shall be taken to expel air from the mains and service lines. PVC pipe shall be filled at least 24 hours before testing. Tapping to bleed air shall be incidental to the testing. The cost of testing shall be incidental to the bid price for the water main.

3.10 IDENTIFICATION

- A. Install continuous underground marking tape during backfilling of trench for underground water-service piping. Locate below finished grade at 18 to 24 inches above pipe, directly over pipe centerline.
- B. Tracer Wire shall be installed on all new water main pipe and shall be considered incidental to the cost of the pipe.
- C. Tracer wire shall be installed along the top of the pipe between the 10 o'clock and 2 o'clock positions.
 - 1. Fasten to the main every five to eight feet with tape.
 - 2. Tracer wire along service laterals is not required.
 - 3. Splices shall not occur more frequently than one per 800 LF of pipe and shall be made using approved splice kits.
 - 4. Tracer wire shall be terminated at each hydrant. It shall be routed up the side of the hydrant, through the protective conduit, to the test station attached to the breakoff flange. Ground wire shall be connected to the center terminal.
 - 5. Tracer wire access point boxes shall be installed per manufacturer's recommendations, in no case more than 1,000 feet between access points. Mark each at-grade tracer wire access point with a Marker Post placed within 6 inches of the access point.
 - 6. Tracer wire must be properly grounded at all terminations. Grounding of tracer wire shall be achieved by driving in the magnesium grounding rod at the same elevation as the pipe.
 - 7. The Contractor shall periodically ensure tracer wire conductivity during construction. Upon completion of the project, the Contractor shall perform an acceptance test of all tracer wire in accordance with City of Minot Standards Section 1000 and the requirements within.

3.11 CLEANING

- A. Clean and disinfect water-distribution piping according to North Dakota Department of Environmental Quality Standards. Flush all lines with high velocity water through fire hydrant nozzles prior to disinfection.
- B. After the new mains and valves have been tested they shall be flushed and utilization of a series of soft swap pigs is required until all foreign material has been removed. The first swab shall have density of 4-6 lbs/CF with a second and third density of 2-4 lbs/CF.
- C. Chlorination application shall be made under the supervision of the Engineer. Sterilization shall conform to AWWA C651, sterilized with an injected chlorine solution conforming to AWWA B301. This work shall be considered incidental to the price bid for the water lines. DO NOT USE GRANULAR CALCIUM HYPRCHLORITE BECAUSE A VIOLENT CHEMICAL REACTION MAY RESULT. A minimum of 50 ppm chlorine residual shall be maintained during disinfection. Chlorine solution shall remain in the system for a minimum of 24 hours and a maximum of 36 hours. After disinfection, the lines shall be flushed until chlorine concentrations are within normal operating levels (1 to 2 ppm).
- D. The Contractor shall submit to an approved testing agency bacteriological tests. A minimum of 1 test group per section with each section being a maximum of 1,200 feet in length shall be taken. Each test group shall contain 2 bacteria tests taken at least 16 hours apart. If the tests show positive total coliform, the section being tested shall have failed. The contractor shall forward the passing test results onto the Engineer. The water line shall not be used for public use until all testing has passed.

3.12 PRESSURE TESTING

- A. Conform to City of Minot Specification 2100-3.11B except as herein modified.
 - 1. Test pressure shall be maintained within 5 psi per AWWA C605

3.13 LEAKAGE TESTING

- A. Conform to City of Minot Specification 2100-3.11B except as herein modified.
 - 1. Allowable Leakage shall be measured per the following:
 - $Q = (LD\sqrt{P})/148,000$
 - Q = Allowable Leakage
 - D = Nominal Diameter of pipe in inches
 - L = Length
 - P = Average test pressure in psi

END OF SECTION 33 1413

SECTION 33-3111 SANITARY SEWER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Sections 31-2316.13 Trenching.
- C. Sections 2300 and 2400 of the 2025 City of Minot Standard Specifications and Details.
- D. American Society of Testing Materials (ASTM).
- E. American Water Works Association (AWWA).

1.2 SUMMARY

- A. This Section includes gravity-flow (non-pressure) and force-main (pressure) sanitary sewerage with the following components:
 - 1. Pre-cast concrete manholes.
 - 2. Valves
 - 3. Fittings
 - 4. Concrete Encasement

1.3 DEFINITIONS

- A. PVC: Polyvinyl chloride plastic.

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Nonpressure, Drainage-Piping Pressure Rating: 10-feet of head water.
- B. Force-Main, Pressure-Piping Pressure Rating: At least equal to system operating pressure but not less than 160 psig.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe

2. Fittings

3. Valves

B. Shop Drawings: For the following:

1. Manholes: Include plans, elevations, sections, details, and frames and covers.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes according to manufacturer's written rigging instructions.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Sewerage 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 according to requirements indicated:

1. Notify Engineer and Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Engineer's written permission.

PART 2 - PRODUCTS

2.1 GENERAL

A. Products shall be in accordance with Sections 2300 and 2400 of the 2025 City of Minot Standard Specifications and Details except as herein modified.

2.2 PIPING MATERIALS

A. PVC Pressure Pipe (forcemain): AWWA C900 DR-18, with a minimum working pressure of 200 psig, with gasketed bell and spigot joints and ASTM F 477, elastomeric seals.

1. Fittings: Ductile-iron fittings complying with AWWA C110 for full body mechanical joint fittings and using AWWA C111 rubber gaskets. Connections shall be with stainless steel bolts.

2.3 PRESSURE-TYPE PIPE COUPLINGS

A. Reducing or transition, metal, bolted, sleeve-type, reducing or transition coupling, for joining underground pressure piping. Include 150-psig minimum pressure rating and ends of same sizes as piping to be joined.

- B. Tubular-Sleeve Couplings: AWWA C219, with center sleeve, gaskets, end rings, and bolt fasteners.
 - 1. Manufacturers:
 - a. Cascade Waterworks Mfg.
 - b. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - c. Smith-Blair, Inc.
 - 2. Center-Sleeve Material: Manufacturer's standard.
 - 3. Gasket Material: Natural or synthetic rubber, hydrocarbon resistant.
 - 4. Metal Component Finish: Corrosion-resistant coating or material.

PART 3 - EXECUTION

3.1 GENERAL

- A. Execution shall be in accordance with Sections 2300 and 2400 of the 2025 City of Minot Standard Specifications and Details except as herein modified.

3.2 PIPING APPLICATIONS

- A. Force-Main Pressure Pipe: Use any of the following pipe materials:
 - 1. AWWA C900 DR-18, with a minimum working pressure of 200 psig, with gasketed bell and spigot joints and ASTM F 477, elastomeric seals.

3.3 MEASUREMENT AND PAYMENT

- 1. Connect to Existing Sanitary Manhole. This item will be measured by the Unit. Payment will be for the total quantity measured at the Contract Unit Price.
- 2. Sewer Mains. Sewer mains of various sizes and types as specified will be measured by the Linear Foot with no deduction for lengths through manholes. Where 2 different sizes enter or leave a manhole, each size will be measured to the center of the manhole. Excavation and pipe bedding material shall be incidental to the appropriate sewer main Bid Item. Payment will be for the total quantities measured for each Bid Item at the Contract Unit Price.
- 3. Sanitary Sewer Manhole. Sanitary sewer manholes will be measured by the Unit complete and in place regardless of total depth. Connections to manholes shall be incidental to the "Sanitary Sewer Manhole" Bid Item. Payment will be for the total quantity measured at the Contract Unit Price.
- 4. Sanitary Sewer Drop Manhole. Sanitary sewer drop manholes will be measured by the Unit complete and in place regardless of total depth. Connections to manholes shall be incidental to the "Sanitary Sewer Drop Manhole" Bid Item. Payment will be for the total quantity measured at the Contract Unit Price.
- 5. Sanitary Plugs. Sanitary plugs of various sizes and types as specified will be measured by the Unit complete and in place per the appropriate details. Payment will be for the total quantity measured at the Contract Unit Price.

**Turtle Mountain Housing Authority
TMHA Maintenance Facility
Belcourt, ND 58316**

**Ackerman-Estvold
Project No. R26165**

END OF SECTION 33-3111

SECTION 33 4213 – STORM SEWER

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Storm Sewer Pipe
 - 2. Structures
 - 3. Appurtenances

1.2 RELATED REQUIREMENTS

- A. Section 31 2500 – Erosion and Sediment Control
- B. Section 32 1313 – Concrete Pavement
- C. Section 2700 and 2800 of the City of Minot Standard Specifications and Details, 2025 edition
- D. American Society of Testing Materials (ASTM)
- E. Section 708.04, 714, 722, and 858 of the NDDOT Standard Specifications for Road and Bridge Construction, 2024 edition

1.3 SUBMITTALS

- A. Submit all shop drawings and manufacturers' information prior to construction.
- B. Submit to the Engineer for review:
 - 1. Structure shop drawings
 - 2. Manufacturer's information:
 - a. Pipe
 - b. Structure castings
 - c. Covers

PART 2 - PRODUCTS

2.1 CASTINGS

- A. All castings shall conform to ASTM A48, class 35 cast iron.

- B. The type and style of casting is shown on the Plan or is indicated on the detail drawings.
- C. Castings to be used for each structure are as follows:
 - 1. Catch Basin (paver area): ADS part# 1299CGPL, square grate or approved equal.
 - 2. Catch Basin (turf area): ADS part# 1899CGS, circular grate or approved equal.
 - 3. Catch Basin (turf area outlet): ADS part# 1899CGD, Dome grate or approved equal.

2.2 CATCH BASINS

- A. Structures shall be round 24" Nyloplast basins, ADS 2824AG or approved equal.
- B. Joints shall be sealed with rubber gaskets.
- C. Outlet structures shall include 3/8" hole perforations in the sump, per manufacturer recommendations.

2.3 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. All PVC sewer main pipe and fittings shall conform to:
 - 1. For non-pressure piping: ASTM D3034 for sizes 4 – 15 inch and ASTM F679 for sizes 18 – 24 inch unless the Engineer requires a higher standard.
 - 2. For pressure piping: ASTM D2241 for sizes 4 – 16 inch and AWWA C900 for sizes up through 36 inch unless the Engineer requires a higher standard. Pipe shall have a pressure rating at least twice the expected operating pressure.
- B. All pipes shall be bell and spigot.
- C. All pipe joints shall be push-on type and shall conform to ASTM D3212. All pipe shall have Elastomeric Seal (Gasket), polymer based synthetic rubber conforming to ASTM F477 which shall be bonded to the inner walls of the gasket recess of the bell socket. Natural rubber gaskets are not allowed.
- D. Each pipe shall be identified by name of manufacturer, nominal pipe size, and PVC cell classification.
- E. For depths less than 20 feet of cover to finished grade, all pipe shall be a minimum of SDR-35. For pipes deeper than 20 feet of cover to finished grade, pipe shall be a minimum of SDR-26.
- F. For pipes larger than 15 inch, pipes shall conform to ASTM F679 with a minimum wall thickness for a minimum pipe stiffness of 46.

2.4 DRAIN TILE PIPE

- A. PVC pipe shall conform to ASTM F758.

- B. Minimum cell classification of 12364C as found in ASTM D1784.
- C. Joints shall be bell and spigot with either gaskets conforming to ASTM D3212 or PVC cemented joints.
- D. Drain tile perforations shall be circular at 3 1/4" on center + - 1/4". Maximum hole size shall be 3/8" with minimum size 3/16", arranged in 4 rows along the full length of the pipe.

2.5 GEOSYNTHETIC MATERIAL

- A. Conform to NDDOT Specifications Section 858, Geosynthetics for Drainage, Type S1.

2.6 CIRCULAR-KNIT GEOSYNTHETIC SOCK

- A. Conform to ASTM D6707.
- B. Sock to be knit of polymeric materials.
- C. Exhibit minimum sag or run potential.
- D. Shall be factory-applied so as to maintain uniform mass.
- E. Shall conform to the outside diameter of the tubing with a snug fit throughout.

PART 3 - EXECUTION

3.1 GENERAL

- A. All trenching activities shall conform to 31 20 00 – Earthwork.
- B. Drain tile location is shown on the Plans in a general way. Contractor should expect minor variations in location.

3.2 INSTALLATION OF PIPE AND FITTINGS

- A. Pipe Installation
 - 1. Pipe shall be laid to the line and grade as shown on the Plan and/or staked in the field. No deviation is allowed unless directed by the Engineer. Deviation shall be cause for removal and relaying pipe at the Contractor's expense.
 - 2. Lay pipe upgrade with spigot end in the direction of flow. Lubricate all joints and push pipes home. Ensure pipe is to line and grade before bedding and backfilling.
 - 3. Joints shall be wrapped with Geotextile fabric 24 inches wide centered on the joint and secured to the pipe.

4. Contractor shall protect pipe during construction at all times. Any material that enters the pipe shall be removed. All pipes shall be clean before being put in service.

3.3 CATCH BASINS

- A. Shall be installed level. No deviation is allowed.
- B. Connect drain tile pipes using specified sand collars.
- C. Cut pipes as necessary to achieve no protrusion into each structure.
- D. All pipe connections must be neatly sealed with included rubber gasket.

3.4 DRAIN TILE INSTALLATION

- A. Construct to location and elevation shown on the plans or as directed by the Engineer.
- B. Pipe grade shall be as indicated on the Plan but at a minimum not flatter than 0.40%.
- C. Geosynthetic material shall be placed in such manner as to line the trench and fully encase the Permeable Trench Backfill and Drain Tile. Drain tile shall rest on a 2-inch bed of Class 2 Aggregate at the bottom of the trench. Permeable Trench Backfill shall be placed on top of the pipe up to the surface. Geosynthetic material shall overlap itself at the surface by a minimum of one foot.
- D. Seal upstream end of pipe with a solid PVC cap.
- E. Drain tile shall be connected to storm structure with specified sand collar. Core drill a connection if a precast connection does not exist.

3.5 CLEANOUTS

- A. The cleanout wye shall be encased in concrete.
- B. Where the cleanout is extended to grade, install a cleanout cover to protect the cleanout.

3.6 FIELD QUALITY CONTROL

- A. Contractor shall provide all labor and materials necessary for inspections and tests.
- B. Contractor shall ensure pipe and manholes are clean and free of material.
- C. All storm sewer lines shall be televised.

END OF SECTION 33 4213

SECTION 34 1000 – TRAFFIC CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Construction Traffic Control
 - 2. Traffic Signs

1.2 RELATED DOCUMENTS

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

1.3 DEFINITIONS

- A. MUTCD: Manual of Uniform Traffic Control Devices.
- B. NDDOT: North Dakota Department of Transportation.

1.4 SYSTEM DESCRIPTION

- A. Provide a qualified traffic control supervisor meeting the minimum qualifications of Section 704 of the NDDOT Standard Specifications for Road and Bridge Construction.

1.5 SUBMITTALS

- A. Traffic Control Plan: Submit traffic control plan to the Engineer for approval.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Use only traffic control devices manufactured from materials that are durable, rigid and highly visible, but do not create a hazard when struck. Comply with the MUTCD and Section 704 of the NDDOT Standard Specifications for Road and Bridge Construction. All traffic control devices shall utilize reflective materials and the devices shall be clean to facilitate proper reflection.

- B. Barricades: Type III, clean, well-maintained and properly marked or lighted for nighttime use.
- C. Signs: Clean, well-maintained and properly marked or lighted for nighttime use.
- D. Cones: A minimum of 28 inches high with 6 inch wide, white, reflectorized bands, placed 3-4 inches from the top, suitable for nighttime use.
- E. Lights, delineators and reflectors: red, yellow or white in color and having no less than 12 square inches of reflective area per unit.
- F. Safety fence: 48 inch orange fence.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Visually evaluate traffic conditions and determine the appropriate traffic control approach to minimize impact and to maintain vehicle, pedestrian and worker safety.

3.2 SCHEDULING AND COORDINATION

- A. Schedule all work to reopen a closed or partially closed intersection or crossing in the most expedient manner.
- B. Maintain or provide alternate access to the property during the performance of the Work.

3.3 PROTECTION OF FINISHED WORK

- A. Traffic control includes the protection of finished work from traffic until the finished work has cured, cooled or stabilized enough to handle traffic.

3.4 MEASUREMENT AND PAYMENT

- A. **Traffic Control.** This item will not be measured. Payment will be for the lump sum at the Contract Price.

END OF SECTION 34 10000

SECTION 34 4100 - POST MOUNTED TRAFFIC SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. This work consists of furnishing, fabricating, and installing highway signs, delineators, and supporting structures.
- B. Related Sections
 - 1. Section 01 55 26 Traffic Control

1.2 REFERENCES

- A. North Dakota Department of Transportation "Standard Specifications for Road and Bridge Construction" 2022 Edition, hereafter referred to as NDDOT Standard Specifications.
 - 1. Section 754 – Highway Signs.
 - 2. Section 894 – Highway Signs and Posts.
- B. Manual on Uniform Traffic Control Devices (2009 Edition, as revised).

1.3 SUBMITTALS

- A. Submit a certificate of compliance for all materials. Include the manufacturer warranties and guarantees for materials, parts, workmanship, or performance for all retroreflective sheeting.

PART 2 - PRODUCTS

2.1 SIGN MATERIAL

- A. Sign Backing Material: Provide Flat Sheet Aluminum that meets NDDOT Standard Specifications Section 894.01 A.
- B. Retroreflective Sheeting Materials: Provide retroreflective sheeting material Type IV or Type XI. Type IV reflective sheet should be used on all signs except the following:
 - 1. Type XI sheeting should be used on all regulatory and warning signs including school signs.

Retroreflective sheeting material shall meet the requirements of the NDDOT Standard Specifications Section 894.02.

2.2 POSTS AND HARDWARE

- A. All posts and hardware material for signs shall meet the requirements of the NDDOT Standard Specifications Section 894.03.

2.3 DELINEATORS

- A. All delineator materials shall meet the requirements of the NDDOT Standard Specifications Section 894.04.

PART 3 - EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

- A. Locating and Positioning Signs and Sign Structures: According to section 754.04 A of the NDDOT Standard Specifications.
- B. Sign Fabrication: According to section 754.04 B of the NDDOT Standard Specifications.
- C. Shipping and Storage: According to section 754.04 C of the NDDOT Standard Specifications.
- D. Erection of sign Supports and Delineators: According to section 754.04 D of NDDOT Standard Specifications.
 - 1. When sign installation occurs in a permanent surface, a 4 inch PVC sleeve shall be installed around the post for the thickness of the permanent surface. The 4 inch PVC shall be backfilled with loose clean sand. The cost shall be included in the sign price.
- E. Mounting Flat Sheet Signs: According to section 754.04 E of the NDDOT Standard Specifications.
- F. Removing and Resetting Signs and Supports: According to section 754.04 F of the NDDOT Standard Specifications.

3.2 MEASUREMENT AND PAYMENT

- A. This item will be measured. Post and Signs will include all materials, labor, and equipment required to install complete units. Signs shall be installed per 2009 Manual on Uniform Traffic Control Devices for Streets and Highways. Payment will be made by contract unit pricing.

END OF SECTION 34 4100