



333 S. 4TH STREET
COOS BAY, OR 97420
P: 541.269.1166
general@hge1.com
www.hge1.com

PROJECT #22.25

BIDDING PHASE

PROJECT MANUAL

FOR

MILLICOMA SCHOOL RENOVATION & ADDITION

FOR

COOS BAY SCHOOL DISTRICT #9



JANUARY 20, 2022

BLANK PAGE

**SECTION 00-0101
PROJECT TITLE PAGE**

PROJECT MANUAL

FOR:

COOS BAY SCHOOL DISTRICT

MILLICOMA SCHOOL

RENOVATION & ADDITION

260 SECOND AVENUE, COOS BAY, OREGON

JANUARY 20, 2023

PROJECT #22.25

PREPARED BY:

HGE ARCHITECTS, INC.

333 SOUTH 4TH STREET

COOS BAY, OREGON 97420

(541) 269-1166

BLANK PAGE

**SECTION 00-0110
TABLE OF CONTENTS**

PROCUREMENT AND CONTRACTING REQUIREMENTS

1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

- A. 00-0101 - Project Title Page
- B. 00-0110 - Table of Contents
- C. Substitution Request Form (During Bid Phase)
- D. 00-7200 - General Conditions
- E. AIA Document A232 - 2019: General Conditions of the Contract for Construction, Construction Manager as Adviser
- F. Attachment C - Coos Bay School District: General Conditions
- G. Exhibit C - Coos Bay School District: Other Provisions of the Agreement
- H. 00-7346 - BOLI Prevailing Wage Rates

1.02 DC - DESIGN CRITERIA

- A. DC-G4- Hazardous Materials Report by Arcadia Environmental, dated 11/11/22

SPECIFICATIONS

2.01 DIVISION 01 -- GENERAL REQUIREMENTS

- A. 01-1000 - Summary
- B. 01-2300 - Alternates
- C. 01-3000 - Administrative Requirements
- D. 01-4000 - Quality Requirements
- E. 01-5000 - Temporary Facilities and Controls
- F. 01-5100 - Temporary Utilities
- G. 01-6000 - Product Requirements
- H. 01-7000 - Execution and Closeout Requirements
- I. 01-7800 - Closeout Submittals
- J. 01-9113 - General Commissioning Requirements

2.02 DIVISION 02 -- EXISTING CONDITIONS

- A. 02-4100 - Demolition

2.03 DIVISION 03 -- CONCRETE

- A. 03-1000 - Concrete Forming and Accessories
- B. 03-2000 - Concrete Reinforcing
- C. 03-3000 - Cast-in-Place Concrete

2.04 DIVISION 04 -- MASONRY (NOT USED)

2.05 DIVISION 05 -- METALS

- A. 05-5000 - Metal Fabrications
- B. 05-5150 - Ladders

2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

- A. 06-1000 - Rough Carpentry
- B. 06-1753 - Shop-Fabricated Wood Trusses
- C. 06-1800 - Glued-Laminated Construction
- D. 06-2000 - Finish Carpentry
- E. 06-4100 - Architectural Wood Casework

2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

- A. 07-2100 - Thermal Insulation
- B. 07-2126 - Blown Insulation
- C. 07-2500 - Weather Barriers
- D. 07-4623 - Wood Siding
- E. 07-4646 - Fiber-Cement Siding
- F. 07-5400 - Thermoplastic Membrane Roofing
- G. 07-5419 - PVC Thermoplastic Single-Ply Roofing - Carlisle
- H. 07-5423 - Thermoplastic Polyolefin (TPO) Membrane Roofing - Carlisle
- I. 07-6200 - Sheet Metal Flashing and Trim
- J. 07-7200 - Roof Accessories
- K. 07-8400 - Firestopping
- L. 07-9005 - Joint Sealers
- M. 07-9513 - Expansion Joint Cover Assemblies

2.08 DIVISION 08 -- OPENINGS

- A. 08-1113 - Hollow Metal Doors and Frames
- B. 08-1416 - Flush Wood Doors
- C. 08-5313 - Vinyl Windows
- D. 08-6300 - Metal-Framed Skylights
- E. 08-7100 - Door Hardware
- F. 08-8000 - Glazing

2.09 DIVISION 09 -- FINISHES

- A. 09-2116 - Gypsum Board Assemblies
- B. 09-5100 - Acoustical Ceilings
- C. 09-5153 - Direct-Applied Acoustical Ceilings
- D. 09-6500 - Resilient Flooring
- E. 09-6813 - Tile Carpeting
- F. 09-7200 - Wall Coverings
- G. 09-9000 - Painting and Coating

2.10 DIVISION 10 -- SPECIALTIES

- A. 10-1100 - Visual Display Units
- B. 10-1423 - Panel Signage
- C. 10-2601 - Wall and Corner Guards
- D. 10-2800 - Toilet, Bath, and Laundry Accessories
- E. 10-4400 - Fire Protection Specialties

2.11 DIVISION 11 -- EQUIPMENT (NOT USED)

2.12 DIVISION 12 -- FURNISHINGS

- A. 12-2413 - Roller Window Shades

2.13 DIVISION 22 -- PLUMBING

- A. 22-0000 - Plumbing Basic Requirements
- B. 22-0523 - General-Duty Valves for Plumbing Piping
- C. 22-0529 - Hangers and Supports for Plumbing Piping and Equipment

- D. 22-0553 - Identification for Plumbing Piping and Equipment
 - E. 22-0700 - Plumbing Insulation
 - F. 22-1000 - Plumbing Piping
 - G. 22-4000 - Plumbing Fixtures
- 2.14 DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (BY OTHERS)**
- A. 23-0800 - Commissioning of HVAC
- 2.15 DIVISION 26 -- ELECTRICAL (BY OTHERS)**
- 2.16 DIVISION 27 -- COMMUNICATIONS (BY OTHERS)**
- 2.17 DIVISION 31 -- EARTHWORK**
- A. 31-1000 - Site Clearing
 - B. 31-2200 - Grading
 - C. 31-2316 - Excavation
 - D. 31-2316.13 - Trenching
 - E. 31-2319 - Dewatering
 - F. 31-2323 - Fill
- 2.18 DIVISION 32 -- EXTERIOR IMPROVEMENTS**
- A. 32-1313 - Concrete Paving
 - B. 32-3113 - Chain Link Fences and Gates
- 2.19 DIVISION 33 -- UTILITIES**
- A. 33-4113 - Storm Drain Pipe and Fittings
- 2.20 DIVISION 34 -- TRANSPORTATION (NOT USED)**

END OF SECTION



333 S. 4TH STREET
 COOS BAY, OREGON 97420
 P: 541.269.1166
 www.hge1.com

SUBSTITUTION REQUEST

(During the Bidding 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.: _____

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 AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
- Substitution approved as noted - Make submittals in accordance with AIA Form 701-2018 Instructions to Bidders, Paragraph 3.3 Substitutions.
- 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 _____

BLANK PAGE

**SECTION 00-7200
GENERAL CONDITIONS**

FORM OF GENERAL CONDITIONS

**1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED
FOLLOWING THIS PAGE:**

- A. AIA Document A232 - 2019, General Conditions of the Contract for Constuction, Construction Manager as Adviser.

END OF SECTION

BLANK PAGE



AIA[®] Document A232™ – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

22.25 Coos Bay School District - Millicoma Addition & Renovations
260 Second Avenue
Coos Bay, OR 97420

THE CONSTRUCTION MANAGER:

(Name, legal status, and address)

Scott Partney Construction, Inc.
598 Chappell Pkwy
North Bend, OR 97459

THE OWNER:

(Name, legal status, and address)

Coos Bay School District #9
1255 Hemlock Avenue,
Coos Bay, Oregon 97420

THE ARCHITECT:

(Name, legal status, and address)

HGE ARCHITECTS, Inc.
333 South 4th Street
Coos Bay, OR 97420

ADDITIONS AND DELETIONS:

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

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

This document is intended to be used in conjunction with AIA Documents A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™–2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™–2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

TABLE OF ARTICLES

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

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 the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

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

§ 1.1.4 **The Project.** The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Contractors, and by the Owner's own forces and Separate Contractors.

§ 1.1.5 **Contractors.** Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 **Separate Contractors.** Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 **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.

§ 1.1.8 **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.

§ 1.1.9 **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.

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

§ 1.2 Correlation and Intent of the Contract Documents

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

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

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

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

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building

Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

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

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements,

assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

§ 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 The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.4 If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 2.3.5 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.

§ 2.3.6 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.

§ 2.3.7 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.

§ 2.3.8 The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 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 review by the Construction Manager and prior approval of the Architect, and the Construction Manager or 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 Construction Manager's and Architect's and their respective consultants' 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 Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.5, 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 Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and 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 Construction Manager and Architect any nonconformity discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and 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, the Construction Manager, and the 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. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

Init.

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

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

§ 3.4 Labor and Materials

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

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

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

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, 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 Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

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

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof 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 Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

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

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

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or

(2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, 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, in consultation with the Construction Manager, 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, Construction Manager, and Contractor, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either 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, Construction Manager, 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, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager 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, Construction Manager, or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information, and the Construction Manager's use in developing the Project schedule, 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. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

§ 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 Construction Manager's and Architect's approval. The Architect and Construction Manager'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 Construction Manager and 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 participate with other Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule.

§ 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 Construction Manager, Architect, and Owner, and delivered to the Construction Manager 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 and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are 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 Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract

Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Contractors.

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

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been reviewed and 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 Construction Manager and 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 Construction Manager and 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, the Architect, and the Construction Manager 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. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

§ 3.13.1 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.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 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, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, 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, Construction Manager, 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, Construction Manager, 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, Architect, or Construction Manager. 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 through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and 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 AND CONSTRUCTION MANAGER

§ 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 The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

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

§ 4.2 Administration of the Contract

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

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager known deviations from the Contract Documents and defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect known deviations from the Contract Documents and the most recent Project schedule, and defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and 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, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 **Communications.** The Owner shall communicate with the Contractor and the Construction Manager's consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager 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 Construction Manager 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 other Contractors shall be

through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.

§ 4.2.10 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are other Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.11 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. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.12 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and 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 Construction Manager and 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.

§ 4.2.13 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.14 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.15 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.16 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.17 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 Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.

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

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

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

§ 4.2.21 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request 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 other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

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

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

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Construction Manager, for review by the Owner, Construction Manager 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 Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager 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, Construction Manager 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, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager 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, Construction Manager 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, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager 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 with Own Forces and to Award Other Contracts

§ 6.1.1 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 the Owner performs construction or operations with the Owner's own forces or Separate Contractors, the Owner shall provide for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 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's own forces, Separate Contractors, Construction Manager and other 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's own forces, Separate Contractors or other Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor or other Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and 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 or other Contractors' 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 Contractors or other Contractors that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, 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 delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.

§ 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, Separate Contractors, or other Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner, Separate Contractors, and other Contractors 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, other 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 Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

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

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager 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 Construction Manager and Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

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

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager 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 Construction Manager and 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 Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The 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 Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

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

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

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner, Architect, Construction Manager, or an employee of any of them, or of the Owner's own forces, Separate Contractors, or other Contractors; (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, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

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

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

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

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Construction Manager, 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 Construction Manager and the Architect. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's schedule of values. Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or 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 fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien 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 Construction Manager and 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 and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all

Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.2.1 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment or, in the case of more than one Contractor, a Project Application and Certificate for Payment, shall be based upon the Construction Manager's evaluation of the Work and the data in the Application or Applications for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager'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, or Contractors are, entitled to payment in the amount certified.

§ 9.4.4 The Architect's issuance of a Certificate for Payment or, in the case of more than one Contractor, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and data in the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation 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, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 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 Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality

Init.

or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or 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 or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the 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 or other 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 or Construction Manager withholds certification for payment under Section 9.5.1, 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 Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and 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 Construction Manager 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 Owner, Construction Manager and Architect 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, Construction Manager 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 Failure of Payment

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

§ 9.8 Substantial Completion

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

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

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

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction

Manager and Architect shall execute, 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 and Construction Manager shall jointly 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 after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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 completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager shall perform an inspection to confirm the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment or Project Certificate for Payment stating that to the best of their knowledge, information and belief, and on the basis of their 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 Construction Manager's and Architect's final Certificate for Payment or Project Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6), if required by the Owner, other data

establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and 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 through the Construction Manager 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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 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;
- .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; and
- .4 construction or operations by the Owner, Separate Contractors, or other Contractors.

§ 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, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4. 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, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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, Construction Manager and Architect.

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner, Construction Manager 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, Construction Manager 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, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager 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, Construction Manager, Architect, their 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, Construction Manager and Construction Manager's consultants, and the Architect and Architect's consultants, shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

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

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

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice directly to the Owner, and separately to the Construction Manager, 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 both the Contractor and the Construction Manager, separately and 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 directly to the Contractor, and separately to the Construction Manager, 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 Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) 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 Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, 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, Architect, and Construction Manager 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 Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, 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 Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their 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 Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or 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 Construction Manager or 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 Construction Manager's and 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, Construction Manager 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, Separate Contractors, or other Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

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

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

§ 13.3.2 No action or failure to act by the Owner, Construction Manager, 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 Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and 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 Construction Manager, 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 Construction Manager and 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 Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and 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 Construction Manager's and 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 Construction Manager for transmittal to the Architect.

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

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

§ 13.5 Interest

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

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or 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, 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, Construction Manager 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 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, Construction Manager and Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

§ 14.3.2 The Contract Sum and the 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 this Contract.

§ 14.4 Termination by the Owner for Convenience

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

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

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

- 3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

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

§ 15.1.2 Time Limits on Claims

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

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

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

§ 15.1.6 Claims for Additional Time

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

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

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

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

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

§ 15.2 Initial Decision

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

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

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

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

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties, the Construction Manager, 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 of 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.

ATTACHMENT C – COOS BAY SCHOOL DISTRICT GENERAL CONDITIONS

DEFINITIONS: As used in the Contract Documents, unless the context requires otherwise:

1. "District," "School District," "Coos Bay School District," or "Owner" means School District No. 9, Coos County, Oregon.
2. "Bond" means a performance and/or labor and materials bond in form and with corporate surety satisfactory to the District. (not required)
3. "Contract" or "Contract Documents" include the Agreement, the bond, the Proposal, the Instructions to Proposers, the General Conditions of the contract and Detailed Specifications, the Addenda, if any, incorporated in the Documents before their execution.
4. "Contractor" means the person or persons with whom a contract is entered into by the District for the performance of work or the providing of goods and/or services.
5. "Person" means a person, partnership, corporation, and other association.
6. "Responsible Proposer" means an individual, firm or corporation who has the capability in all respects to perform fully the contract requirements, the integrity and reliability which will assure good faith performance, and who has not been disqualified under ORS 279C.440.
7. "Specifications" means the directions, requirements, explanations, terms and provisions pertaining to the various features of the work, the manner and method of proposing for the work, the manner and method of performance of the work, and the manner and method of payment all as they appear in the contract documents.

THE CONTRACT NEGOTIATED AS A RESULT OF THIS RFP WILL BE SUBJECT TO THE FOLLOWING TERMS:

1. Contractor's performance of Services shall be as a professional contractor to Owner to carry out the Project and to provide the technical documents and supervision to achieve Owner's Project objectives.
2. Contractor shall provide a list of all sub-contractors, which Contractor intends to utilize on the Project (the "Sub-contractors"). This list shall include such information on the qualifications of the Sub-contractors as may be requested by Owner. Owner reserves the right to review the Sub-contractors proposed, and the Contractor shall not retain a Sub-contractor to which Owner has a reasonable objection.
3. Contractor shall make available Key Personnel as identified in its proposal. Contractor shall provide to Owner a list of the proposed Key Personnel to be assigned to the Project. This list shall include such information on the professional background of each Key Person as may be requested by Owner. If any Key Person becomes unavailable to Contractor, the Parties shall mutually agree upon an appropriate replacement. Contractor shall remove any individual or Sub-contractor from the Project if so directed by Owner in writing following discussion with Contractor, provided that Contractor shall have a reasonable time period within which to find a suitable replacement.
4. **Contract Performance.** Contractor shall at all times perform the Services diligently and without delay and shall punctually fulfill all Contract requirements consistent with the schedule for the performance of Services. Expiration or termination of the Contract shall not extinguish, prejudice, or limit either party's

right to enforce this Contract with respect to any default or defect in performance. Time is of the essence in the performance of this Contract.

5. Access to Records. For not less than three (3) years after the Contract's expiration or termination, Owner, and its duly authorized representatives shall have access to the books, documents, papers, and records of Contractor and the Sub-contractors which pertain to the Contract for the purpose of making audits, examination, excerpts, and transcripts. If, for any reason, any part of this Contract, any Project-related contractor contract or any Project-related construction contract(s) is involved in litigation, Contractor shall retain all pertinent records for not less than three years or until all litigation is resolved, whichever is longer. Contractor shall provide Owner and the other entities referenced above with full access to these records in preparation for and during litigation.

6. Funds Available and Authorized. Owner reasonably believes as of the Effective Date that sufficient funds are available and authorized for expenditure to finance the cost of this Contract within Owner's appropriation or limitation. Contractor understands and agrees that, to the extent that sufficient funds are not available and authorized for expenditure to finance the cost of this Contract, Owner's payment of amounts under this Contract attributable to Services performed after the last day of the current biennium is contingent on Owner receiving appropriations, limitations or other expenditure authority sufficient to allow Owner, in the exercise of its reasonable administrative discretion, to continue to make payments under this Contract.

7. Insurance. Throughout the term of this agreement and for any additional periods specified, CM/GC shall procure and maintain, at the minimum, the following scope and limits of insurance. All insurance required of the CM/GC shall be purchased by the CM/GC at the CM/GC's sole cost and expense.

MINIMUM SCOPE AND LIMITS OF INSURANCE

7.1 Commercial General Liability Insurance (CGL) must be written on an "occurrence" basis, providing coverage for bodily injury and property damage, products and completed operations and personal and advertising injury, with limits not less than \$1,000,000 per occurrence and \$2,000,000 aggregate. This coverage shall include contractual liability insurance for the CM/GC's indemnity obligations under this contract. The CGL shall be written on an Insurance Services Office (ISO) Form CG 00 01 04 13 (or substitute form providing equivalent coverage). This insurance shall be primary to any other insurance, self-insurance program afforded to the Owner and will not seek any right of contribution, or any pro-rata share of Owner's insurance. The aggregate limits shall apply separately to this project and location, granted by a Per Project Aggregate endorsement to the CGL policy. The CGL coverage shall provide for a severability of interests, by applying separately to each insured and the insureds shall not be subject to a cross liability exclusion. Owner shall be included as an Additional Insured under the CGL using one of the following ISO endorsement options: (1) CG 20 10 (11 85); or (2) CG 20 10 (10 01) and CG 20 37 (10 01); or (3) CG 20 33 (10 01) and CG 20 37 (10 01). CM/GC shall maintain the CGL insurance with the limits and conditions specified herein, for a period of not less than three (3) years following the completion and acceptance by Owner of the work and services provided in this agreement. CM/GC will require its Commercial General Liability insurer to waive any rights of subrogation or recovery against the District.

7.2 Commercial Automobile Liability insurance using a current Insurance Services Office (ISO) Form CA 00 01 covering all owned, leased, borrowed, hired and non-owned autos used for the work and services provided in this agreement, with limits not less than \$1,000,000 per accident for bodily injury and property

damage liability. CM/GC shall require its insurer to name Owner as an Additional Insured. CM/GC will require its Commercial Automobile Liability insurer to waive any rights of subrogation or recovery against the District.

7.3 Workers' Compensation and Employers Liability: CM/GC, its subcontractors, and all other employers providing work, labor or materials under this contract are subject employers under the Oregon Workers Compensation Law and shall purchase, at their sole expense, Workers Compensation insurance, in compliance with ORS 656.017, which requires them to provide workers' compensation coverage that satisfies Oregon Law for all subject workers. The Worker's Compensation policy shall include Employer's Liability insurance with coverage limits not less than \$1,000,000 Bodily Injury, each accident; \$1,000,000 Bodily Injury by Disease, each employee; \$1,000,000 Bodily Injury by Disease, policy limit. CM/GC will require its Workers Compensation and Employers Liability insurer to waive any rights of subrogation or recovery against the District.

7.4 Umbrella or Excess Liability Insurance using a current Insurance Services Office (ISO) Form CU 00 01 or equivalent, in an amount not less than \$1,000,000 per occurrence or claim. This insurance shall provide limits in excess of and extend the coverage forms and endorsements applicable to the underlying policies of Commercial General Liability, Commercial Automobile Liability and Employers' Liability insurance. CM/GC shall require its insurer to name Owner as an Additional Insured. CM/GC will require its Umbrella or Excess Liability insurer to waive any rights of subrogation or recovery against the District. CM/GC shall maintain the Umbrella or Excess Liability insurance with the limits and conditions specified herein, for a period of not less than three (3) years following the completion and acceptance by Owner of the work and services provided in this agreement.

7.5 Professional Liability/ Contractor Errors and Omissions (E&O): Not required.

7.6 Contractors' Pollution Legal Liability: CM/GC shall purchase and maintain Contractors' Pollution Liability (CPL) insurance for the duration of this agreement, with limits not less than \$1,000,000 per occurrence or claim. CM/GC's insurer shall name Owner as an Additional Insured. CM/GC will require its Contractor Pollution Liability insurer to waive any rights of subrogation or recovery against the District.

7.7 Additional Insured: Where additional insured status is required by Owner in this agreement, the additional insured shall be named and addressed as follows:

Coos Bay School District #9
Its officers, officials, employees, agents and volunteers
1255 Hemlock Ave.
Coos Bay, OR 97420

7.8 Broader Coverage and Limits: If the CM/GC maintains broader coverage and/or higher limits than the minimums shown above, the District requires and shall be entitled to the broader coverage and/or higher limits maintained by the CM/GC. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the District.

7.9 Self-Insured Retentions: Self-insured retentions must be declared to and approved by the District. At the option of the District, either: the CM/GC shall cause their insurer to reduce or eliminate such self-insured retentions as respects the District, its officers, officials, employees, and volunteers; or the CM/GC

shall provide a financial guarantee satisfactory to the District guaranteeing the payment of losses and related investigations, claim administration, and defense expenses.

7.10 Cancellation, Non-renewal and Material Change: CM/GC shall cause its insurer or its insurer's agents and representatives to provide no less than 30 days advance notice to the District, of any cancellation, non-renewal or material change to any of the insurance required herein.

7.11 Certificates of Insurance and Evidence of Insurance: Prior to commencing any work and continuously throughout this agreement, CM/GC shall furnish Owner original, current and valid certificates of insurance, executed by a duly authorized representative of each insurer, showing compliance with the requirements set forth herein. CM/GC will replace certificates and evidence of insurance upon any renewal, replacement or material change. Certificates of insurance shall include copies of related declarations pages, policy forms and amendatory endorsements evidencing compliance with these insurance requirements. Failure to obtain the required documents prior to work beginning shall not waive the CM/GC's obligation to provide them. The District also reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

7.12 Acceptability of Insurers: Insurance is to be placed with insurers authorized to conduct business in the State of Oregon with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the District

7.13 Subcontractors: The CM/GC shall require and verify that primary subcontractors maintain insurance meeting all the requirements stated herein, and CM/GC shall ensure that the District be named as an Additional Insured on insurance required from subcontractors. For CGL coverage, subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13. Owner must approve waiver of any insurance provision for any subcontractor, in writing.

Other Provisions

Builder's Risk (Course of Construction) Insurance shall be purchased by the Owner at the Owner's sole expense, for the interests of the Owner and CM/GC, with a limit of insurance not less than the Guaranteed Maximum Price, plus soft costs and consequential losses, to be determined. The insurance company, policy form, limits, deductibles and conditions of insurance, must be agreed to and approved in writing by both Owner and CM/GC, prior to placing the insurance or performing any work.

Property Insurance: Other than the work to be insured, subject to Builder's Risk Insurance, Owner and CM/GC agree that each party is responsible for insuring, at each party's sole expense and discretion, its own buildings, personal property, property of employees and others, vehicles, tools, equipment and supplies, against all forms of loss or damage and the loss of use thereof. Any deductibles, self-insured retentions or losses to any uninsured property, are that party's sole responsibility.

Surety Bonds

The CM/GC shall provide the following Surety Bonds:

1. Bid Bond (if applicable)
2. Performance Bond
3. Payment Bond

4. Maintenance Bond

The Performance and Payment Bonds shall be in the sum equal to the contract price. If the Performance Bond provides for a one-year warranty, a separate Maintenance Bond is not necessary. If the warranty period specified in the contract is for longer than one year, a Maintenance Bond equal to 10% of the contract price is required. Bonds shall be duly executed by a responsible corporate surety, authorized to issue bonds in the State of Oregon and secured through an authorized agent with an office in Oregon.

Special Risks or Circumstances

The District reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

Optional Owner Controlled Insurance Program (OCIP) Notice

In lieu of the Commercial General Liability and Umbrella Liability insurance required in these specifications, the District reserves the right, in its sole discretion, to procure an Owner Controlled Insurance Program covering specified exposures and risks of the District, CM/GC and subcontractors. Proposers understand and agree that they may be required to participate in an OCIP, which will require the CM/GC and subcontractors to provide and validate deductions in their bids for the cost of insurance, which will be offset by the OCIP coverage and excluded from their own insurance programs.

8. Indemnity.

8.1. Claims for Other Than Professional Liability. Contractor shall indemnify, defend, save, and hold harmless the Coos Bay School District and its officers, agents and employees from and against all claims, suits, actions, losses, damages, liabilities, costs and expenses of whatsoever nature resulting from or arising out of the acts or omissions of contractor or its sub-contractors, subcontractors, agents or employees under this contract.

8.2. Claims for Professional Liability. Contractor shall indemnify, defend, save, and hold harmless the Coos Bay School District and its officers, agents and employees from and against all claims, suits, actions, losses, damages, liabilities, costs and expenses of whatsoever nature arising out of the professionally negligent acts, errors or omissions of contractor or its sub-contractors, subcontractors, agents or employees in the performance of professional services under this contract.

8.3. Owner Defense Requirements. Notwithstanding the obligations under Sections 8.1 and 8.2, neither Contractor nor any attorney engaged by Contractor shall defend any claim in the name of the Coos Bay School District without the prior written consent of the Superintendent. Coos Bay School District may, at any time and at its election, assume its own defense and settlement of any claims in the event that: it determines that Contractor is prohibited from defending Coos Bay School District; Contractor is not adequately defending Coos Bay School District's interests; an important governmental principle is at issue; or it is in the best interests of the Coos Bay School District to do so. The Coos Bay School District reserves all rights to pursue any claims it may have against Contractor if the Coos Bay School District elects to assume its own defense.

8.4. Owner's Actions. This section does not include indemnification by Contractor of the Coos Bay School District, its officers, agents, and employees, for the acts or omissions of the Coos Bay School District, its officers, agents, and employees, whether within the scope of the Contract or otherwise.

9. Contractor's Status.

9.1. Contractor Services. Although Owner reserves the right to set the delivery schedule for the Services to be performed and to evaluate the quality of the completed performance, Owner cannot and will not control the means and manner of Contractor's performance. Contractor is responsible for determining the appropriate means and manner of performing the Services. Contractor, Contractor's employees and the Sub-contractors are not "officers, employees, or agents" of the Coos Bay School District as those terms are used in ORS 30.265.

9.2. Contractor shall not have control or charge of, and shall not be responsible for, the acts or omissions of other contractors or contractors under contract with Owner who are performing services or construction work on the Project. However, this provision does not in any way change Contractor's professional responsibility to report to Owner any information, including information on the performance of contractors or contractors outside the control or charge of Contractor, concerning activities or conditions that have or could have an adverse effect on Owner or the Project.

9.3. Contractor is not a contributing member of the Public Employees Retirement System and will be responsible for any federal, state or other taxes applicable to any compensation or payments paid to Contractor under this Contract. Contractor will not be eligible for any benefits from any payments made under this Contract for federal Social Security, unemployment insurance, or worker's compensation, except as a self-employed individual. If any payment under this Contract is to be charged against federal funds, Contractor certifies that it is not currently employed by the federal government.

10. Successors & Assignments. The provisions of this Contract shall be binding upon and shall inure to the benefit of the Parties and their respective successors and assigns. After the original Contract is executed, Contractor shall not enter into any Sub-contractor agreements for any of the Services or assign or transfer any of its interest in this Contract, without the prior written consent of Owner.

11. Compliance with Applicable Law. Contractor shall comply with all federal, state and local laws, regulations, executive orders and ordinances applicable to the Services. Owner's performance under this Contract is conditioned upon Contractor's compliance with the provisions of ORS 279C.505, 279C.515, 279C.520, and 279C.530, which are hereby incorporated by reference. Contractor, the Sub-contractors, if any, and all employers providing Services, labor or materials under this Contract are subject employers under the Oregon workers' compensation law and shall comply with ORS 656.017.

12. Governing Law; Jurisdiction; Venue. The Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflicts of law. Any claim, action, suit or proceeding (collectively "Claim") between Owner and Contractor that arises from or relates to this Contract shall be brought and conducted solely and exclusively within the Circuit Court of Coos County for the State of Oregon; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this "Governing Law; Jurisdiction; Venue" section be construed as a waiver by the State of Oregon of any form of defense or immunity, whether based on sovereign immunity,

governmental immunity, immunity based on the Eleventh Amendment to the United States Constitution or otherwise. CONTRACTOR, BY EXECUTION OF THE CONTRACT, HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF SAID COURTS.

13. Tax Compliance Certification.

13.1. By signature on the Contract, the signatory certifies under penalty of perjury that they are authorized to act on behalf of Contractor and that Contractor is, to the best of the signatory's knowledge, not in violation of any Federal or Oregon Tax Laws.

13.2. For purposes of this certification, "Oregon Tax Laws" means a state tax imposed by ORS 401.792 to 401.816 (Tax For Emergency Communications), 118 (Inheritance Tax), 314 (Income Tax), 316 (Personal Income Tax), 317 (Corporation Excise Tax), 318 (Corporation Income Tax), 320 (Amusement Device and Transient Lodging Taxes), 321 (Timber and Forestland Tax), 323 (Cigarettes and Tobacco Products Tax), the elderly rental assistance program under ORS 310.630 to 310.706, and any local taxes administered by the Department of Revenue under ORS 305.620.

14. Severability. The Parties agree that if any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the Parties shall be construed and enforced as if the Contract did not contain the particular term or provision held to be invalid.

15. Force Majeure. Neither party shall be held responsible for delay or default in the performance of its obligations due to a cause beyond its reasonable control, including, but not limited to fire, riot, acts of God, terrorist acts or war where such cause was beyond such party's reasonable control. Each party shall, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and shall, upon the cessation of the cause, diligently pursue performance of its obligations under the Contract.

16. Waiver. The failure of Owner to enforce any provision of the Contract shall not constitute a waiver by Owner of that or any other provision.

17. Third Party Beneficiaries. Nothing contained in the Contract shall create a contractual relationship with or a cause of action in favor of a third party against Owner or Contractor. Contractor's Services under this Contract shall be performed solely for Owner's benefit and no other entity or person shall have any claim against Contractor because of this Contract for the performance or nonperformance of Services hereunder.

18. Ownership of Work Product; Confidentiality.

18.1. Definitions. As used in the Contract, the following terms have the meanings set forth below:

18.1.1. "Contractor Intellectual Property" means any intellectual property that is owned by Contractor and developed independently from this Contract and that is applicable to the Services or included in the Work Product.

18.1.2. "Third Party Intellectual Property" means any intellectual property that is owned by parties other than Owner or Contractor and that is applicable to the Services or included in the Work Product.

18.1.3. "Work Product" means the Services Contractor delivers or is required to deliver to Owner under this Contract. Work Product includes every invention, discovery, work of authorship, trade secret or other

tangible or intangible item and all intellectual property rights therein, and all copies of plans, specifications, reports and other materials, whether completed, partially completed or in draft form.

18.2. Work Product. All Work Product created by Contractor pursuant to the Contract, including derivative works and compilations, and whether or not such Work Product is considered a “work made for hire” or an employment to invent, shall be the exclusive property of Owner. Owner and Contractor agree that such original works of authorship are “work made for hire” of which Owner is the author within the meaning of the United States Copyright Act. To the extent that Owner is not the owner of the intellectual property rights in such Work Product, Contractor hereby irrevocably assigns to Owner any and all of its rights, title, and interest in all original Work Product created pursuant to this Contract, whether arising from copyright, patent, trademark, trade secret, or any other state or federal intellectual property law or doctrine. Upon Owner’s reasonable request, Contractor shall execute such further documents and instruments necessary to fully vest such rights in Owner. Contractor forever waives any and all rights relating to original Work Product created pursuant to this Contract, including without limitation, any and all rights arising under 17 USC §106A or any other rights of identification of authorship or rights of approval, restriction or limitation on use or subsequent modifications.

18.3. Contractor Intellectual Property. In the event that Contractor Intellectual Property is necessary for the use of any Work Product, Contractor hereby grants to Owner an irrevocable, non-exclusive, non-transferable, perpetual, royalty-free license to use Contractor Intellectual Property, including the right of Owner to authorize contractors, contractors and others to use Contractor Intellectual Property, for the purposes described in this Contract.

18.4. Third Party Intellectual Property. In the event that Third Party Intellectual Property is necessary for the use of any Work Product, Contractor shall secure on Owner’s behalf and in the name of Owner, an irrevocable, non-exclusive, non-transferable, perpetual, royalty-free license to use the Third Party Intellectual Property, including the right of Owner to authorize contractors, contractors and others to use the Third Party Intellectual Property, for the purposes described in this Contract.

18.5. Contractor Intellectual Property-Derivative Work. In the event that Work Product created by Contractor under this Contract is a derivative work based on Contractor Intellectual Property or is a compilation that includes Contractor Intellectual Property, Contractor hereby grants to Owner an irrevocable, non-exclusive, non-transferable, perpetual, royalty-free license to use the pre-existing elements of Contractor Intellectual Property employed in the Work Product, including the right of Owner to authorize contractors, contractors and others to use the pre-existing elements of Contractor Intellectual Property employed in a Work Product, for the purposes described in this Contract.

18.6. Third Party Intellectual Property-Derivative Work. In the event that Work Product created by Contractor under this Contract is a derivative work based on Third Party Intellectual Property, or is a compilation that includes Third Party Intellectual Property, Contractor shall secure on Owner’s behalf and in the name of Owner an irrevocable, non-exclusive, non-transferable, perpetual, royalty-free license to use the pre-existing elements of the Third Party Intellectual Property employed in a Contract Work Product, including the right to authorize contractors, contractors and others to use the pre-existing elements of the Third Party Intellectual Property employed in a Contract Work Product, for the purposes described in this Contract.

18.7. Limited Owner Indemnity. To the extent permitted by the Oregon Constitution, Article XI, Section 7, and by the Oregon Tort Claims Act, ORS 30.260 through 30.397, Contractor shall be indemnified and held harmless by Owner from liability arising out of re-use or alteration of the Work Product by Owner which was not specifically contemplated and agreed to by the Parties in this Contract or under separate contract.

18.8. Contractor Use of Work Product. Contractor may refer to the Work Product in its brochures or other literature that Contractor utilizes for advertising purposes and, unless otherwise specified, Contractor may use standard line drawings, specifications and calculations on other, unrelated projects.

18.9. Confidential Information. Contractor acknowledges that it or its employees, Subcontractors, subcontractors or agents may, in the course of performing their responsibilities under this Contract, be exposed to or acquire information that is the confidential information of Owner or Owner's clients. Any and all information provided by Owner and marked confidential, or identified as confidential in a separate writing, that becomes available to Contractor or its employees, Sub-contractors, subcontractors or agents in the performance of this Contract shall be deemed to be confidential information of Owner ("Confidential Information"). Any reports or other documents or items, including software, that result from Contractor's use of the Confidential Information and any Work Product that Owner designates as confidential are deemed Confidential Information. Confidential Information shall be deemed not to include information that: (a) is or becomes (other than by disclosure by Contractor) publicly known; (b) is furnished by Owner to others without restrictions similar to those imposed by this Contract; (c) is rightfully in Contractor's possession without the obligation of nondisclosure prior to the time of its disclosure under this Contract; (d) is obtained from a source other than Owner without the obligation of confidentiality; (e) is disclosed with the written consent of Owner; or (f) is independently developed by employees or agents of Contractor who can be shown to have had no access to the Confidential Information.

18.10. Non-Disclosure. Contractor agrees to hold Confidential Information in strict confidence, using at least the same degree of care that Contractor uses in maintaining the confidentiality of its own confidential information, and not to copy, reproduce, sell, assign, license, market, transfer or otherwise dispose of, give, or disclose Confidential Information to third parties or use Confidential Information for any purposes whatsoever other than the provision of Services to Owner under this Contract, and to advise each of its employees, Sub-contractors, subcontractors and agents of their obligations to keep Confidential Information confidential. Contractor shall use its best efforts to assist Owner in identifying and preventing any unauthorized use or disclosure of any Confidential Information. Without limiting the generality of the foregoing, Contractor shall advise Owner immediately in the event Contractor learns or has reason to believe that any person who has had access to Confidential Information has violated or intends to violate the terms of this Contract and Contractor will at its expense cooperate with Owner in seeking injunctive or other equitable relief in the name of Owner or Contractor against any such person. Contractor agrees that, except as directed by Owner, Contractor will not at any time during or after the term of this Contract disclose, directly or indirectly, any Confidential Information to any person, except in accordance with this Contract, and that upon termination of this Contract or at Owner's request, Contractor will turn over to Owner all documents, papers, and other matter in Contractor's possession that embody Confidential Information.

18.11. Injunctive Relief. Contractor acknowledges that breach of this section, including disclosure of any Confidential Information, will give rise to irreparable injury to Owner that is inadequately compensable in

damages. Accordingly, Owner may seek and obtain injunctive relief against the breach or threatened breach of this section, in addition to any other legal remedies that may be available. Contractor acknowledges and agrees that the covenants contained herein are necessary for the protection of the legitimate business interests of Owner and are reasonable in scope and content.

18.12. Publicity. Contractor agrees that news releases and other publicity relating to the subject of this Contract will be made only with the prior written consent of Owner.

18.13. Security. Contractor shall comply with all virus-protection, access control, back-up, password, and other security and other information technology policies of Owner when using, having access to, or creating systems for any of Owner's computers, data, systems, personnel, or other information resources.

19. Termination.

19.1. Parties Right to Terminate by Agreement. This Contract may be terminated at any time, in whole or in part, by written mutual consent of the Parties.

19.2. Owner's Right to Terminate for Convenience. Owner may, at its sole discretion, terminate this Contract, in whole or in part, by written notice to Contractor specifying the termination date of the Contract.

19.3. Owner's Right to Terminate for Cause. Owner may terminate this Contract immediately, in whole or in part, upon written notice to Contractor, or such later date as Owner may establish in such notice, upon the occurrence of any of the following events:

19.3.1. Owner lacks lawful funding, appropriations, limitations or other expenditure authority at levels sufficient to allow Owner, in the exercise of its reasonable discretion, to pay for Contractor's Services;

19.3.2. Federal, state or local laws, regulations or guidelines are modified or interpreted in such a way that either the Services under this Contract are prohibited or Owner is prohibited from paying for such Services from the planned funding source;

19.3.3. Contractor no longer holds all licenses or certificates that are required to perform the Services; or

19.3.4. Contractor fails to provide Services within the times specified or allowed under this Contract; fails to perform any of the provisions of this Contract; or so fails to perform the Services as to endanger performance of this Contract in accordance with its terms, and after receipt of written notice from Owner, does not correct such failures within the time that Owner specifies (which shall not be less than 10 calendar days, except in the case of emergency).

19.4. Cessation of Services. Upon receiving a notice of termination, and except as otherwise directed in writing by Owner, Contractor shall immediately cease all activities related to the Services or the Project.

19.5. Contractor's Right to Terminate for Cause.

19.5.1. Contractor may terminate the Contract if Owner fails to pay Contractor pursuant to this Contract, provided that Owner has failed to make such payment to Contractor within forty-five (45) calendar days after receiving written notice from Contractor of such failure.

19.5.2. Contractor may terminate the Contract, for reasons other than non-payment, if Owner commits any material breach or default of any covenant, warranty, obligation or agreement under this Contract,

fails to perform under the Contract within the time specified, or so fails to perform as to endanger Contractor's performance under this Contract, and such breach, default or failure is not cured within thirty (30) calendar days after delivery of Contractor's notice, or such longer period as Contractor may specify in such notice.

19.6. Delivery of Work Product/Retained Remedies of Owner. As directed by Owner, Contractor shall, upon termination, promptly deliver to Owner all documents, information, works in progress and other property that are deliverables or would be deliverables if the Contract had been completed. By Contractor's signature, Contractor allows Owner to use Work Product and other property for Owner's intended use. The rights and remedies of Owner provided in this Section 19 are not exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

20. Payment upon Termination.

20.1. In the event of termination, Contractor's sole remedy shall be a claim for the sum designated for accomplishing the Services multiplied by the percentage of Services completed and accepted by Owner plus Contractor's reasonable Contract close-out costs, less previous amounts paid and any claim(s) which Owner has against Contractor, except in the event of a termination under Section 19.3.1, where no payment will be due and payable for Services performed or costs incurred after the last day of the current biennium. Within thirty (30) days after termination, Contractor shall submit an itemized invoice for all un-reimbursed Services completed before termination and all Contract close-out costs actually incurred by Contractor. Owner shall not be obligated to pay for any such costs invoiced to and received by Owner later than thirty (30) days after termination. If previous amounts paid to Contractor exceed the amount due to Contractor under this subsection, Contractor shall promptly refund any excess amount upon demand.

20.2. In the event of termination pursuant to Sections 19.3.3 or 19.3.4, Owner shall have any remedy available to it in law or equity. Such remedies may be pursued separately, collectively or in any order whatsoever. If it is determined for any reason that Contractor was not in default under Sections 19.3.3 or 19.3.4, the rights and obligations of the Parties shall be the same as if the Contract was terminated pursuant to Section 19.2.

21. Foreign Contractor. If Contractor is not domiciled in or registered to do business in the State of Oregon as of the Effective Date, Contractor shall promptly provide to the Oregon Department of Revenue and the Secretary of State's Corporation Division all information required by those agencies relative to this Contract. Contractor shall demonstrate its legal capacity to perform the Services under this Contract in the State of Oregon prior to executing this Contract.

22. Notice. Except as otherwise expressly provided in this Contract, any notices to be given hereunder shall be given in writing by personal delivery, facsimile, or mail, postage prepaid, to Contractor or Owner at the address or number as either party may provide pursuant to this "Notice" section. Any notice delivered by mail shall be deemed to be given five (5) calendar days after the date of mailing. Any notice delivered by facsimile shall be deemed to be given when the transmitting machine generates a receipt of the transmission. To be effective against Owner, any facsimile communication or notice must be confirmed by telephone notice to Owner's Representative for the Project and shall not be deemed to be given until such confirmation is completed. Any notice by personal delivery shall be deemed to be given when actually delivered. Regular, day-to-day communications between the Parties may be transmitted

through one of the methods set forth above, in person, by telephone, by e-mail, or by other similar electronic transmission.

23. Media Contacts; Confidentiality. Contractor shall provide no news release, press release, or any other statement to a member of the news media regarding this Project, without Owner's prior written authorization.

24. Conflict of Interest. Except with Owner's prior written consent, Contractor shall not engage in any activity, or accept any employment, interest or contribution that would, or would reasonably appear to, compromise Contractor's professional judgment with respect to this Project, including, without limitation, concurrent employment on any project in direct competition with the Project.

Exhibit C

8.8 Other Provisions

Within two weeks of executing this Agreement, the Contractor will provide the Owner with insurance certificates meeting the requirements specified in the Coos Bay School District General Conditions.

When the final GMP is established and accepted by the Owner per Article 4.4.7, the Contractor will provide Performance and Payment bonds for the amount of the contract prior to mobilization.

The Contractor's services for pre-construction and construction include those described in the RFP for CM/GC Selection for the Project published 3 August 2022, especially Sections III, IV and VI.

The Contractor will develop a plan and demonstrate good faith efforts to provide opportunities for local contractors, Minority and Women Owned Businesses and Emerging Small Enterprises. Local contractors are defined as contractors, subcontractors, vendors, and material suppliers residing and/or doing business that support Coos Bay and surrounding communities for at least the last 12 months. The Contractor will provide a status report as subcontracts and purchase orders are released.

This project is subject to prevailing wage law. The Contractor is subject to the following provisions and will include these provisions in all subcontracts:

- Workers must be paid not less than the applicable prevailing rate of wage in accordance with ORS 279C.838 and 279C.840, ORS 279C.830(1)©; OAR 839-025-0020(5)(a).
- If the Contractor or a subcontractor fails to pay for labor and services, the Owner can pay for them and withhold these amounts from payments. ORS 279C.515; OAR 839-025-0020(2)(a).
- The Contractor and subcontractors must pay daily, weekly, weekend and holiday overtime as required in ORS 279C.540. ORSS 279C520(1); OAR 839-025-0020(2)(b).
- The Contractor and subcontractors must give written notice to the workers of the number of hours per day and days per week they may be required to work. ORS 279.520(2); OAR 839-025-0020(2)©.

- The Contractor and subcontractors must make prompt payment for all medical services for which they have agreed to pay, and for all amounts for which they collect or deduct from the workers' wages. ORS 279C.530; OAR 839-025-0020(2)(d).
- The Contractor will have a public works bond filed with the Construction Contractors Board before starting work on the project per ORS 279C.830(2)(b)(A) and OAR 839-0225-0020(3)(a). The Contractor will require that subcontractors have a public works bond filed with the Construction Contractors Board before starting work on the project, unless exempt. ORS 279C.830(2)(b)(B); OAR 839-025-0020(3)(b).

The Contractor has no responsibility for the scope, performance or schedule of the design-build HVAC and electrical contractors since this work has been independently contracted by the District.

9.1.9 Enumeration of Contract Documents

In the event of any conflict or inconsistency between the Coos Bay School District General Conditions attached to the CM/GC RFP for the project dated 3 August 2022, and any other contract document, the language of the Coos Bay School District General Conditions shall control, except as to insurance and bonds. In the event of any conflict or inconsistency between any contract documents as to insurance or bonds, the language giving the greatest protection to the Owner shall control.

**SECTION 00-7346
PREVAILING WAGE RATES**

PART 1 GENERAL

1.01 REQUIREMENTS

- A. The "Prevailing Wage Rates for Public Works Contracts in Oregon" dated July 1, 2022 including any issued corrections or amendments that follow are herein added to the Contract Documents by reference.
- B. BOLI Prevailing Wage Rate information is available upon request, or electronically at www.oregon.gov/boli.
- C. Work under this Contract will be subject to the provisions of ORS 279C.800 to 279C.870, relating to BOLI Prevailing Wage Rates in effect at the time the project was advertised for bids.
- D. Provisions described in this Section or in Exhibit A of the Public Contracting Code Requirement for Public Improvements Contracts over \$50,000, located at the end of the Supplemental General Conditions, will apply regardless of the price of any individual Contract, so long as the combined price of all Contracts award on the project is \$50,000 or more.
- E. If total Contract amount does not exceed \$50,000, Contractor is not required to pay prevailing wage rates.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

BLANK PAGE



Chris Giggy
Project Engineer
Integrity Management Solutions
18525 Van Horn Rd
Alsea OR 97324

11 November 2022

Re: Asbestos inspection at Millicoma Junior High School for HVAC project.

Mr. Giggy,

You requested an asbestos sampling in specific areas of Millicoma School. The survey was conducted on 28 October 2022 by Ken Newman, an AHERA certified asbestos building inspector. The inspection is in preparation for future work on the buildings. This is NOT an AHERA Inspection, it is a directed sampling to identify and verify hazards in the school prior to upgrading the HVAC system.

Millicoma School is a two-story structure with multiple classrooms on the main level and gym associated rooms and locker rooms in the basement area. There are 2 different eras of classrooms, the original was built in the 1950's or 60's with an addition in the 1980's adding four classrooms. the building is half concrete slab on grade and the other half is wood structure over the basement locker rooms. There is a large choir room and a large band room on the main level. The flooring throughout the building is 9x9 VAT with black mastic, the walls are a mix of sheet rock with a heavy texture covering and the ceilings are also mixed with a plaster layer covered with 9x9 and 12x12 ceiling tiles (stapled and glued) in some areas. The plumbing for the building is hidden in the walls and ceilings and the HVAC is located in the attic space. The roof is a welded vinyl product with a heat shield.

The survey was conducted according to EPA regulations in CFR 763. Subpart E and OSHA standards 29 CFR 1910 and 29 CFR 1926. No walls, ceilings or floors were penetrated to asses' areas not visible during a normal inspection. No inaccessible areas were breached during this inspection unless otherwise noted. The inspection follows the AHERA guidelines for material description only, samples taken are based on the inspector's experience, OSHA guidelines and general protocols. The ACM (asbestos containing materials) classifications are SM (surfacing materials) TSI (thermal systems insulation) and MBM (miscellaneous building materials), their conditions will be described and they will be characterized as Friable or Non-friable, any volumes will be estimates only and not recommended for bidding purposes. All samples will be sent to a NVLAP (national voluntary laboratory accreditation program) Laboratory for analysis. Bulk samples will generally be analyzed by method PLM EPA 600/R-93/116 unless a different method is requested or required (consult lab report).

**840 Central Avenue, PO Box 1290
Coos Bay OR 97420
541-808-3880
Oregon CCB # LBPR 211308**

7 Asbestos samples were taken during the inspection from inside and outside of the building.

Sample #	Description	ACM %	Friable/NON
BRCT 1	Break room ceiling tile and plaster	Non-detect	N/A
	Plaster	Non-detect	N/A
	Skim Coat	Non-detect	N/A
	Tile	Non-detect	N/A
WRC 2	Work Room 319 Ceiling Plaster	Non-detect	N/A
	Skim Coat	Non-detect	N/A
WRC 3	Work Room Ceiling Plaster	Non-detect	N/A
	Skim Coat	Non-detect	N/A
PR2P 4 Band room	Practice room 2 ceiling Plaster	Non-detect	N/A
	Skim Coat	Non-detect	N/A
PR2T 5 Band room	Practice room 2 ceiling Plaster	Non-detect	N/A
	Ceiling tile	Non-detect	N/A
	Mastic	Non-detect	N/A
RUE 6	Roofing Material (upper area East)	Non-detect	N/A
	Tar Paper	Non-detect	N/A
RM 7	Roofing material (main roof) TAR Roofing Felt	Non-detect 75% Chrysotile	N/A Friable

Black = non-asbestos Red = contains ODEQ regulated asbestos levels green indicates trace or less than 1% asbestos



Ceiling tile



Ceiling tile mastic



Teacher work room



Ceiling insulation



Teacher work room



Upper East Roof



Upper East Roof



Main roof



Main Roof

The ceiling tiles in the music department and staff break room are fastened in place with Non-ACM mastic, above that is the plaster ceilings, the same material is located in the class work room ceilings and is also Non-ACM. The roof has a PVC membrane over the top of a white fire shield, tar paper and hot mop. The upper east roof was non-ACM while the lower main roof Tar Paper (felt) is 75% Asbestos and must be abated by a licensed Asbestos contractor.

As with all construction and remodeling projects for buildings of this age there may be Thermal Systems Insulation and other Suspected Asbestos Containing Materials found in the walls, attics, crawl spaces and voids, if any suspect items are found all work must stop and a certified Asbestos inspector contacted for identification and disposition of the materials in question.

If there are any questions or concerns, please contact our office for clarification.

Inspector: Ken Newman, AHERA/ASHERA Inspector # IMR 18 4997B
Arcadia Environmental Inc. OR CCB LBPR 211308
PO Box 1290 Coos Bay OR 97420
541-808-3880/541-404-9919

Laboratory: SanAir Technologies Laboratory
1551 Oakbridge Drive, Suite B
Powhatan, VA 23139
804-897-1177

Structure: Millicoma Intermediary School
260 2nd Ave
Coos Bay OR 97420

Customer: Chris Giggy
Project Engineer
Integrity Management Solutions
18525 Van Horn Rd.
Alsea OR 97324

Dates: Inspection, 28 October 2022
Report, 11 November 2022

Respectfully



Ken Newman
AHERA/ASHERA Inspector
Arcadia Environmental Inc.



The Identification Specialists

Analysis Report
prepared for
Arcadia Environmental Inc.

Report Date: 11/1/2022

Project Name: Millicoma School

Project #: AE 22101835

SanAir ID#: 22054911



NVLAP LAB CODE 200870-0

10501 Trade Court | North Chesterfield, Virginia 23236
888.895.1177 | 804.897.1177 | fax: 804.897.0070 | IAQ@SanAir.com | SanAir.com



SanAir ID Number
22054911
FINAL REPORT
11/1/2022 11:02:01 AM

Name: Arcadia Environmental Inc.
Address: P.O. Box 1290
Coos Bay, OR 97420
Phone: 541-808-3880

Project Number: AE 22101835
P.O. Number:
Project Name: Millicoma School
Collected Date: 10/28/2022
Received Date: 10/31/2022 10:35:00 AM

Dear Ken Newman,

We at SanAir would like to thank you for the work you recently submitted. The 7 sample(s) were received on Monday, October 31, 2022 via UPS. The final report(s) is enclosed for the following sample(s): BRCT 1, WRC 2, WRC 3, PR2P 4, PR2T 5, RUE 6, RM 7.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

A handwritten signature in black ink that reads "Sandra Sobrino". The signature is written in a cursive, flowing style.

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:

- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:

- 7 samples in Good condition.



SanAir ID Number
22054911
 FINAL REPORT
 11/1/2022 11:02:01 AM

Name: Arcadia Environmental Inc.
Address: P.O. Box 1290
 Coos Bay, OR 97420
Phone: 541-808-3880

Project Number: AE 22101835
P.O. Number:
Project Name: Millicoma School
Collected Date: 10/28/2022
Received Date: 10/31/2022 10:35:00 AM

Analyst: Hogrefe, Sarah

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic	Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous	
BRCT 1 / 22054911-001 Break Room Ceiling (Tile & Plaster), Plaster	White Non-Fibrous Heterogeneous		100% Other	None Detected
BRCT 1 / 22054911-001 Break Room Ceiling (Tile & Plaster), Skim Coat	Yellow Non-Fibrous Heterogeneous		100% Other	None Detected
BRCT 1 / 22054911-001 Break Room Ceiling (Tile & Plaster), Tile	White Fibrous Homogeneous	40% Cellulose 30% Glass	30% Other	None Detected
WRC 2 / 22054911-002 Work Room 319 Ceiling Plaster, Plaster	White Non-Fibrous Heterogeneous		100% Other	None Detected
WRC 2 / 22054911-002 Work Room 319 Ceiling Plaster, Skim Coat	Yellow Non-Fibrous Heterogeneous		100% Other	None Detected
WRC 3 / 22054911-003 Work Room ?? Ceiling Plaster, Plaster	White Non-Fibrous Heterogeneous		100% Other	None Detected
WRC 3 / 22054911-003 Work Room ?? Ceiling Plaster, Skim Coat	Yellow Non-Fibrous Heterogeneous		100% Other	None Detected
PR2P 4 / 22054911-004 Practice Room 2 Band Room Ceiling Plaster, Plaster	White Non-Fibrous Heterogeneous		100% Other	None Detected
PR2P 4 / 22054911-004 Practice Room 2 Band Room Ceiling Plaster, Skim Coat	White Non-Fibrous Heterogeneous		100% Other	None Detected
PR2T 5 / 22054911-005 Practice Room 2 Band Room Ceiling Tile & Mastic, Tile	Brown Fibrous Homogeneous	99% Cellulose	1% Other	None Detected

Analyst:

Approved Signatory:

Analysis Date: 11/1/2022

Date: 11/1/2022



SanAir ID Number
22054911
 FINAL REPORT
 11/1/2022 11:02:01 AM

Name: Arcadia Environmental Inc.
Address: P.O. Box 1290
 Coos Bay, OR 97420
Phone: 541-808-3880

Project Number: AE 22101835
P.O. Number:
Project Name: Millicoma School
Collected Date: 10/28/2022
Received Date: 10/31/2022 10:35:00 AM

Analyst: Hogrefe, Sarah

Asbestos Bulk PLM EPA 600/R-93/116

SanAir ID / Description	Stereoscopic		Components		Asbestos Fibers
	Appearance	% Fibrous	% Non-fibrous		
PR2T 5 / 22054911-005 Practice Room 2 Band Room Ceiling Tile & Mastic, Mastic	Brown Non-Fibrous Homogeneous		100% Other		None Detected
RUE 6 / 22054911-006 Roofing Material (Upper Level East), Roofing	White Non-Fibrous Homogeneous	20% Glass	80% Other		None Detected
RUE 6 / 22054911-006 Roofing Material (Upper Level East), Tar Paper	Black Fibrous Homogeneous	65% Cellulose	35% Other		None Detected
RM 7 / 22054911-007 Roofing Material (Main Roof), Tar	Black Non-Fibrous Homogeneous		100% Other		None Detected
RM 7 / 22054911-007 Roofing Material (Main Roof), Felt	Brown Fibrous Homogeneous	10% Cellulose	15% Other		75% Chrysotile

Analyst:

Approved Signatory:

Analysis Date: 11/1/2022

Date: 11/1/2022

Disclaimer

This report is the sole property of the client named on the SanAir Technologies Laboratory chain-of-custody (COC). Results in the report are confidential information intended only for the use by the customer listed on the COC. Neither results nor reports will be discussed with or released to any third party without our client's written permission. The final report shall not be reproduced except in full without written approval of the laboratory to assure that parts of the report are not taken out of context. The information provided in this report applies only to the samples submitted and is relevant only for the date, time, and location of sampling. The accuracy of the results is dependent upon the client's sampling procedure and information provided to the laboratory by the client. SanAir assumes no responsibility for the sampling procedure and will provide evaluation reports based solely on the sample(s) in the condition in which they arrived at the laboratory and information provided by the client on the COC, such as: project number, project name, collection dates, po number, special instructions, samples collected by, sample numbers, sample identifications, sample type, selected analysis type, flow rate, total volume or area, and start stop times that may affect the validity of the results in this report. Samples were received in good condition unless otherwise noted on the report. SanAir assumes no responsibility or liability for the manner in which the results are used or interpreted. This report does not constitute and shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any other U.S. governmental agencies and may not be certified by every local, state, and federal regulatory agencies.

Samples are held for a period of 60 days. Fibers smaller than 5 microns cannot be seen with this method due to scope limitations.

For NY state samples, method EPA 600/M4-82-020 is performed.

NYELAP Disclaimer:

Polarized- light microscopy is not consistently reliable in detecting asbestos in floor covering and similar non-friable organically bound materials. Quantitative transmission electron microscopy is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos containing.

Asbestos Certifications

NVLAP lab code 200870-0

City of Philadelphia: ALL-460

PA Department of Environmental Protection Number: 68-05397

California License Number: 2915

Colorado License Number: AL-23143

Connecticut License Number: PH-0105

Massachusetts License Number: AA000222

Maine License Number: LB-0075, LA-0084

New York ELAP lab ID: 11983

Rhode Island License Number: PCM00126, PLM00126, TEM00126

Texas Department of State Health Services License Number: 300440

Commonwealth of Virginia 3333000323

Washington State License Number: C989

West Virginia License Number: LT000616

Vermont License: AL166318

Louisiana Department of Environmental Quality: 212253, Cert 05088

Revision Date: 8/14/2020

SanAir Technologies Laboratory, Inc.

1551 Oakbridge Drive, Suite B - Powhatan, VA 23139
 804-897-1177 / 888-895-1177 / Fax 804-897-0070
 www.sanair.com

Asbestos Chain of Custody

SanAir ID Number
22054911

Company: Arcadia Environmental Inc. #2912		Project #: AE 22101835	Phone #: 541-808-3880
Address: PO Box 1290		Project Name: Millicoma School	Phone #: 541-404-9919
City, St., Zip: Coos Bay OR 97420		Date Collected: 10/28/2022	Fax #: 541-808-3169
Samples Collected By: Ken Newman		P.O. Number:	Email: ken@arcadiaenv.com

Asbestos Analysis Types

Bulk		Air		Soil/Vermiculite	
ABB	PLM EPA 600/R-93/116 <input checked="" type="checkbox"/>	ABA	PCM NIOSH 7400 <input type="checkbox"/>	ABSE	PLM EPA 600/R-93/116 (Qual.) <input type="checkbox"/>
	Positive Stop <input type="checkbox"/>	ABA-2	OSHA w/ TWA* <input type="checkbox"/>	ABSP	PLM CARB 435 (LOD <1%) <input type="checkbox"/>
ABEPA	PLM EPA 400 Point Count <input type="checkbox"/>	ABTEM	TEM AHERA <input type="checkbox"/>	ABSP1	PLM CARB 435 (LOD 0.25%) <input type="checkbox"/>
ABB1K	PLM EPA 1000 Point Count <input type="checkbox"/>	ABATN	TEM NIOSH 7402 <input type="checkbox"/>	ABSP2	PLM CARB 435 (LOD 0.1%) <input type="checkbox"/>
	PLM EPA NOB <input type="checkbox"/>	ABT2	TEM Level II <input type="checkbox"/>		
ABBCH	TEM Chatfield <input type="checkbox"/>				
ABBTM	TEM EPA NOB <input type="checkbox"/>				
ABBNY	TEM NY ELAP 198.4 <input type="checkbox"/>	Water		Dust	
OTHER/ Matrix :	<input type="checkbox"/>	ABHE	EPA 100.2 <input type="checkbox"/>	ABWA	TEM Wipe ASTM D-6480 <input type="checkbox"/>
				ABDMV	TEM Microvac ASTM D-5755 <input type="checkbox"/>

Turn Around Times	3 HR (4 HR TEM)	6 HR (8HR TEM)	12 HR <input type="checkbox"/>	24 HR XX	
	2 Days <input type="checkbox"/>	3 Days <input type="checkbox"/>	4 Days <input type="checkbox"/>	5 Days <input type="checkbox"/>	
Sample #	Sample Identification/Location	Volume or Area	Sample Type	Flow Rate*	Time* Start - Stop
BRCT 1	break room ceiling (tile & plaster)				
WRC 2	Work room 319 ceiling plaster				
WRC 3	Work room ?? Ceiling plaster				
PR2P 4	Practice room 2 Band room Ceiling Plaster				
PR2T 5	practice room 2 Band room ceiling tile & mastic				
RUE 6	Roofing material (upper level East)				
RM 7	Roofing material (main roof)				

Special Instructions

Relinquished by	Date	Time	Received by	Date	Time
<i>[Signature]</i>	10/28/2022	1200	<i>[Signature]</i>	10-31-22	10:35AM

Unless scheduled, the turn around time for all samples received after 5 pm Friday will begin at 8 am Monday morning. Weekend or Holiday work must be scheduled ahead of time and is charged for rush turn around time. Work with standard turn around time sent Priority Overnight and Billed To Recipient will be charged a \$10 shipping fee.

**SECTION 01-1000
SUMMARY**

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: 22.25 Coos Bay School District - Millicoma School Renovation & Addition
- B. Owner's Name: Coos Bay School District.
- C. Architect's Name: HGE Architects, Inc.
- D. The Project consists of:
 - 1. Mechanical Upgrade: The entire replacement of the existing HVAC system in the building. The actual equipment and associated piping and ductwork to be performed by a design-build contractor, contracted separately with the Owner. The Contractor shall coordinate and accommodate all such improvements, including but not limited to building component demolition, rough framing, roof curbs, ceilings, finishes. Electrical work related to HVAC replacement is also contracted separately with Owner, and the Contractor shall coordinate and accommodate all such improvements. HVAC Drawings are included in the Architects drawing set for Contractor reference.
 - 2. Classroom Addition: This work consists of a two room classroom addition and extended hallway on the north side of the building, and associated impacted adjacent improvements in existing building.
 - 3. Roof Upgrade: This work consists of an over-framing system over the existing flat roof structure with framing, trusses and structural sheathing. The actual roofing system includes vapor barrier, rigid insulation, roof cover board and 60 mil PVC roofing membrane.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price.

1.03 WORK BY OWNER.

- A. Owner has awarded a contract for supply and installation of complete HVAC replacement, including associated electrical which will commence on same time as Contractor .
- B. Owner has awarded a contract for supply and installation of HVAC and electrical work associated with Classroom Addition. which will commence on same time as Contractor .
- C. Owner has awarded a contract for demolition and removal of hazardous materials which will commence on same time as Contractor .
- D. Items noted NIC (Not in Contract) will be supplied and installed by Owner before Substantial Completion. Some items include:
 - 1. Movable cabinets.
 - 2. Furnishings.
 - 3. Small equipment.
 - 4. Phone system.
- E. Owner will supply and install the following:
 - 1. Flat panel display (TV) screens.

1.04 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Work by Owner.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to the hours of 8 - 5.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01-2300
ALTERNATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.

1.02 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.

1.03 SCHEDULE OF ALTERNATES

- A. Deductive Alternate No. 1 - Classroom Addition:
 - 1. Base Bid Item: Work as shown.
 - 2. Alternate Items: Deduct all work from Base Bid related to classroom addition, including demo, building addition, rooms Classroom 26, Classroom 27, Hall Addition 171.
- B. Deductive Alternate No. 2 - TPO Roofing Membrane:
 - 1. Base Bid Item: Work as shown, with PVC 60 Mil Single Ply Roofing Membrane.
 - 2. Alternate Item: TPO 60 Mil Single Ply Roofing Membrane.
- C. Additive Alternate No. 3 - Replace Existing Skylights:
 - 1. Base Bid Item: Work as shown, with existing skylights deleted and infil of roof and ceiling in existing skylight shaft opening, (4) locations. Refer to Detail Drawings.
 - 2. Alternate Item: Extend existing skylight shaft up through overframing, provide curb and pre-engineered curb mounted insulated Metal Framed Skylights (4). Refer to Detail Drawings and Specification Section 08-6300.
- D. Additive Alternate No. 4 - Roof Monitors:
 - 1. Base Bid Item: Work as shown, with existing skylights deleted and infil of roof and ceiling in existing skylight shaft opening, (4) locations. Refer to details.
 - 2. Alternate Item: Extend existing skylight shaft up through overframing, provide roof monitor (walls, windows and roof) as detailed. Refer to Detail Drawings and respective Specification Sections.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

BLANK PAGE

**SECTION 01-3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Submittals for review, information, and project closeout.
- E. Number of copies of submittals.
- F. Requests for Interpretation (RFI) procedures.
- G. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01-6000 - Product Requirements: General product requirements.
- B. Section 01-7000 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01-7800 - Closeout Submittals: Project record documents.

1.03 REFERENCE STANDARDS

- A. AIA G716 - Request for Information 2004.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. General Contractor, contractor's superintendent(s) and major subcontractors.
- C. Agenda:
 - 1. Distribution of Contract Documents.
 - 2. Designation of personnel representing the parties to Contract, Owner, Contractor, and Contactor.
 - 3. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

4. Scheduling. Contractor to present and review schedule.
 5. Submittals. Contractor shall present and review submittal log and schedule.
- D. Record minutes and distribute copies within three days after meeting to participants, with emailed electronic copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum two-week intervals.
- B. Architect will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on progress schedule and coordination.
 11. Other business relating to work.
- E. Record minutes and distribute copies within three days after meeting to participants, with emailed electronic copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. Submit updated schedule at each construction progress meeting.

3.04 REQUESTS FOR INFORMATION (RFI)

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.

- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 - 2. Prepare in a format and with content acceptable to Owner.
 - a. Use AIA G716 - Request for Information, or similar.
 - 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01-6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 - 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 - 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date, and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Identify and include improper or frivolous RFIs.

3.05 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 - 1. Submit at the same time as the preliminary schedule specified in Section - 01-3216 - Construction Progress Schedule.
 - 2. Coordinate with Contractor's construction schedule and schedule of values.
 - 3. Format schedule to allow tracking of status of submittals throughout duration of construction.
 - 4. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
 - 5. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

3.06 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01-7800 - Closeout Submittals.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01-7800 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
 - 1. Excessively large submittals shall be separated into reasonable file size and clearly marked/named.
- B. Documents for Project Closeout: Make 2 reproductions of submittal originally reviewed (**three (3) total** project closeout documents).
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

- A. General Requirements:
 - 1. Use a separate transmittal for each item.
 - 2. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - 3. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
- B. Product Data Procedures:
 - 1. Submit only information required by individual specification sections.
 - 2. Collect required information into a single submittal.
 - 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 - 2. Do not reproduce Contract Documents to create shop drawings.
 - 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
 - 1. Transmit related items together as single package.
 - 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
- E. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- F. Transmit each submittal with a copy of approved submittal form.

- G. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- H. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- I. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- J. Schedule submittals to expedite the Project, and coordinate submission of related items.
- K. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- L. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- M. Provide space for Contractor and Architect review stamps.
- N. When revised for resubmission, identify all changes made since previous submission.
- O. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- P. Submittals not requested will not be recognized or processed.

3.10 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved".
 - b. "Approved as Noted, Resubmission not required".
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record".
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:
 - a. "Received" - to notify the Contractor that the submittal has been received for record only.
 - 2. Items for which action was taken:

- a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

BLANK PAGE

**SECTION 01-4000
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing and inspection agencies and services.
- B. Control of installation.
- C. Defect Assessment.

1.02 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION

- A. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.

2. Perform specified sampling and testing of products in accordance with specified standards.
 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 5. Perform additional tests and inspections required by Architect.
 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.03 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.

END OF SECTION

**SECTION 01-5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Waste removal facilities and services.
- G. Field offices.

1.02 RELATED REQUIREMENTS

- A. Section 01-5100 - Temporary Utilities.

1.03 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power and metering, consisting of existing panels only, connection point determined by Contractor.
 - 2. Water supply, consisting of connection point for Contractor.
- B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.04 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
 - 1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.
 - 2. Internet Connections: Minimum of one; DSL modem or faster.

1.05 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft. Maintain fencing to prohibit students from entering site from main high school campus area.

1.08 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing and new structures.

1.09 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01-5100
TEMPORARY UTILITIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary Utilities: Provision of electricity, lighting, heat, ventilation, and water.

1.02 TEMPORARY ELECTRICITY

- A. Cost: By Owner.
- B. Utility bill cost: By Owner.
- C. Connect to Owner's existing power service.
 - 1. Do not disrupt Owner's need for continuous service.
 - 2. Exercise measures to conserve energy.
- D. Provide temporary electric feeder from existing building electrical service at location as directed.
- E. Complement existing power service capacity and characteristics as required.
- F. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- G. Provide main service disconnect and over-current protection at convenient location and meter.
- H. Permanent convenience receptacles may be utilized during construction.
- I. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.
- D. Permanent building lighting may be utilized during construction.

1.04 TEMPORARY HEATING

- A. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in specifications.

1.05 TEMPORARY VENTILATION

- A. Existing ventilation equipment may not be used.

1.06 TEMPORARY WATER SERVICE

- A. Cost of Water Used: By Owner.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.
 - 1. Exercise measures to conserve water.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01-7000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Surveying for laying out the work.
- C. Cleaning and protection.
- D. Starting of systems and equipment.
- E. Demonstration and instruction of Owner personnel.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01-1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01-3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- C. Section 01-4000 - Quality Requirements: Testing and inspection procedures.
- D. Section 01-5000 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01-7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.
- F. Section 07-8400 - Firestopping.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.

1.04 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in Oregon and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.05 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
 - 1. Minimize amount of bare soil exposed at one time.
 - 2. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
 - 3. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
 - 4. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- E. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- F. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.

- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Contractor shall locate and protect survey control and reference points.
- D. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- E. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- F. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- G. Utilize recognized engineering survey practices.
- H. Establish a minimum of two permanent bench marks on site, referenced to established control points. Record locations, with horizontal and vertical data, on project record documents.
- I. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.

- 3. Building foundation, column locations, ground floor elevations.
- J. Periodically verify layouts by same means.
- K. Maintain a complete and accurate log of control and survey work as it progresses.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.04 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07-8400, to full thickness of the penetrated element.
- I. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.

3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.05 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.06 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.07 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.08 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of Owner's personnel.

3.09 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.

- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.12 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

BLANK PAGE

**SECTION 01-7800
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.
- D. Evidence of Payments and Release of Liens.

1.02 RELATED REQUIREMENTS

- A. Section 00-7200 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01-3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01-7000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.
 - 3. Contractor to submit clean set of Drawings, transferring all changes that occurred during construction from the working job set of Drawings to a clean set of Drawings. Submit to Architect for review and approval.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.

- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
 - 1. General Warranties:
 - a. Provide one-year warranty as described in the General Conditions, Article 3.5. Warranty period shall commence on the date of the fully executed Certificate of Substantial Completion.
 - b. Weather-tight warranty: The Contractor shall, and hereby does, warranty flashings, roofing, and all other work which is a component part of the roofing to be weather-tight under ordinary wear and usage for a period of two years from and after Substantial Completion of the building. This is an extension of the general one year warranty described above. Further, the Contractor shall warranty that it will make good without delay all defects of labor and materials without additional cost to the Owner.
 - 2. Additional Warranties: See individual technical specification sections for written warranties for specific projects of work.
 - 3. Warranty period shall begin upon Substantial Completion, or if a Certificate of Substantial Completion is not issued or if Work which is to be covered by warranty is not then complete, Warranty Period shall begin upon the date of Final Acceptance or on the date appearing on the final Certificate for Payment to the Contractor, whichever is earlier.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.07 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Submit with Final Application for Payment the following:
 - 1. Contractor's Affidavit of Payment of Debts and Claims: AIA G706.
 - 2. Contractor's Affidavit of Release of Liens: AIA G706A, with
 - a. Consent of Surety to Final Payment (AIA G707) with accompanying Power of Attorney.
 - b. Contractor's release or waivers of liens.
 - c. Separate releases or waivers of liens for subcontractors, suppliers, and others with lien rights against property of Owner.

END OF SECTION

BLANK PAGE

**SECTION 01-9113
GENERAL COMMISSIONING REQUIREMENTS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Scope of systems and equipment to be commissioned.
 - 2. Commissioning duties and procedures at the site.

1.02 RELATED SECTIONS

- A. Division 01, General Requirements applies to this Section.
- B. Contents of Division 23 apply to this Section.
- C. In addition, reference the following:
 - 1. Mechanical drawings.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by:
 - 1. Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. Current edition of the ASHRAE Guideline 0, The Commissioning Process.

1.04 SUBMITTALS

- A. Submittals as required by:
 - 1. Division 01, General Requirements.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by:
 - 1. Division 01, General Requirements.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Division 01, General Requirements.
 - 1. Division 01, General Requirements.

1.07 DEFINITIONS

- A. Commissioning Authority: The Commissioning Authority is the person or entity referred to throughout the Contract Documents as if singular in number who works with the Owner's Authorized Representative under a separate Contract.
- B. Commissioning:
 - 1. Commissioning is a process for achieving, verifying, and documenting that performance of a building and its various energy consuming systems meets the Design Engineer's design intent and the Owner's operational needs.

2. Commissioning includes tests for the operation of equipment and building systems to ensure that they operate as designed by the Design Engineer, and meet the needs of the building throughout the entire range of operating conditions.
 3. Commissioning is a cooperative effort that requires participation by the Owner's Authorized Representative, General Contractor, system and equipment installers, building automation system installer, Testing and Balancing Agency, equipment manufacturers' representatives, Architect, Architect's design engineers, and Commissioning Authority.
- C. Commissioning Procedures:
1. Inspection and testing procedures that are written by the Commissioning Authority for equipment and systems within the scope of commissioning.
 2. Inspection checklists typically address items of installation compliance with design intent and approved submittals.
 3. Functional performance test procedures typically address all sequences for normal and emergency equipment and system operation. These procedures consist of a mix of One-Time Tests and Continuous Measurement.
 4. One-Time Tests: Functional performance tests of equipment and systems that are performed by forcing specific conditions that are intended to trigger specific responses, per the design intent.
- D. Continuous Measurements:
1. Functional performance tests of equipment and systems that are performed by observing parameters of normal operation over an extended period. This is typically accomplished by means of the BAS trend logging capabilities, by monitoring with stand-alone data logging equipment, or by some combination of both.
 2. Temperature conditions in occupied spaces, control stability, and lighting levels in areas with daylighting controls are three typical subjects of continuous measurement.
- E. Commissioning Plan: The document, provided by the Commissioning Authority, that states the required tests for all equipment and systems within the scope of commissioning.
- F. Commissioning Meetings: Issues related to commissioning will be discussed as required during regularly scheduled progress meetings.

1.08 PERFORMANCE REQUIREMENTS

- A. Testing, inspecting and performance monitoring tasks specified in this Section are the responsibility of the Commissioning Authority, unless specifically indicated otherwise, and not part of the General Construction Contract. These tasks are included in these Sections for the Contractor's information, so the Contractor can understand the standards of system performance that are required and more effectively coordinate with the process of commissioning.
- B. The Commissioning Authority will verify for the Owner's Authorized Representative that commissioned mechanical, plumbing, electrical, and controls system function interactively and in compliance with the Project design intent, and to facilitate orderly and efficient transfer of building operating systems to the Owner.
- C. Commissioning does not relieve the Contractor of Contract obligations.

1.09 EQUIPMENT AND SYSTEMS TO BE COMMISSIONED

- A. Systems:
 1. HVAC Equipment
 2. HVAC Controls.

1.10 COMMISSIONING DUTIES

- A. Duties of Commissioning Authority:
1. Attend commissioning portion of Project Meetings as necessary, minimum two meetings.
 2. Provide plan to Owner's Authorized Representative for review and comment.
 3. Utilize web based Commissioning software to manage all commissioning related checklists, tests, issues, and observation reports.
 4. Prepare commissioning procedures for each commissioned system based on actual system configuration.
 5. Commissioning Procedures written by Commissioning Authority will include, in field data collection format, the detailed test procedures, test conditions, and criteria for acceptance of test results.
 6. Submit any commissioning procedures that are written by Commissioning Authority to the Owner's Authorized Representative for review and approval at least 1 week prior to scheduled field testing.
 7. Provide personnel experienced in technical aspects of each system to be commissioned for execution of tests.
 8. BAS Sequence Demonstration:
 - a. Witness the Control Contractor's demonstration of their sequence tests.
 - b. If any of the demonstrated sequences fails to operate per the controls submittal, witness the repeat demonstration after corrective action has been taken.
 9. Execute the Commissioning Procedures.
 10. Prepare and submit Observation Reports and Deficiency Reports as required, but within 3 days of noting any deficiency.
 11. Submit to Owner's Authorized Representative a weekly written report of commissioning progress, unresolved deficiencies, and projected inspection, and test schedule during field testing.
 12. Take the lead in timely evaluation of deficiencies, and advise Owner's Authorized Representative on resolution.
 13. Assist in resolving commissioned system disputes by performing research to determine the scope of the dispute, and informing the involved parties on possible solutions to disputes.
 14. During the systems warranty period(s) CxA to retest any systems that had their full testing deferred during the initial functional testing due to the lack of peak season conditions. This testing must ensure that all system sequences of operations and capacity have been verified.
 15. Prepare a Commissioning Report that includes a summary of overall commissioning process, including deficiencies found, deficiency corrections, unresolved deficiencies, approved equipment and systems, discrepancies between final design intent and as-built systems, completed commissioning checklists, test documentation, and other commissioning documentation.
- B. Duties of Installer's and Manufacturer's Representatives:
1. Attend commissioning portion of Project Meetings as necessary, minimum two meetings.
 2. Participate and respond to commissioning related issues by using the Commissioning Authority's web based commissioning software Facility Grid.
 3. Within three months of the award of the Contract, as part of the required submittals for the contract, Contractor submits manufacturer's startup and installation procedures as well as controls point-to-point and sequence checkout and provides in checkset format for each piece of equipment and controls.
 4. Demonstrate proper system operation in the presence of the Commissioning Authority.
 5. Commissioning does not relieve installers from obligations to complete Work as required by Contract Documents.
- C. Duties of BAS Installer:
1. Attend commissioning portion of project meetings as necessary, minimum two meetings.

2. Participate and respond to commissioning related issues by using the Commissioning Authority's web based commissioning software Facility Grid.
3. Review and approve Commissioning Procedures as relevant to controls work.
4. Point-to-Point Checkout:
 - a. Perform point-to-point checkout and calibration of all energy management system points.
 - b. Document checkout and calibration on forms as approved by mechanical designer, and/or Commissioning Authority.
 - c. Submit three copies of the completed point-to-point checkout forms to the Owner's Authorized Representative within five working days of completion of field checkout. Distribute copies to the Commissioning Authority and the designer.
5. Control Sequence Testing:
 - a. Prepare control sequence test procedure forms to a degree of rigor comparable to the Commissioning Authority's Commissioning Procedures.
 - b. Submit test procedure forms to the Commissioning Authority for approval at least two weeks prior to intended sequence testing. At the contractor's option, it is acceptable to use the Commissioning Authority's Commissioning Procedures, substituting one-time tests for continuous measurement wherever applicable. However, it is still necessary to submit any edited Commissioning Authority Commissioning Procedures as least two weeks prior to intended sequence testing.
 - c. Submit the completed sequence testing forms to the Owner's Authorized Representative. The Owner's Authorized Representative distributes copies to the Commissioning Authority and the designer.
6. Submit to Commissioning Authority, prior to Sequence Demonstration, two copies of installed control Drawings, sequence narratives, control wiring diagrams, and program code or block diagrams.
7. Sequence Demonstration:
 - a. After completing and documenting all required sequence tests with own staff, demonstrate sequence tests to the Commissioning Authority. Demonstration is to be performed by the BAS installer's programmer who programmed the control system for this specific project.
 - b. If any of the demonstrated sequences fails to operate per the controls submittal, take corrective action and demonstrate the failed sequence tests to the Commissioning Authority a second time.
 - c. If the Control Contractor fails to demonstrate proper sequence operation in any of the second round of sequence tests, the Commissioning Authority's costs for witnessing all further demonstration of that sequence may be assigned to the Control Contractor by the Owner as a deduct to their contracted price. The Control Contractor will not be responsible for costs related to failure due to design or to other factors beyond their control, though it is expected to call any design concerns (and other factors beyond their control that might cause failure) to the attention of the Commissioning Authority and the Owner's Authorized Representative.
8. Assist Commissioning Authority with programming of the energy management system for trend logs to support functional performance testing during field testing.
9. Assist Commissioning Authority with execution of the Commissioning Procedures. Commissioning Authority will present test schedule at Progress Meeting at least one week ahead of scheduled tests.
10. The Commissioning Authority, acting with Owner authority, may request the Control Contractor to assist with or perform minor loop tuning adjustments, set point and schedule changes, and other similar minor field corrections.
11. Recommended changes to the controls sequences, program code, and recommendations for additional points must go through the Owner's Authorized Representative and the designer. The designer is the final authority on all recommended sequence changes, and will submit such changes to the Owner's Authorized Representative for implementation.

12. Submit to Owner's Authorized Representative, at least two weeks prior to Final Completion, two copies of as-built version of points list, including I/O and virtual points, controls Drawings, program printout, and sequence narratives.
 13. Participate in resolution of problems and deficiencies that are discovered during commissioning.
- D. Duties of Balancer:
1. Attend commissioning portion of Project Meetings as necessary, minimum two meetings.
 2. Participate in resolution of problems and deficiencies that are discovered during commissioning.
 3. Assist Commissioning Authority with execution of commissioning procedures.
 4. Demonstrate accuracy of final balance report in the presence of the Commissioning Authority. This will be a 10 percent spot check.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COMMISSIONING PROCEDURES AT THE SITE

- A. Testing Techniques:
1. Each testing procedure may use a variety of techniques. Generally it is preferred to observe new and existing equipment and systems during normal operation.
 2. When functional and emergency modes of operation occur rarely or seasonally, if possible, simulate the conditions that trigger these operational modes.
 3. Simulation of conditions may involve changing set points, changing schedules, simulating pneumatic system pressures or energy management system voltages and currents, disconnecting power, jumpering contacts, or other such procedures.
 4. Whenever temporary adjustments are made, restore the system to its original condition once tests are completed.
 5. When testing requires observing equipment operation over an extended period, use the building energy management system's trend logging capabilities or independent monitoring equipment.
 6. Do not use the building automation system trend logging in the commissioning process prior to point-to-point checkout by Controls Contractor and approval of point-to-point checkout by Commissioning Authority.
- B. Commissioning Documentation:
1. The Contractors are required to perform startup and checkout of their systems (prefunctional testing) and document the results in Facility Grid. The Commissioning Authority will provide electronic forms that may be used by the Contractors. The Contractors may use their own forms if they contain all the required information on the Commissioning Authority's forms, but prior approval must be obtained.
 - a. Where numeric data is required, a narrative entry or simple check-off is not acceptable.
 - b. Annotate trend logs and monitored data as necessary to clarify meaning, and attach to relevant test reports.
 - c. Do not attach irrelevant data to test reports.
 2. The Contractor sends the startup and checkout forms to the Commissioning Authority when they are complete and functional. The Contractor sends a "Certificate of Readiness" with the forms which will signal that functional testing can begin.
 3. The technician who performed the pretesting and checkout of the system completes the Pre-Functional Checklists using the web based commissioning software Facility Grid.
 4. E-mail an "issues log" weekly to inform the design and construction team of issues that need resolution. The "issues log" will open and close items as they are discovered and resolved until all items are closed.

5. The Commissioning Authority will assemble all the information from the Commissioning Plan (test forms, trend logs, issues log, and basis of design) into a final Commissioning Report.
- C. Coordination of Commissioning and Equipment Startup: Do not initiate functional performance testing for equipment or systems in advance of their startup and checkout by affected equipment or system installers and manufacturers' representatives.
- D. Test Acceptance Criteria:
1. Acceptance Criteria are the test results that are required before the mode of performance or inspection item in question will be considered acceptable.
 2. Any procedures in Specification Sections 23 08 00 that begin with "Verify that..." have an implied acceptance criterion that the sequence as stated is proven to occur and is documented with visual observation notes, measurements, trend logs, and/or monitored data.
 3. Acceptance criteria for other functional modes and checklist items are as stated in each section of the Commissioning Plan.
 4. Input will be sought when necessary from the Architect's Engineer to determine if test results indicate compliance with Design Intent.
 5. The Commissioning Authority will recommend acceptance or rejection of commissioned system work based on test results.
- E. Resolution of Deficiencies:
1. Adjust, repair, or replace defective equipment and systems to meet Commissioning Procedure Acceptance Criteria as directed by Owner's Authorized Representative.
 2. Inform the Owner's Authorized Representative and Commissioning Authority of the date for completion of corrective activities.
 3. If the date for completion of corrective work passes without resolution of deficiencies, Owner's Authorized Representative reserves the right to obtain supplementary services and equipment to correct the problem as indicated in General Conditions.
- F. Rechecking and Retesting Charges:
1. In the event of a second failure of a specific commissioning procedure item or test, the responsible party may be assessed charges by Owner's Authorized Representative.
 2. Charges will be based on each party's actual expenses, including normal hourly billing rates for preparation, testing, and travel time, and materials, equipment rental, and travel expenses as applicable.
- G. Construction and Acceptance Milestones for Tasks Related to Commissioning:
1. Equipment, ductwork, and piping installation.
 2. Equipment startup.
 3. Pre-functional checklists.
 4. Substantial completion.
 5. Point-to-point checkout and sequence testing of controls.
 6. Test and balance.
 7. Commissioning field testing.
 8. Owner training.
 9. Occupant move-in.
 10. Final completion.
 11. Seasonal testing.
 12. Commissioning report submittal.

END OF SECTION

**SECTION 02-4100
DEMOLITION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.
- B. Modification of existing utilities and utility structures.

1.02 RELATED REQUIREMENTS

- A. Section 01-1000 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01-5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01-7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 31-1000 - Site Clearing: Vegetation and existing debris removal.
- E. Section 31-2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction Current Edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations 2022, with Errata (2021).

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE

- A. See Drawings for scope of demolition work.
- B. All work related to asbestos abatement of the building shall be performed by others. Coordinate Work with Abatement Contractor.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Use of explosives is not permitted.

3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 4. Provide, erect, and maintain temporary barriers and security devices.
 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 7. Do not close or obstruct roadways or sidewalks without permit.
 8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
1. Provide bracing and shoring.
 2. Prevent movement or settlement of adjacent structures.
 3. Stop work immediately if adjacent structures appear to be in danger.
- D. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- E. Noise Control: Maintain a reasonable degree of quiet throughout progress of the work so as not to disturb Owner's work in adjoining rooms. Machines and tools must operate below OSHA noise and fume standards.
- F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- G. Perform demolition in a manner that maximizes salvage and recycling of materials.
1. Dismantle existing construction and separate materials.
 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as shown.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that will not be demolished.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01-5000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - 3. See Section 01-1000 for other limitations on outages and required notifications.
 - 4. Verify that abandoned services serve only abandoned facilities before removal.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL

- A. Owner desires that as much existing building materials be salvaged as possible. Owner will work with local salvage organizations to coordinate pick up.
- B. Remove debris, junk, and trash from site.
- C. Remove from site all materials not to be reused on site; do not burn or bury.

- D. Leave site in clean condition, ready for subsequent work.
- E. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

**SECTION 03-1000
CONCRETE FORMING AND ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03-2000 - Concrete Reinforcing.
- B. Section 03-3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 347R - Guide to Formwork for Concrete 2014 (Reapproved 2021).

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.

2.03 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.

- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - 1. Composition: Colorless reactive, mineral oil-based, soy-based, or vegetable-oil based compound.
 - 2. Do not use materials containing diesel oil or petroleum-based compounds.
 - 3. VOC Content: None; water-based.
- C. Filler Strips for Chamfered Corners: Rigid plastic type; size; maximum possible lengths.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

- A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

3.05 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
- B. Construct permanent insulated foam panel formwork to maintain tolerances required by ACI 301.
- C. Camber slabs and beams 1/4 inch per 10 feet.

3.06 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01-4000 - Quality Requirements.

- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

3.07 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

END OF SECTION

BLANK PAGE

**SECTION 03-2000
CONCRETE REINFORCING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03-3000 - Cast-in-Place Concrete.
- B. Testing Agency Requirements.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Concrete Construction 2020.
- B. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).
- C. ACI SP-66 - ACI Detailing Manual 2004.
- D. ASTM A82/A82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- F. CRSI (DA4) - Manual of Standard Practice 2009.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).

1. Deformed billet-steel bars.
 2. Unfinished.
- B. Reinforcement Accessories:
1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
 1. Supported Slabs and Joists: 3/4 inch, not exposed to ground or weather.
 2. Walls (exposed to weather or backfill): 2 inch.
 3. Footings and Concrete Formed Against Earth: 3 inch.
 4. Slabs on Fill: 3 inch.
- E. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

- A. An independent testing agency, as specified in Section 01-4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

END OF SECTION

**SECTION 03-3000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Floors and slabs on grade.
- B. Concrete foundation walls and concrete foundations.
- C. Joint devices associated with concrete work.
- D. Miscellaneous concrete elements, including equipment pads and light pole bases.

1.02 RELATED REQUIREMENTS

- A. Section 014000 - Quality Requirements.
- B. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.
- C. Section 03-1000 - Concrete Forming and Accessories: Forms and accessories for formwork.
- D. Section 03-2000 - Concrete Reinforcing.
- E. Section 07-9005 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- E. ACI 306R - Guide to Cold Weather Concreting 2016.
- F. ACI 318 - Building Code Requirements for Structural Concrete 2019 (Reapproved 2022).
- G. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2018.
- H. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- I. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- J. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.
- K. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- L. ASTM C150/C150M - Standard Specification for Portland Cement 2022.

- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- N. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- O. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete 2017a.
- P. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019, with Editorial Revision (2022).
- Q. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2022.
- R. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.
- S. 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 2018a.

1.04 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.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. 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.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03-2000.

2.02 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal 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. Lightweight Aggregate: ASTM C330/C330M.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Calcined Pozzolan: ASTM C618, Class N.
- F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.03 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.

2.04 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder:
 - 1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
 - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 - 3. Manufacturers:
 - a. Stego Industries, LLC; Stego Wrap 15-Mil Vapor Barrier: www.stegoindustries.com/#sle.
 - b. Substitutions: See Section 01-6000 - Product Requirements.

2.05 BONDING AND JOINTING PRODUCTS

- A. 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.
- B. 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.

2.06 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
 - 1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.
- B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- C. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C 39/C 39M at 28 days: 4,000 psi, unless drawings indicate otherwise. Concrete should be a minimum of a 6-sack mix.
 - 2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.

3. Water-Cement Ratio: Maximum 40 percent by weight.
4. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
5. Maximum Slump: 4 inches.
6. Maximum Aggregate Size: 3/4 inch.

2.07 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. 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.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Notify Architect and Owner's Independent Testing Agency not less than 24 hours prior to commencement of placement operations.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.04 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.
- D. 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.
- E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. 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.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 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: Rub down or chip off and smooth fins or other raised areas 1/8 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. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.07 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.
- 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.

3.08 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 three concrete test cylinders. Obtain test samples for every 100 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.

3.09 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.

3.10 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

**SECTION 05-5000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- E. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 2004.
- H. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.
- I. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, hot-dip galvanized finish.

- E. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. 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.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Bumper Posts, Handrails, Guard Rails, Handrails, and Handrails: As detailed; galvanized finish.
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

2.04 FINISHES - STEEL

- A. Prepare surfaces to be primed in accordance with SSPC-SP2.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Prime Painting: One coat.
- D. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. All exterior fabricated steel hot-dipped galvanized.
- E. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements. All exterior fabricated steel, handrails to be hot-dipped galvanized.

2.05 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

3.01 PREPARATION

- A. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.02 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. Obtain approval prior to site cutting or making adjustments not scheduled.

3.03 TOLERANCES

- A. Maximum Offset From True Alignment: 1/4 inch.
- B. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

BLANK PAGE

**SECTION 05-5150
LADDERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum access ladders.

1.02 RELATED SECTIONS

- A. Section 05-5000 – Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.

1.03 REFERENCES

- A. AA – Aluminum Association.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- D. OSHA 1910.27 – Fixed Ladders.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01-3000.
- B. Product Data: Manufacturer's data sheets on each product.
- C. Shop Drawings:
 - 1. Detail fabrication and erection of each ladder indicated. Include plans, elevations, sections, and details of metal fabrications and their connections.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. Provide reaction loads for each hanger and bracket.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
 - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B. Installer Qualifications: Competent and experienced firm capable of selecting fasteners and installing ladders to attain designed operational and structural performance.
- C. Product Qualification: Product design shall comply with OSHA 1910.27 minimum standards for ladders.

1.06 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: O'Keeffe's, Inc.; 325 Newhall St. San Francisco, CA 94124. ASD. Toll Free Tel: (888) 653-3333. Tel: (415) 824-4900. Fax: (415) 824-5900. Email: info@okeeffes.com. Web: <http://www.okeeffes.com>.
- B. Substitutions: See Section 01-6000 - Product Requirements.

2.02 APPLICATIONS/SCOPE

- A. Fixed Access Ladder:
 - 1. Standard Duty Channel Rail.
 - a. Model 500 as manufactured by O'Keeffe's Inc.
 - b. Provide telescoping safety post.
 - c. Location: Storage room to access roof.
 - d. Qt: one (1).
 - 2. Tubular Rail Low Parapet Access Ladder with Platform.
 - a. Model 503A as manufactured by O'Keeffe's Inc.
 - b. Location: Lower roofs to upper roofs.
 - c. Qt: Refer to Drawings.

2.03 FINISHES

- A. Mill finish. As extruded.

2.04 MATERIALS

- A. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
- B. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

2.05 FABRICATION

- A. Rungs shall withstand a 500 pound load without deformation or failure.
- B. Channel Side Rails: Not less than 1/8 inch wall thickness by 3 inches wide.
- C. Landing Platform: 1-1/2 inches or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
- D. Ladder Safety Post: Retractable hand hold and tie off.
 - 1. Location: At standard fixed ladder only, to provide hand hold up thru roof hatch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- B. Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- C. If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and in proper relationship with adjacent construction.

3.03 PROTECTION

- A. Protect installed products until completion of project.

END OF SECTION

BLANK PAGE

**SECTION 06-1000
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Sheathing.
- E. Subflooring.
- F. Roof-mounted curbs.
- G. Roofing nailers.
- H. Preservative treated wood materials.
- I. Miscellaneous framing and sheathing.
- J. Communications and electrical room mounting boards.
- K. Concealed wood blocking, nailers, and supports.
- L. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 06-1753 - Shop-Fabricated Wood Trusses.
- B. Section 06-1800 - Glued-Laminated Construction.
- C. Section 07-2500 - Weather Barriers: Water-resistive barrier over sheathing.
- D. Section 07-6200 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2022.
- B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- D. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2018, with Errata (2019).
- E. AWPA U1 - Use Category System: User Specification for Treated Wood 2022.

- F. PS 1 - Structural Plywood 2009 (Revised 2019).
- G. PS 20 - American Softwood Lumber Standard 2021.
- H. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
 - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 by 2 through 2 by 6):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: No. 2.
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 - 1. Species: Douglas Fir-Larch.
 - 2. Grade: No. 2 & Btr.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 EXPOSED DIMENSION LUMBER

- A. Sizes: Nominal sizes as indicated on drawings.
- B. Surfacing: S4S.
- C. Sizes: Nominal sizes as indicated on drawings, Rough (unsurfaced).
- D. Moisture Content: S-dry or MC19.
- E. Rafter, Purlin, Small Beam, Purlin, and Purlin Framing (2 by 6 through 4 by 16):
 - 1. Species: Western Cedar.
 - 2. Grade: Select.
- F. Location: North side covered walkway, heavy timber framing and brackets. West side awning framing, brackets.

2.04 TIMBERS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry (23 percent maximum).
- C. Beams and Posts 5 inches and over in thickness:
 - 1. Grade: No. 2.

2.05 CONSTRUCTION PANELS

- A. Subflooring: Particleboard, ANSI A208.1, Grade M-2 EXTERIOR GLUE waferboard; 3/4 inch thick, tongue and groove edge.
- B. Roof Sheathing : APA PRP-108/APA PRPR-108, Form B455, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - 1. Span Rating: 24/16.
 - 2. Thickness: 5/8 inch, nominal.
 - a. Location: Classroom addition roof.
 - 3. Thickness: 1/2 inch, nominal.
 - a. Location: Roof overframing area only.
 - 4. Edges: square.
- C. Wall Sheathing: APA PRP-108/APA PRP-108, Form B455 Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - 1. Span Rating: 24/16.
 - 2. Thickness: 1/2 inch, nominal.
- D. Wall Sheathing, Oriented Strand Board (OSB): APA rated structural sheathing, structural I. EXTERIOR GLUE.
 - 1. Span Rating: 24/16.
 - 2. Thickness: 1/2 inch, nominal.
- E. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.06 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Preservative Treatment:
 - 1. Manufacturers:
 - a. Lonza Group: www.wolmanizedwood.com/#sle.
 - b. Viance, LLC: www.treatedwood.com.
 - c. Osmose, Inc: www.osmose.com.
 - d. Substitutions: See Section 01-6000 - Product Requirements.
 - 2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.40 lb/cu ft retention.

- a. Treat lumber exposed to weather.
- b. Treat lumber in contact with roofing, flashing, or waterproofing.
- c. Treat lumber in contact with masonry or concrete.

PART 3 EXECUTION

3.01 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.

3.02 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.

3.03 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 and AWC (WFCM) Wood Frame Construction Manual.
- E. 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.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- F. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.

3.05 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, as indicated on Roof Framing Plan
 - 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.
- D. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
 - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 - 3. Install adjacent boards without gaps.

3.06 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- B. Allow preservative to dry prior to erecting members.

3.07 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

BLANK PAGE

**SECTION 06-1753
SHOP-FABRICATED WOOD TRUSSES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated wood trusses for roof framing.
- B. Bridging, bracing, and anchorage.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Installation requirements for miscellaneous framing.

1.03 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 2022.
- B. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction 2014.
- C. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses 2018.
- D. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; joint publication of the Truss Plate Institute and the Wood Truss Council of Amer
- E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses 1989.
- F. BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; joint publication of the Truss Plate Institute and the Wood Trust Council of America; 2008.
- G. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

1.04 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.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design by or under direct supervision of a Professional Engineer experienced in design of this Work and licensed in Oregon.

1.06 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

2.01 TRUSSES

- A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.

2.02 MATERIALS

- A. Lumber:
 - 1. Grade: WCLB (GR), Douglas Fir-Larch No. 2 or better .
 - 2. Moisture Content: S-Green.
 - 3. 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 required.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.03 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.

2.04 FABRICATION

- A. Fabricate trusses to achieve structural requirements specified.
- B. Brace wood trusses in accordance with TPI DSB-89 and BCSI 1.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that supports and openings are ready to receive trusses.

3.02 PREPARATION

- A. Coordinate placement of bearing items.

3.03 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. Install permanent bridging and bracing.

3.04 TOLERANCES

- A. Framing Members: 1/4 inch maximum, from true position.

END OF SECTION

BLANK PAGE

**SECTION 06-1800
GLUED-LAMINATED CONSTRUCTION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glue laminated wood beams and purlins.
- B. Steel hardware and attachment brackets.

1.02 REFERENCE STANDARDS

- A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- E. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength 2014.
- F. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric) 2014.
- G. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.
- H. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric) 2021a.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings .

1.04 QUALITY ASSURANCE

- A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect members to AITC requirements for individually wrapped.
- B. Leave individual wrapping in place until finishing occurs.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Glued-Laminated Structural Units:
 - 1. Western Wood Structures, Inc: www.westernwoodstructures.com/#sle.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.

2.02 GLUED-LAMINATED UNITS

- A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Architectural grade.
 - 1. Verify dimensions and site conditions prior to fabrication.
 - 2. Cut and fit members accurately to length to achieve tight joint fit.
 - 3. Fabricate member with camber built in.
 - 4. Do not splice or join members in locations other than those indicated without permission.
 - 5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

2.03 MATERIALS

- A. Lumber: Softwood lumber conforming to RIS grading rules with 12 percent maximum moisture content before fabrication. Design for the following values, unless indicated otherwise in Drawings:
 - 1. Bending (Fb): 2400 psi.
 - 2. Tension Parallel to Grain (Ft): 1500 psi.
 - 3. Compression Parallel to Grain (Fc): 1650 psi.
 - 4. Compression Perpendicular to Grain Bottom (Fc1): 650 psi.
 - 5. Compression Perpendicular to Grain Top (Fc1): 650 psi.
 - 6. Horizontal Shear (Fv): 165 psi.
 - 7. Modulus of Elasticity (E): 1,600,000 psi.
- B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.
- C. Hardware: {rs#4} ({rs#1}) Type 1 high strength heavy hex bolts and {rs#3} ({rs#2}) nuts, hot-dip galvanized to meet requirements of ASTM A153/A153M, matching washers.

2.04 FABRICATION

- A. Fabricate glue laminated structural members in accordance with AITC Industrial grade.
- B. Verify dimensions and site conditions prior to fabrication.
- C. Cut and fit members accurately to length to achieve tight joint fit.
- D. Fabricate member with camber built in.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

3.02 ERECTION

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.

3.03 TOLERANCES

- A. Framing Members: 1/2 inch maximum from true position.

END OF SECTION

BLANK PAGE

**SECTION 06-2000
FINISH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Finish carpentry items.
- B. Wood casings and moldings.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06-4100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 07-4646 Fiber Cement Siding.
- D. Section 09-9113 - Exterior Painting: Painting of finish carpentry items.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- B. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- C. PS 1 - Structural Plywood 2009 (Revised 2019).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
- B. Unless otherwise indicated provide products of quality specified by Woodwork Institute Manual of Millwork for Premium grade.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

2.03 LUMBER MATERIALS

- A. Softwood Lumber: Doug-Fir KD S4s, clear vertical grade species, maximum moisture content of 6 percent; with vertical grain, of quality suitable for transparent finish.
 - 1. Grading: In accordance with rules certified by ALSC; www.alsc.org.
 - 2. Location: Interior.
- B. Softwood Lumber: Resawn texture cedar, K.D., grade C and better species, maximum moisture content of 6 percent; , primed, fingerjointed, 20 foot lengths.
 - 1. Location: Exterior.

2.04 SHEET MATERIALS

- A. Softwood Plywood Exposed to View: Face species as indicated, rough sawn texture, veneer core; PS 1 Grade A-B; no plugs, glue type as recommended for application.
 - 1. Grading: Certified by the American Plywood Association.

2.05 ADHESIVE

- A. Adhesive: Type recommended by laminate manufacturer to suit application .

2.06 ACCESSORIES

- A. Aluminum Edge Trim: Extruded convex shape; smooth surface finish; self locking serrated tongue; of width to match component thickness; natural mill finish.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

2.07 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Cap exposed plastic laminate finish edges with aluminum trim.
- C. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.02 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

B. Site Finishing: See Section 09-9000.

3.03 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

BLANK PAGE

**SECTION 06-4100
ARCHITECTURAL WOOD CASEWORK**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Hardware.
- D. Factory finishing.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 09-9900 - Painting and Coating

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. BHMA A156.9 - Cabinet Hardware 2020.
- D. ANSI A135.4 - American National Standard for Basic Hardboard; 2012.
- E. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- F. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- G. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- H. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- I. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.
- J. PS 1 - Structural Plywood; 2009.
- K. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

PART 2 PRODUCTS

2.01 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

2.02 LUMBER MATERIALS

- A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.
- B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as indicated on drawings.

2.03 PANEL MATERIALS

- A. Particleboard: ANSI A208.1; medium density industrial type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, composed of wood chips bonded with interior grade adhesive under heat and pressure; sanded faces; thickness as required; use for components indicated on drawings.
- B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
- C. Plywood for Non-Decorative Purposes: NIST PS 1, Interior rated adhesives, core of seven (7) wood plies from listed species unless otherwise indicated, thickness as indicated or as required by application.
 - 1. Semi-Exposed Surfaces: APA A-B Grade, rotary cut redwood face veneer.
 - 2. Concealed Surfaces: PS 1; APA B-B Grade, rotary cut Douglas fir face veneer.
 - 3. Location: At countertops and base cabinets in all sink and lavatory locations.
- D. Hardboard: AHA A135.4; Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth two sides (S2S); use for drawer bottoms, dust panels, and other components indicated on drawings.
- E. Pre-Finished High Density Particle Board (PFHDPB)

2.04 LAMINATE MATERIALS

- A. Provide specific types as indicated.
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, color, finish as indicated.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, color, finish as indicated.

2.05 COUNTERTOPS

- A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated, with decorative PVC edge.
 - 1. Counter Plastic Edge Banding/Profile: Radius edge with thick applied band, 0.12 inch thick, 1/8 inch nominal (3 mm) radius edge with thick applied band, shaped; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.

2.06 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Typical Plastic Edge Banding/Profile: Radius edge with thick applied band, 0.12 inch thick, 1/8 inch nominal (3 mm) radius edge with thick applied band shaped; smooth finish; of width to match component thickness, color as selected from manufacturer's standards.
 - 1. Use at all drawer and door edges.
- C. Other Edge Banding/Profile: Impact resistant HPDL or PVC edge banding, square edge with thin applied band, 1/16 inch thick, square edge with thin applied band, flat shaped; smooth finish; of width to match component thickness
 - 1. Use at all exposed shelf edges, casework boxes. Ease edge of banding to remove any sharp edges.
- D. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.
- E. Concealed Station Brackets:
 - 1. Product: "C" (Concealed Bracket), "EC" (Extended Concealed Bracket); steel, black powder coat, mounting hardware as recommended by manufacturer; manufactured by A & M Hardware, Inc.; www.AandMhardware.com; 1-888-647-0200.
 - a. "C", without upper extension:
 - 1) 9" Support Arm, 4,520 lbs/pair load limit
 - 2) 12" Support Arm, 4,020 lbs/pair load limit
 - 3) 18" Support Arm, 2,060 lbs/pair load limit
 - 4) 24" Support Arm, 1,800 lbs/pair load limit
 - b. "EC", with upper extension:
 - 1) 9" Support Arm, 7,960 lbs/pair load limit
 - 2) 12" Support Arm, 3,100 lbs/pair load limit
 - 3) 18" Support Arm, 4,500 lbs/pair load limit
 - 4) 24" Support Arm, 2,320 lbs/pair load limit
 - c. Color: Black powder coat.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.
- F. Surface Station Brackets:
 - 1. Product: Standard Bracket; steel, black powder coat, mounting hardware as recommended by manufacturer; manufactured by A & M Hardware, Inc.; www.AandMhardware.com; 1-888-647-0200.

- a. Color: Black powder coat.
- b. Size: A & M "24 x 24".
2. Substitutions: See Section 01-6000 - Product Requirements.

2.07 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers.
- D. Catches: Touch type.
- E. Drawer Slides:
 1. Type: Full extension.
 2. Static Load Capacity: Commercial grade.
 3. Manufacturers:
 - a. Knap & Vogt Manufacturing Company; Light-Duty Drawer Slides: www.knapeandvogt.com/#sle.
- F. Hinges: European style concealed self-closing type, steel with polished finish.
 1. Manufacturers:
 - a. Blum, Inc: www.blum.com/#sle.

2.08 SITE FINISHING MATERIALS

- A. Finishing: Field finished as specified in Section 09-9000.

2.09 FABRICATION

- A. Cabinet Style: Flush overlay.
- B. Cabinet Doors and Drawer Fronts: Flush style.
- C. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- D. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- E. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
 1. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- F. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

2.10 FACTORY FINISHING

- A. Finish work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Section 1500, Nitrocellulose Lacquer, Transparent.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.02 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.03 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.04 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

BLANK PAGE

**SECTION 07-2100
THERMAL INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall, underside of floor slabs, and concealed header assemblies as indicated in Drawings and to fill all voids.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
- C. Batt insulation for filling perimeter window and door shim spaces.
- D. Reflective insulation.

1.02 RELATED REQUIREMENTS

- A. Section 07-5400 - Thermoplastic Membrane Roofing: Installation requirements for board insulation over low slope roof deck.

1.03 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2022.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2021.
- C. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation 2022.
- D. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications 2013 (Reapproved 2019).
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2022.
- F. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation 2014 (Reapproved 2019).
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- H. ASTM C1224 - Standard Specification for Reflective Insulation for Building Applications 2015 (Reapproved 2020).
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- J. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 °C 2022.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.

- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.05 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- B. Insulation in Wood Framed Walls: Batt insulation with integral vapor retarder.
- C. Insulation in Wood Framed Ceiling Structure: Batt insulation with integral vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 4. Board Edges: Square.
 - 5. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
 - 6. Products:
 - a. DuPont de Nemours, Inc; Styrofoam Brand Square Edge: building.dupont.com/#sle.
 - b. Owens Corning Corporation; FOAMULAR Type 1 Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
 - c. Substitutions: See Section 01-6000 - Product Requirements.

2.03 MINERAL FIBER BLANKET INSULATION MATERIALS

- A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
 - 1. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
 - 2. Formaldehyde Content: Zero.
 - 3. Thermal Resistance: R-value of 21, 30, 38, 49 as indicated in Drawings.
 - 4. Thickness: varies inch.
 - 5. Facing: Asphalt treated Kraft paper, one side.
- B. Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
 - 3. Provide foil facing on one side, at locations indicated on drawings.

4. Products:
 - a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
 - b. Knauf Insulation; EcoBatt Insulation: www.knaufinsulation.com/#sle.
 - c. ROCKWOOL; COMFORTBATT: www.rockwool.com/#sle.
 - d. Substitutions: See Section 01-6000 - Product Requirements.

2.04 ACCESSORIES

- A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 2. Width: As required for application.
- B. Self-Adhered Transition Flashing: Multipurpose, self-adhered flashing with modified butyl adhesive, polyester fiber top sheet, and polypropylene interlayer.
 1. Application: Primerless adhesion for use as through-wall flashings and wall transitions to roof and below-grade systems.
 2. Thickness: 45 mil, 0.045 inch, nominal.
 3. Size: 6 inches wide, in rolls 75 feet long.
- C. Flashing Tape: Special reinforced film with high performance adhesive.
 1. Application: Window and door opening flashing tape.
 2. Width: As required for application.
 3. Primer: Tape manufacturer's recommended product.
- D. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
 1. Width: 5-1/2 inches.
 2. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 30 days of weather exposure.
- E. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
- F. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- G. Insulation Fasteners: Appropriate for purpose intended.
- H. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- I. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
 1. Three continuous beads per board length.
 2. Full bed 1/8 inch thick.

- B. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION - MISCELLANEOUS

- A. Install board insulation at wood framed header assemblies to fill all voids in framing.

3.04 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.
- F. Tape seal tears or cuts in vapor retarder.
- G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

3.05 FIELD QUALITY CONTROL

- A. See Section 01-4000 - Quality Requirements for additional requirements.
- B. Coordination of Air Barrier Association of America (ABAA) Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA Quality Assurance Program (QAP).
 - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.

3.06 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

**SECTION 07-2126
BLOWN INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ceiling and Attic: Blown insulation pneumatically placed into joist spaces through access holes.
 - 1. Work is primarily restorative, to restore existing disturbed insulation in existing ceiling cavities to maintain uniform level of existing insulation.
- B. Refer to overhang Detail Drawings for location

1.02 REFERENCE STANDARDS

- A. ASTM C1015 - Standard Practice for Installation of Cellulosic and Mineral Fiber Loose-Fill Thermal Insulation 2017.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and limitations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Applications: Provide blown insulation in attic, ceiling, and overhangs as indicated on drawings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install insulation in accordance with ASTM C1015 and manufacturer's instructions.
- B. Place insulation pneumatically to completely fill joist and rafter spaces.
- C. Pour insulation to completely fill joist and rafter spaces.
- D. Completely fill intended spaces leaving no gaps or voids.

3.02 CLEANING

- A. Remove loose insulation residue.

END OF SECTION

BLANK PAGE

**SECTION 07-2500
WEATHER BARRIERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.
- C. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

- A. Section 03-3000 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 06-1000 - Rough Carpentry: Water-resistive barrier under exterior cladding.
- C. Section 07-2100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
- D. Section 07-5400 - Thermoplastic Membrane Roofing: Vapor retarder installed as part of roofing system.
- E. Section 07-9005 - Joint Sealers: Sealant materials and installation techniques.

1.03 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.

1.04 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- B. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a.
- C. ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers 2016, with Editorial Revision (2019).

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
- B. Air Barrier:
- C. Interior Vapor Retarder:
 - 1. On inside face of studs of exterior walls, under cladding, use mechanically fastened vapor retarder sheet.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Self-Adhered Water Resistant Air Barrier Membrane:
 - 1. Water Vapor Permeance: 29 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 - 2. Dry Film Thickness: 28 mils (0.028 inch), minimum.
 - 3. Criteria for Water Resistance Barriers: Pass, when tested in accordance with ICC - ES AC38.
 - 4. Water Penetration around Nails: Pass, when tested in accordance with AAMA 711-05 and modified ASTM D 1970.
 - 5. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
 - 6. Manufacturers:
 - a. Henry Company Blueskin VP 160..
 - b. Substitutions: See Section 01-6000 - Product Requirements.

2.03 SELF-ADHERING FLASHING

- A. Manufacturer and Product:
 - 1. W.R. Grace Construction Products "Perm-A-Barrier".
 - 2. Henry Company, Blueskin SA.
 - 3. Substitutions: See Section 01-6000 - Product Requirements.
- B. Materials: Rubberized asphalt and polyethylene. 40 mils thickness.
- C. Location: Around all wall openings and where noted on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water but with seams not sealed.
- C. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- E. Self-Adhered Sheets:
 - 1. All surfaces to receive membrane must be dry and clean of oil, dust, fronts, bulk water and other contaminants that would be detrimental to adhesion of membrane. Approved adhesive -primer to be applied as recommended by Membrane manufacturer. Primer required for applications below 40 degrees, not required above 40 degrees temperature.
 - 2. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
 - 3. Lap sheets shingle-fashion to shed water and seal laps air tight.
 - 4. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
 - 5. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
 - 6. At wide joints, provide extra flexible membrane allowing joint movement.
- F. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 4. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 5. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
 - 6. Refer to Drawings for additional placement requirements, and coordination placement with metal flashings.

3.04 FIELD QUALITY CONTROL

- A. See Section 01-4000 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 - 1. Provide testing and inspection required by ABAA QAP.
 - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 - 3. Cooperate with ABAA testing agency.
 - 4. Allow access to air barrier work areas and staging.
 - 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Do not cover installed weather barriers or vapor retarders until inspections have been completed.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

**SECTION 07-4623
WOOD SIDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Panel siding for walls.
 - 1. Located at patch back exterior wall areas only.
- B. Trim, flashings, accessories, and fastenings.

1.02 RELATED REQUIREMENTS

- A. Section 06-2000 - Finish Carpentry: Exterior wood trim at windows.
- B. Section 07-2500 - Weather Barriers: Weather barrier under siding.
- C. Section 07-6200 - Sheet Metal Flashing and Trim: Product requirements for metal flashings and trim associated with wood siding for placement by this section.

1.03 REFERENCE STANDARDS

- A. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2018.

PART 2 PRODUCTS

2.01 SIDING

- A. Plywood Specified by APA PRP-108 Grade or Type: Labeled by APA certified grading agency.
- B. Panel Siding: APA B840 Rated Siding 303-6-S/W, exterior exposure class, panel style.
 - 1. Panel Size: 48 inch by 96 inch size sheet, 19/32 inch thick.
 - 2. Texture/Pattern: APA B840 Texture 1-11.
 - a. Match existing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready to receive work.
- B. Verify that water-resistive barrier has been correctly and completely installed over substrate.
- C. Do not begin until unacceptable conditions have been corrected.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Fasten siding in place, level and plumb.
 - 1. Arrange for orderly nailing pattern, blind nail except over trim.
 - 2. Install siding for natural shed of water.
 - 3. Position cut ends over bearing surfaces, and sand cut edges smooth and clean.
- B. Sand work smooth and set exposed nails and screws.

3.03 TOLERANCES

- A. Maximum Variation From Plumb and Level: 1/4 inch per 10 feet.
- B. Maximum Offset From Joint Alignment: 1/16 inch.

END OF SECTION

**SECTION 07-4646
FIBER-CEMENT SIDING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fiber-cement siding.

1.02 RELATED REQUIREMENTS

- A. Section 07-2500 - Weather Barriers: Weather barrier under siding.

1.03 REFERENCE STANDARDS

- A. ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets 2022.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.

PART 2 PRODUCTS

2.01 FIBER-CEMENT SIDING

- A. Panel Siding: Vertically oriented panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 - 1. Texture: Smooth.
 - 2. Length (Height): 96 inches, nominal.
 - 3. Width: 48 inches.
 - 4. Thickness: 5/16 inch, nominal.
 - 5. Finish: Factory applied primer.
 - 6. Warranty: 50 year limited; transferable.
 - 7. Products:
 - a. James Hardie Building Products, Inc: www.jameshardie.com/#sle.
 - b. Substitutions: See Section 01-6000 - Product Requirements.

2.02 ACCESSORIES

- A. Trim: Same material and texture as siding.
- B. Fiber-Cement Siding Metal Trim: Extruded aluminum alloy 6063-T5 temper.
 - 1. Dimension and Layout: As indicated on drawings.

2. Finish: paint grade.
 3. Shapes: See Detail Drawings.
 4. Extruded Aluminum Shapes: ASTM B 221, 6063-T6 .050" +/- .005 "
 5. Manufacturers:
 - a. Basis of Design: EasyTrim® Reveals, Fiber Cement Panel System
www.easytrimreveals.com info@easytrimreveals.com 1-877-973-8746.
 - b. R.H. Tamlyn & Sons, LP 3623 Pike Road Stafford, TX 77477 Phone:
800-334-1676 Fax: 281-499-8948.
 - c. Substitutions: See Section 01-6000 - Product Requirements.
- C. Fasteners: Stainless Steel; length as required to penetrate minimum 1-1/4 inch.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Verify that weather barrier has been installed over substrate completely and correctly.
- C. Do not begin until unacceptable conditions have been corrected.
- D. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations.
 1. Read warranty and comply with terms necessary to maintain warranty coverage.
 2. Use trim details indicated on drawings.
 3. Touch up field cut edges before installing.
 4. Pre-drill nail holes if necessary to prevent breakage.
- B. Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- C. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- D. After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

3.03 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

**SECTION 07-5400
THERMOPLASTIC MEMBRANE ROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Mechanically attached system with thermoplastic roofing membrane.
- B. Adhered system with thermoplastic roofing membrane, in select locations, primarily vertical sidewall surfaces only.
- C. Insulation, flat and tapered.
- D. High Density Insulation/Cover Board.
- E. Roof Cover boards.
- F. Flashings, PVC coated.
- G. Expansion Joint Covers.
- H. Roofing cant strips, stack boots, roofing expansion joints, and walkway pads.
- I. Refer to **ROOF TYPE LEGEND**, found in Drawings, for listing of roof assemblies and respective component types and thicknesses.

1.02 RELATED REQUIREMENTS

- A. Section 01-2300 - Alternates: TPO in lieu of PVC.
- B. Section 06-1000 - Rough Carpentry: Wood nailers and curbs.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: gutters, flashings, copings, reglets, and other accessories, flashings as shown in Drawings.

1.03 REFERENCE STANDARDS

- A. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2022a.
- B. ASTM C1484 - Standard Specification for Vacuum Insulation Panels 2010 (Reapproved 2018).
- C. ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing 2021.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a.
- E. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.
- F. FM (AG) - FM Approval Guide current edition.
- G. FM DS 1-28 - Wind Design 2015, with Editorial Revision (2022).
- H. NRCA (RM) - The NRCA Roofing Manual 2022.

- I. NRCA (WM) - The NRCA Waterproofing Manual 2021.
- J. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.
- K. UL (DIR) - Online Certifications Directory Current Edition.
- L. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Specimen Warranty: For approval.
- D. Warranty Documentation:
 - 1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
 - 2. Submit installer's certification that installation complies with warranty conditions for waterproof membrane.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 90 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.07 WARRANTY

- A. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
 - 1. Warranty Term: 20 years, no dollar limit.
 - 2. For repair and replacement include costs of both material and labor in warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Thermoplastic Polyvinyl Chloride (PVC) Membrane Roofing Materials:
 - 1. Carlisle Roofing Systems, Inc: www.carlisle-syntec.com/#sle.
 - 2. Duro-Last Roofing, Inc. www.duro-last.com.
 - 3. IB Roof Systems: www.ibroof.com/#sle.
 - 4. Johns Manville: www.jm.com/#sle.
 - 5. Sika Corporation Roofing; Sarnafil PVC: usa.sarnafil.sika.com/#sle.
 - 6. Substitutions: See Section 01-6000 - Product Requirements.
- B. Insulation:
 - 1. Same manufacturer as above or as approved by roof membrane manufacture.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.

2.02 ROOFING - UNBALLASTED APPLICATIONS

- A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened over roof cover board (as scheduled), insulation, over vapor barrier.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
 - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
- C. Acceptable Insulation Types - Constant Thickness Application:
 - 1. Single layer of polyisocyanurate/cover board.
 - a. Location: Areas scheduled for roof insulation 1/2 inch thick.
 - 2. Minimum 2 layers of polyisocyanurate board.
 - a. Locations: Areas scheduled for roof insulation more than 1/2 inch thick.
- D. Acceptable Insulation Types - Tapered Application:
 - 1. Tapered polyisocyanurate board covered with uniform thickness glass fiber board.
 - 2. Uniform thickness polyisocyanurate board covered with tapered polyisocyanurate or extruded polystyrene board.

2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

- A. Membrane Roofing Materials:
 - 1. PVC: Polyvinyl chloride (PVC) complying with ASTM D4434/D4434M, Type II, sheet contains reinforcing fibers or reinforcing fabrics.
 - a. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Material: Polyvinyl chloride copolymer alloy, ethylene interpolymer, or acrylonitrile butadiene polymer complying with ASTM D4434/D4434M.
 - 3. Reinforcing: Internal fabric.
 - 4. Thickness: 0.060 inch, minimum.
 - 5. Sheet Width: Factory fabricated into largest sheets possible.
 - 6. Color: Gray.
- B. Seaming Materials: As recommended by membrane manufacturer, heat welded.
- C. Membrane Fasteners: As recommended and approved by membrane manufacturer.

- D. Flexible Flashing Material: Same material as membrane.
- E. PVC Coated Metal Flashing: Membrane manufacturer to provide coated metal for complete system. Refer to Detail Drawings.

2.04 ROOF COVER BOARD

- A. Deck Sheathing: Glass mat faced gypsum panels, ASTM C 1177/C 1177M, fire resistant type, 1/4 inch thick. "Densdeck" by G-P Gypsum or equivalent.
 - 1. Thickness: 1/4 inch and 1/2 inch, fire-resistant.
 - a. Locations: Refer to **ROOF TYPE LEGEND** in Drawings.
 - 2. Manufacturers:
 - a. Georgia-Pacific; DensDeck: www.densdeck.com/#sle.
 - b. National Gypsum Company; DEXcell Glass Mat Roof Board: www.nationalgypsum.com/#sle.
 - c. USG Corporation; Securock Ultralight Glass-Mat Roof Board: www.usg.com/#sle.
 - d. Substitutions: See Section 01-6000 - Product Requirements.

2.05 HIGH DENSITY POLYISO COVER BOARD

- A. Cover Board: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
- B. Polyisocyanurate (ISO) foam core with inorganic coated glass facers, complying with ASTM C1289.
 - 1. Thickness: 1/2 inch, fire-resistant.
 - 2. Compressive strength per ASTM D 1621: Grade 1 - 109 psi.
 - 3. Manufacturers:
 - a. Basis of Design: JM "Protector HD" High Density Polyiso Cover Board.
 - b. Equivalent manufacturers as approved by roof membrane manufacturers.
 - c. Substitutions: See Section 01-6000 - Product Requirements.

2.06 INSULATION

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 - 1. Classifications:
 - a. Type II:
 - 1) Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
 - 2. Board Size: 48 by 96 inch.
 - 3. Board Thickness: 1.0 inch, minimum.
 - 4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
 - 5. Board Edges: Square.
 - 6. Manufacturers:
 - a. Same as roof membrane manufacturers, or as approved by roofing manufacturer.
 - b. Substitutions: See Section 01-6000 - Product Requirements.

2.07 VAPOR BARRIER

- A. Air and Vapor Barrier Sheet, Self-Adhered, with Primer:
 - 1. Air Permeance: 0.001 L/s/m², maximum, when tested in accordance with ASTM E2178.
 - 2. Water Vapor Permeance: 0.03 perms, maximum, when tested in accordance with ASTM E96/E96M, Procedure B.
 - 3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 of weather exposure.
 - 4. Manufacturers:
 - a. Basis of Design: JM Vapor Barrier SA.
 - 1) Polyethylene-Reinforced, Self-Adhering SBS Vapor Barrier.
 - 2) 31.5 mil.
 - 3) Nonslip, UV-protected top surface.
 - 4) Self-sealing, SBS rubber and asphalt blend, 45 inch roll x 134 ft.
 - 5) Primer required, same manufacturer or approved by manufacturer.
 - b. Or approved by roofing manufacturer.
 - c. Substitutions: See Section 01-6000 - Product Requirements.

2.08 ACCESSORIES

- A. Prefabricated Roofing Expansion Joint Flashing: Flexible rubber membrane over closed-cell foam backing seamed to galvanized steel flanges.
 - 1. Product, Basis of Design: Expand-O-Flash Expansion Joint Cover manufactured by Johns Manville.
 - 2. Equivalent brand and model by roofing manufacturer.
 - 3. Substitutions: See Section 01-6000 - Product Requirements.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Cant and Edge Strips: Wood fiberboard, compatible with roofing materials; cants formed to 45 degree angle.
- D. Fasteners: Appropriate for purpose intended and approved by Factory Mutual and roofing manufacturer.
- E. Membrane Adhesive: As recommended by membrane manufacturer.
- F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
- G. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
 - 1. Composition: Roofing membrane manufacturer's standard.
 - 2. Locate around all mechanical equipment on roof, all four sides, and as indicated in Drawings.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

- B. Do not apply roofing membrane during unsuitable weather.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.02 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.03 INSTALLATION - GENERAL

- A. Refer to **ROOF TYPE LEGEND**, found in Drawings, for listing of roof assemblies and respective component types and thicknesses.
- B. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- C. Do not apply roofing membrane during unsuitable weather.
- D. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- E. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- F. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.04 VAPOR BARRIER, INSULATION & ROOF COVER BOARD

- A. Apply primer on deck for vapor barrier installation, as required and instructed by manufacturer.
- B. Apply self-adhered vapor barrier to deck surface in accordance with manufacturer's instructions.
 - 1. Extend vapor barrier under cant strips and blocking to deck edge.
 - 2. Install flexible flashing from vapor barrier to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- C. Ensure vapor barrier is clean and dry, continuous, and ready for application of insulation.
- D. Attachment of Insulation:

1. Mechanically fasten first layer for distance of 6 inch from roof edge.
 2. Mechanically fasten subsequent layer of insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
 3. Use 5 fasteners per board, or as per manufacturer requirements, whichever is more stringent.
- E. Cover Board: Mechanically fasten cover boards, as scheduled, in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
- F. Lay with joints staggered. 24 inch minimum, or per manufacturers recommendations.
- G. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- H. Do not apply more sheathing than can be covered with membrane in same day.
- I. Apply roof cover board, as scheduled, immediately under membrane with fasteners in accordance with manufacturer's instructions.

3.05 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. All membrane sheets shall be overlapped a minimum of 6 inches to provide space for fastener and plate placement and for a continuous minimum 1-1/2 inch weld width.
- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- E. Mechanical Attachment: Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.
- F. Welding of Lap Areas:
 1. Welding by hot air welding only.
 2. All surfaces to be welded shall be clean and dry. No adhesive shall be present in the lap areas.
 3. Follow in strict accordance with manufacturer requirements.
 4. Test and check all seams for continuity and integrity. Check seams daily. Repair openings and "fishmouths" with hand-held hot air tool and narrow nozzle tip. Pull apart several sections of seams to test quality of the welds.
- G. At intersections with vertical surfaces:
 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- H. Around roof penetrations, seal flanges and flashings with flexible flashing.
- I. Install roofing expansion joints where indicated. Make joints watertight.
 1. Install prefabricated joint components in accordance with manufacturer's instructions.
- J. Coordinate installation of roof drains and sumps and related flashings.

3.06 FIELD QUALITY CONTROL

- A. Provide periodic on-site attendance of roofing and insulation manufacturer's representative during installation of this work.

3.07 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.08 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

**SECTION 07-5423
THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Same as Section 07-5400.

1.02 RELATED REQUIREMENTS

- A. Section 01-2300 Alternates: TPO membrane in lieu of PVC.
- B. Section 07-5400 - Thermoplastic Membrane Roofing (PVC).
- C. Section 07-6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets and and other accessories, flashings as shown in Drawings..

1.03 REFERENCE STANDARDS

- A. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing 2021.
- B. NRCA (RM) - The NRCA Roofing Manual 2022.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Carlisle SynTec Systems: www.carlisle-syntec.com/#sle.
- B. Duro-Last Roofing, Inc.www.duro-last.com.
- C. IB Roof Systems: www.ibroof.com/#sle.
- D. Johns Manville: www.jm.com/#sle.
- E. Sika Corporation Roofing; Sarnafil PVC: usa.sarnafil.sika.com/#sle.
- F. Substitutions: See Section 01-6000 - Product Requirements.

2.02 ROOFING APPLICATIONS

- A. TPO Membrane Roofing: One ply membrane, mechanically fastened, over insulation.
- B. Roofing Assembly Performance Requirements and Design Criteria:

1. Refer to Section 07-5400.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane:
 1. Material: Thermoplastic Polyolefin (TPO) complying with ASTM D6878/D6878M.
 2. Products:
 - a. Basis of Design: JM TPO - 60 Mil.
 - 1) Color: Grey.
 - 2) Elongation at break: 27%, ASTM D751.
 - 3) Tearing strength: 92 lbs, ASTM D751.
 - 4) Factory seam strength: 112 lbs, ASTM D751.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended and approved by membrane manufacturer.
- D. Flexible Flashing Material: Same material as membrane.
- E. Base Flashing: Provide waterproof, fully adhered base flashing system at all penetrations, plane transitions, and terminations.

2.04 INSULATION

- A. Refer to Section 07-5400.

2.05 AIR BARRIER MATERIALS (AIR AND VAPOR BARRIER)

- A. Refer to Section 07-5400.

2.06 ACCESSORIES

- A. Refer to Section 07-5400.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Refer to Section 07-5400.
- B. Verify that surfaces and site conditions are ready to receive work.
- C. Verify deck is supported and secure.
- D. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- E. Verify deck surfaces are dry and free of snow or ice.
- F. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

3.02 PREPARATION, GENERAL

- A. Refer to Section 07-5400.

- B. Clean substrate thoroughly prior to roof application.
- C. Do not begin work until other work that requires foot or equipment traffic on roof is complete.

3.03 INSTALLATION - GENERAL

- A. Refer to Section 07-5400.
- B. Perform work in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- C. Do not apply roofing membrane during unsuitable weather.
- D. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- E. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- F. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.04 VAPOR BARRIER, INSULATION & ROOF COVER BOARD APPLICATION

- A. Refer to Section 07-5400.
- B. Do not apply more insulation than can be completely waterproofed in the same day.

3.05 MEMBRANE APPLICATION

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Seam Welding:
 - 1. Seam Welding: Overlap edges and ends and seal seams by heat welding, minimum 2 inches.
 - 2. Cover seams with manufacturer's recommended joint covers.
 - 3. Probe seams once welds have thoroughly cooled, in approximately 30 minutes.
 - 4. Repair deficient seams within the same day.
 - 5. Seal cut edges of reinforced membrane after seam probe is complete.
- D. Mechanical Attachment:
 - 1. Apply membrane and mechanical attachment devices in accordance with manufacturer's instructions.
- E. At intersections with vertical surfaces:
 - 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Coordinate installation of roof drains and sumps and related flashings. Locate all field splices away from low areas and roof drains. Lap upslope sheet over downslope sheet.
- G. Daily Seal: Install daily seal per manufacturers instructions at the end of each work day. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.
- H. Refer to Section 07-5400.

3.06 CLEANING

- A. Remove bituminous markings from finished surfaces.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- C. Repair or replace defaced or damaged finishes caused by work of this section.

3.07 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

**SECTION 07-6200
SHEET METAL FLASHING AND TRIM**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Wood nailers for sheet metal work.
- B. Section 07-5400-Thermoplastic Membrane Roofing: Roofing system.
- C. Section 07-9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- F. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- G. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- H. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- I. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- J. CDA A4050 - Copper in Architecture - Handbook current edition.
- K. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A 653/A 653M, with G90/Z275 zinc coating; minimum 0.02 inch (24 gauge) thick base metal, shop pre-coated with modified silicone coating.
 - 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
 - 2. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
- B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gage, (0.0156 inch) thick; smooth No. 4 - Brushed finish.

2.02 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- E. Sealant to be Exposed in Completed Work: $\{\rs\#1\}$; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- F. Sealant: Type 1 specified in Section 07-9005.
- G. Plastic Cement: $\{\rs\#1\}$, Type I.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing edge. Return and brake edges.

2.04 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size indicated.
- D. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Brackets.
 - 3. Downspout Supports: Brackets.
- E. Downspout Boots: Plastic.
- F. Seal metal joints.

PART 3 EXECUTION

3.01 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.02 INSTALLATION

- A. Comply with drawing details.
- B. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

- E. Seal metal joints watertight.
- F. Secure gutters and downspouts in place with concealed fasteners.
- G. Slope gutters 1/8 inch per foot minimum.
- H. Connect downspouts to downspout boots, and grout connection watertight.

3.03 FIELD QUALITY CONTROL

- A. See Section 01-4000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

**SECTION 07-7200
ROOF ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof hatches.
- B. Gravity vents for vented attics.

1.02 RELATED REQUIREMENTS

- A. Section 07-6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

PART 2 PRODUCTS

2.01 ATTIC VENTS, CURB MOUNTED

- A. Curb mounted gravity vents for vented attics. See Roof Plan for locations.
 - 1. Manufacturers:
 - a. Greenheck.
 - b. Substitutions: See Section 01-6000-Product Requirements.
 - 2. Model: Greenheck Model FGI , insect screen, curb mounted.
 - 3. Sizes, refer to Drawings:
 - a. 18 x 18 inch.
 - b. 20 x 24 inch.

2.02 ROOF HATCHES AND VENTS, MANUAL AND AUTOMATIC OPERATION

- A. Roof Hatch Manufacturers:
 - 1. Bilco Company; Type TB (various types and special size): www.bilco.com/#sle.
 - 2. Dur-Red Products: www.dur-red.com/#sle.
 - 3. Milcor, Inc: www.milcorinc.com/#sle.
 - 4. Substitutions: See Section 01-6000 - Product Requirements.

- B. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
 - 1. Material: Mill finished aluminum, 11 gage, 0.0907 inch thick.
 - 2. Insulation: Manufacturer's standard; 1 inch rigid glass fiber, located on outside face of curb.
 - 3. Curb Height: 10 inches from finished surface of roof, minimum. Shim under manufacturers curb as required to adjust for depth of roof insulation.

- C. Hardware: Type 316 stainless steel, unless otherwise indicated or required by manufacturer.
 - 1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf load.
 - 2. Hinges: Heavy duty pintle type.
 - 3. Hold open arm with vinyl-coated handle for manual release.
 - 4. Latch: Upon closing, engage latch automatically and reset manual release.
 - 5. Manual Release: Pull handle on interior.
 - 6. Locking: Padlock hasp on interior.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.
- B. Construct curb as noted in Detail Drawings. Curb to be 10 inches above roof membrane, confirm depth of roof insulation prior to completion of curb.

3.04 PROTECTION

- A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

BLANK PAGE

**SECTION 07-8400
FIRESTOPPING**

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09-2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.02 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.03 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Manufacturers:
 - 1. A/D Fire Protection Systems Inc.: www.adfire.com.
 - 2. 3M Fire Protection Products: www.3m.com/firestop.
 - 3. Hilti, Inc: www.us.hilti.com/#sle.
 - 4. Nelson FireStop Products: www.nelsonfirestop.com.
 - 5. Specified Technologies, Inc.: www.stifirestop.com.
 - 6. Substitutions: See Section 01-6000 - Product Requirements.
- B. Firestopping Materials: Any materials meeting requirements.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.

- B. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

- A. Gypsum Board Walls:
 - 1. Wall to Wall Joints That Have Movement Capabilities (Dynamic):
 - a. 2 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
 - b. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.

2.04 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - 2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

2.05 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: See drawings for required systems and ratings.
 - 2. Color match based on fire rating.

2.06 MATERIALS

- A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by Owner's Independent Testing Agency.
- C. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

BLANK PAGE

**SECTION 07-9005
JOINT SEALERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

- A. Section 07-2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
- B. Section 09-2116 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants 2017.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- D. SCAQMD 1168 - Adhesive and Sealant Applications 1989, with Amendment (2022).
- E. ASTM C 1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Joint Sealants.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum three years experience.

1.07 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.01 SEALANTS

- A. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
 - 1. Color: color as selected.
 - 2. Product: Sonolastic NP-1 manufactured by BASF.
 - 3. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Joints at wood siding and trim as indicated.
 - e. Other exterior joints for which no other sealant is indicated.
 - 4. Test Data:
 - a. Movement capability, % - +100 to -50.
 - b. Tensile strength - 250 psi.
 - c. Ultimate elongation at break, % - 1000.
 - d. Hardness, Shore A - passes 25 - 30.

- B. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 - 1. Color: Match adjacent finished surfaces.
 - 2. Product: Sonalac manufactured by BASF.
 - 3. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.

2.02 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056 sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.

- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
 - 1. Width/depth ratio of 2:1.
 - 2. Neck dimension no greater than 1/3 of the joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- E. Install bond breaker where joint backing is not used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect sealants until cured.

3.06 SCHEDULE

- A. Exterior Joints for Which No Other Sealant Type is Indicated: Type 1 ; colors as shown on drawings.
- B. Interior Joints for Which No Other Sealant is Indicated: Type 2; colors as shown on the drawings.

END OF SECTION

BLANK PAGE

**SECTION 07-9513
EXPANSION JOINT COVER ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint cover assemblies for wall and ceiling surfaces.

1.02 RELATED REQUIREMENTS

- A. Section 07-6200 - Sheet Metal Flashing and Trim: Roof expansion and control joint covers.

1.03 REFERENCE STANDARDS

- A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Expansion Joint Cover Assemblies:
 - 1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
 - 2. Inpro: www.inprocorp.com/#sle.
 - 3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS

- A. Interior Non-Fire-Rated Wall/Ceiling Joints Subject to Seismic Movement:
 - 1. Manufacturers:
 - a. Construction Specialties, Inc; FWF: www.c-sgroup.com/#sle.
 - b. Substitutions: See Section 01-6000 - Product Requirements.
- B. Exterior Wall Joints Subject to Seismic Movement:
 - 1. Manufacturers:
 - a. Construction Specialties, Inc; Exterior Wall Covers: www.c-sgroup.com/#sle.
 - 1) AFW-X Series.
 - b. Substitutions: See Section 01-6000 - Product Requirements.

2.03 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
 - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.
- B. Verify that frames and anchors installed by others are in correct locations and suitable for installation of remainder of assembly.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

END OF SECTION

**SECTION 08-1113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated hollow metal doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Hollow metal borrowed lites glazing frames.

1.02 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
 - 2. Republic Doors: www.republicdoor.com.
 - 3. Steelcraft, an Allegion brand: www.allegion.com/#sle.
 - 4. Steelcraft: www.steelcraft.com.
 - 5. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 3. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 4. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.
 5. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 2. Door Core Material: Polystyrene, 1 lbs/cu ft minimum density.
 - a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
 3. Door Thermal Resistance: R-Value of 6.0 minimum, for installed thickness of polystyrene, or code minimum, whichever is highest, most stringent.
 4. Door Thickness: 1-3/4 inch, nominal.
 5. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvanized) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
 6. Weatherstripping: Refer to Section 08-7100.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI A250.8 - SDI-100, Level 1 Door Frames: 16 gage, 0.053 inch, minimum thickness.

- b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 - SDI-100, Level 1, 16 gage, 0.053 inch
 - 2. Finish: Same as for door.
- C. Exterior Door Frames: Face welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 3. Weatherstripping: Separate, see Section 08-7100.
- D. Interior Door Frames, Non-Fire Rated: Face welded type.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- E. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- F. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Louvers: Roll formed steel with overlapping frame; finish same as door components ; factory-installed.
 - 1. Style: Standard straight slat blade.
- B. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: As indicated on drawings.
 - 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
 - 3. Metal Finish: Gray polyester powder coating.
 - 4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- C. Glazing: As specified in Section 08-8000, factory installed.
- D. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- E. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- F. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.07 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Install door hardware as specified in Section 08-7100.
- D. Touch up damaged factory finishes.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.05 SCHEDULE

- A. Refer to Door Schedule on the Drawings.

END OF SECTION

**SECTION 08-1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, acoustical, and special function.

1.02 RELATED REQUIREMENTS

- A. Section 08-1113 - Hollow Metal Doors and Frames.
- B. Section 08-7100 - Door Hardware.
- C. Section 08-8000 - Glazing.
- D. Section 09-9000 - Painting and Coating.

1.03 REFERENCE STANDARDS

- A. ICC (IBC) - International Building Code; 2012.
- B. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- C. WDMA I.S. 1A - Interior Architectural Wood Flush Doors 2021, with Errata.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Samples: Submit two samples of door veneer, 12 by 12 inch in size illustrating wood grain, stain color, and sheen.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
- B. Wood Veneer Faced Doors:
 - 1. Graham Wood Doors: www.grahamdoors.com.
 - 2. Eggers Industries: www.eggersindustries.com/#sle.
 - 3. Haley Brothers: www.haleybros.com/#sle.
 - 4. Marshfield Door Systems, Inc: www.marshfielddoors.com.
 - 5. VT Industries, Inc: www.vtindustries.com.
 - 6. Oregon Door: www.oregondoor.com.
 - 7. Lynden Door: www.lyndendoor.com.
 - 8. Substitutions: See Section 01-6000 - Product Requirements.

2.02 DOORS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Wood veneer facing for field transparent finish as indicated on drawings.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
- C. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Natural birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with slip match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

2.05 ACCESSORIES

- A. Metal Louvers:
 - 1. Material and Finish: Roll formed steel; pre-painted finish to color as selected.
- B. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

2.06 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

2.07 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
- B. Factory finish doors in accordance with specified quality standard:
 - 1. Transparent Finish: Transparent conversion varnish, Premium quality, high gloss sheen.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.
- B. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches surface area.
- B. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches surface area.
- C. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches surface area.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.05 SCHEDULE

- A. Refer to Door Schedule in the Drawings and Hardware Schedule in Section 08-7100.

END OF SECTION

**SECTION 08-5313
VINYL WINDOWS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vinyl-framed, factory-glazed windows.
- B. Factory fabricated tubular extruded plastic windows with fixed and operating sash.
- C. Factory glazed including infill panels.
- D. Operating hardware.
- E. Insect screens.

1.02 RELATED REQUIREMENTS

- A. Section 07-9005 - Joint Sealers: Perimeter sealant and back-up materials.
- B. Section 08-8000 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2017.
- B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- C. FS L-S-125 - Screening, Insect, Nonmetallic; Federal Specifications and Standards; Revision B, 1972.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, anchors, fasteners, glass, and internal drainage.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, and installation requirements.
- D. Grade Substantiation: Prior to submitting shop drawings or starting fabrication, submit one of the following showing compliance with specified grade:
 - 1. Evidence of AAMA Certification.
 - 2. Evidence of WDMA Certification.
 - 3. Evidence of CSA Certification.
 - 4. Test report(s) by independent testing agency itemizing compliance and acceptable to authorities having jurisdiction.

- E. Test Reports: Prior to submitting shop drawings or starting fabrication, submit test report(s) by independent testing agency showing compliance with performance requirements in excess of those prescribed by specified grade.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Vinyl Windows:
 - 1. JeldWen Premium Vinyl Windows, V-4500 Series.
 - 2. Milgard Style Line, Tuscany Series.
 - 3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 DESCRIPTION

- A. Vinyl Windows: Factory fabricated frame and sash members of extruded, hollow, ultra-violet-resistant, polyvinyl chloride (PVC) with integral color; with factory-installed glazing, hardware, related flashings, anchorage and attachment devices.
 - 1. Configuration: As indicated on drawings.
 - a. Product Type: C - Casement window and FW - Fixed window in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.
 - 2. Color: White.
 - 3. Size to fit openings with minimum clearance around perimeter of assembly providing necessary space for perimeter seals.
 - 4. Framing Members: Fusion welded corners and joints, with internal reinforcement where required for structural rigidity; concealed fasteners.
 - 5. System Internal Drainage: Drain to exterior side by means of weep drainage network any water entering joints, condensation within glazing channel, or other migrating moisture within system.
 - 6. Glazing Stops, Trim, Flashings, and Accessory Pieces: Formed of rigid PVC, fitting tightly into frame assembly.
- B. Performance Requirements: Provide products that comply with the following:
 - 1. Grade: AAMA/WDMA/CSA 101/I.S.2/A440 requirements for specific window type:
 - a. Performance Class (PC): R.
 - 2. Performance Validation: Windows shall comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements as indicated by having AAMA, WDMA, or CSA certified label, or an independent test report for indicated products itemizing compliance and acceptable by authorities having jurisdiction.

2.03 PERFORMANCE REQUIREMENTS

- A. Design Pressure: In accordance with applicable codes.
- B. Condensation Resistance Factor: CRF of 50, minimum, the lower value of the glass and frame window components and determined in accordance with AAMA 1503.
- C. Overall Thermal Transmittance (U-value): 0.35, maximum, including glazing, measured on window sizes required for this project.

2.04 COMPONENTS

- A. Glazing: Insulated double pane, annealed glass, clear, low-E coated, argon filled, with glass thicknesses as recommended by manufacturer for specified wind conditions and acoustic rating indicated.
- B. Windows: Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
 - 1. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440 R15.
 - 2. Configuration: Fixed, non-operable, outward opening, top hinged, horizontal sliding, and double hung sash.
 - 3. Color: White.
- C. Frames: Standard profile; flush glass stops of screw fastened type.
- D. Insect Screen Frame: Rolled aluminum frame of rectangular sections; fit with adjustable hardware; nominal size similar to operable glazed unit.
- E. Insect Screens: Woven aluminum mesh; 14/18 mesh size.
 - 1. Color: Black.

2.05 GLASS AND GLAZING MATERIALS

2.06 HARDWARE

- A. Horizontal Sliding Sash: Rigid PVC interfacing tracks with dual brass wheel and stainless steel axle assembly housing, provide two sets for each operating sash and opening stops in head and sill track as required.
- B. Vertical Sliding Sash: Metal and nylon spiral friction slide cylinder, provide two for each sash and jamb.
- C. Sash lock: Lever handle and keeper with cam lock, provide at least one for each operating sash.
- D. Finish For Exposed Hardware: Stainless Steel.

2.07 FABRICATION

- A. Fabricate framing, mullions and sash members with fusion welded corners and joints, in a rigid jig. Supplement frame sections with internal reinforcement where required for structural rigidity.
- B. Form snap-in glass stops, closure molds, weather stops, and flashings of extruded PVC for tight fit into window frame section.
- C. Arrange fasteners to be concealed from view.
- D. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.
- E. Factory glaze window units.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install window unit assemblies in accordance with manufacturers instructions and applicable building codes.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities as necessary.
- C. Align window plumb and level, free of warp or twist, and maintain dimensional tolerances and alignment with adjacent work.

3.02 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.03 CLEANING

- A. Remove protective material from pre-finished surfaces.
- B. Wash surfaces by method recommended and acceptable to window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess glazing sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer and appropriate for application indicated.

END OF SECTION

**SECTION 08-6300
METAL-FRAMED SKYLIGHTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum skylight framing system.
- B. Skylight glazing.
- C. Fasteners, anchors, reinforcement, and flashings.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Wood support curbs.

1.03 REFERENCE STANDARDS

- A. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure 2017.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- I. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants 2018 (Reapproved 2022).
- J. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- K. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2006a (Reapproved 2013).
- L. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014 (Reapproved 2021).

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's specifications, standard details, and installation requirements.
- C. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations.
- D. Structural Glazing Adhesive: Submit product data and calculations showing compliance with performance requirements.
- E. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Provide wrapping to protect prefinished aluminum surfaces. Do not use adhesive papers or spray coatings that bond when exposed to sunlight or weather.

1.06 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.07 WARRANTY

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work, including leaks, discoloration, failure of seal at insulated glazing units, and excessive thermal or structural movement, within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal-Framed Skylights:
 - 1. Velux America, Inc: www.veluxusa.com/#sle.
 - a. Brad R. Glauser CSI NFRC-A.C.E. | Partner
 - b. EDIFY STUDIOS
 - c. C: 206-786-9657 | E: bglauser@edify-studios.com | W: www.edify-studios.com
 - 2. Substitutions: See Section 01-6000 - Product Requirements.

2.02 METAL-FRAMED SKYLIGHTS

- A. Metal Framed Skylights: Factory-fabricated, and glazed.
 - 1. Basis of Design: Wasco, part of Velux, "Classic Square Pyramid", C_PY, with center rafter.
 - a. Size: 8'-0" x 8'-0" outside dimension, curb to curb.
 - b. Slope: standard 5/12.
 - 2. Frame: Extruded aluminum structural members with integral condensation collection and guttering system thermally separated from exterior pressure bar.

3. Glazing System: Pressure glazing bar system for sloped joints and two (2)-sided structural sealant glazing (SSG) for horizontal joints.
4. Glazing: Insulating glass, manufacturers standard 1 inch nominal overall thickness.
 - a. Clear low e.
 - b. Standard SunGuard 68 glass.
5. Aluminum Finish: Manufacturers standard mill finish.
6. Fabricate to prevent vibration harmonics, thermal movement transmitted to other building elements, and loosening, weakening, or fracturing of attachments or components of system.

2.03 PERFORMANCE REQUIREMENTS

- A. Provide metal-framed skylights that comply with the following:
 1. Structural Design: Design and size components to withstand dead loads and specified live loads without damage or permanent set.
 2. Wind Loads: Test in accordance with ASTM E330/E330M, using loads 1.5 times the specified design pressures and 10 second duration of maximum load.
 3. Design Pressure (DP): In accordance with applicable codes.
 4. Glazing Support Member Deflection Under Wind Load: 1/180 of span, maximum.
 5. Structural Glazing Adhesive: Design system to limit stress on structural glazing adhesive to 20 percent of tested tensile adhesion and maximum compression or elongation to 25 percent of neutral dimension.

2.04 MATERIALS

- A. Aluminum Extrusions: Alloy and temper 6063-T5, 6063-T6, or 6061-T6 members complying with ASTM B221 (ASTM B221M), with minimum thickness 1/8 inch for structural members and 1/16 inch for non-structural members.
- B. Internal Reinforcement: ASTM A36/A36M Steel shapes as required for strength and mullion size limitations, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
- C. Structural Glazing Adhesive: Silicone, ASTM C920, Class 25, Grade NS, neutral cure; maximum hardness of 40, when tested in accordance with ASTM D2240 using Type A durometer; minimum tensile strength of 250 psi, when tested in accordance with ASTM D412.
- D. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
- E. Touch-Up Primer for Galvanized Steel Surfaces: Zinc rich type.

2.05 FABRICATION

- A. Rigidly fit and secure joints and corners with screw and spline; fabricate rigid joints with connections that are flush, hairline, and weatherproof.
- B. Fabricate components to allow for expansion and contraction with minimum clearance and shim spacing around perimeter of assembly.
- C. Drain to exterior any water entering exterior joints, condensation occurring in glazing channels, or migrating moisture occurring within system.
- D. Prepare components to receive concealed anchorage devices, and ensure that fasteners will be concealed upon completion of installation.
- E. Adhere glass to glazing frames with structural adhesive and cure under controlled conditions in shop. Field glazing of frames to glass is not acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that structural curb is ready to receive skylight system. Coordinate installation of roofing and other adjacent work to ensure weathertight construction.

3.02 INSTALLATION

- A. Install metal-framed skylights in accordance with manufacturer's instructions.
- B. Set skylight structure plumb, level, and true to line, without warp or rack of frames or glazing panels. Anchor securely in place in accordance with approved shop drawings.
- C. Maintain assembly dimensional tolerances, aligning with adjacent work.
- D. Install base flashings in accordance with Section 07-6200.
- E. Touch up damaged finishes so repair is imperceptible from 6 feet distance, and remove and replace components that cannot be acceptably touched up.

3.03 TOLERANCES

- A. Maximum Variation from Plumb, Level, or Line: 1/8 inch per 10 feet, or 3/8 inch total in overall dimension.
- B. Alignment of Two Adjoining Members Abutting in Plane: Within 1/16 inches.

3.04 FIELD QUALITY CONTROL

- A. Water-Spray Test: Provide water spray quality test of installed metal-framed skylight components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
- B. Repair or replace metal-framed skylight components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down exposed surfaces; wipe surfaces clean.
- C. Remove excess sealant by methods recommended by skylight manufacturer.

END OF SECTION

**SECTION 08-7100
DOOR HARDWARE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Lock cylinders for doors that hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

- A. Section 08-1416 - Flush Wood Doors.

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- B. BHMA A156.1 - Standard for Butts and Hinges 2021.
- C. BHMA A156.2 - Bored and Preassembled Locks and Latches 2017.
- D. BHMA A156.3 - Exit Devices 2020.
- E. BHMA A156.4 - Door Controls - Closers 2019.
- F. BHMA A156.6 - Standard for Architectural Door Trim 2021.
- G. BHMA A156.7 - Template Hinge Dimensions 2016.
- H. BHMA A156.8 - Door Controls - Overhead Stops and Holders 2021.
- I. BHMA A156.13 - Mortise Locks & Latches Series 1000 2017.
- J. BHMA A156.15 - Release Devices - Closer Holder, Electromagnetic and Electromechanical 2021.
- K. BHMA A156.17 - Self Closing Hinges & Pivots 2019.
- L. BHMA A156.18 - Materials and Finishes 2020.
- M. BHMA A156.21 - Thresholds 2019.
- N. BHMA A156.22 - Standard for Gasketing 2021.
- O. BHMA A156.31 - Electric Strikes and Frame Mounted Actuators 2019.

- P. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames 2016.
- Q. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames 2006.
- R. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames 2004.
- S. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors 1993; also in WDHS-1/WDHS-5 Series, 1996.
- T. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
- U. NFPA 101 - Life Safety Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- V. UL (DIR) - Online Certifications Directory Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Shop Drawings:
 1. Indicate locations and mounting heights of each type of hardware, schedules, catalog cuts, electrical characteristics and connection requirements .
 2. Submit manufacturer's parts lists and templates.
- D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- E. Keying Schedule: Submit for approval of Owner.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

PART 2 PRODUCTS

- A. Allegion Brands, lves: www.allegion.com/us.
- B. Assa Abloy Brands, Corbin Russwin: www.assaabloydss.com.

2.02 DOOR HARDWARE - GENERAL

- A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Fire-Rated Doors: NFPA 80.
 - 3. Hardware on Fire-Rated Doors, Except Hinges: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
 - 4. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
 - 5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
- E. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- F. Finishes: Provide door hardware of the same finish unless otherwise indicated.
 - 1. Primary Interior Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
 - a. Location: Interior doors.
 - 2. Primary Exterior Finish: Stainless steel, satin, 630.
 - a. Location: Exterior doors.
 - 3. Finish Definitions: BHMA A156.18.
 - 4. Exceptions:
 - a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
 - b. Hinges for Fire-Rated Doors: Steel base metal with painted finish.

2.03 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
 - 1. If no hardware set is indicated for a swinging door provide an office lockset.
 - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
 - 3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
 - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Keyed in like-groups.
 - 1. Key to existing keying system.
 - 2. When providing keying information, comply with DHI Handbook "Keying systems and nomenclature".

- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".
- E. Privacy Latchset - Mortise Style;
 1. Basis of Design: L9496 Px17A by Schlage.
 2. Privacy lock with ADA thumbturn and "vacant/occupied" indicator.

2.04 HINGES

- A. Hinges - Basis of Design: FBB179 or FBB199, Stanley.
- B. Self Closing Hinges: Comply with BHMA A156.17.
- C. Hinges: Provide hinges on every swinging door.
 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 2. Provide ball-bearing hinges at all doors having closers.
 3. Provide hinges in the quantities indicated.
 4. Provide non-removable pins on exterior outswinging doors.
 5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.
- D. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7; standard weight, unless otherwise indicated.
- E. Quantity of Hinges Per Door:
 1. Doors up to 60 inches High: Two hinges.
 2. Doors From 60 inches High up to 90 inches High: Three hinges.
 3. Doors 90 inches High up to 120 inches High: Four hinges.
 4. Doors 42 inches Wide up to 90 inches High: Four Hinges.
- F. Manufacturers - Hinges:
 1. Assa Abloy Brands; McKinney: www.assaabloydss.com.
 2. Ives Architectural Hardware.
 3. Bommer Industries, Inc: www.bommer.com.
 4. C. R. Laurence Company, Inc: www.crl-arch.com/sle.
 5. Hager Companies: www.hagerco.com.
 6. Stanley Black & Decker: www.stanleyblackanddecker.com.

2.05 PUSH/PULLS

- A. Push/Pulls - Basis of Design: Ives.
- B. Push/Pulls: Comply with BHMA A156.6.
 1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
 2. On solid doors, provide matching push plate and pull plate on opposite faces.
- C. Manufacturers - Push/Pulls:
 1. Assa Abloy McKinney or Ives.
 2. C. R. Laurence Company, Inc: www.crl-arch.com/sle.
 3. Substitutions: See Section 01-6000 - Product Requirements.

2.06 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
 1. Hardware Sets indicate locking functions required for each door.

2. If no hardware set is indicated for a swinging door provide an office lockset.
 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.07 CYLINDRICAL LOCKSETS

- A. Cylindrical Locksets - Basis of Design: Schlage ND Series.
- B. Locking Functions: As defined in BHMA A156.2, and as follows.
1. Passage: No locking, always free entry and exit.
 2. Privacy: F76, emergency tool unlocks.
 3. Office: F81, key not required to lock, remains locked upon exit.
 4. Classroom: F84, key required to lock.
 5. Intruder Classroom: F110, keyed both sides.
 6. Communicating: F80 or F113.
 7. Hotel: F93.
 8. Store Room Function: F86, key required to lock, may not be left unlocked.
- C. Manufacturers - Cylindrical Locksets:
1. Schlage, an Allegion brand: www.allegion.com/us.
 2. Substitutions: See Section 01-6000 - Product Requirements.

2.08 FLUSHBOLTS AND COORDINATORS

- A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
 2. Floor Bolts: Provide dustproof strike except at metal thresholds.
- B. Coordinators: Provide on doors having closers and self-latching or automatic flushbolts to ensure that leaves close in proper order.
- C. Manufacturers - Flushbolts:
1. Ives, an Allegion brand: www.allegion.com/us.
 2. Substitutions: See Section 01-6000 - Product Requirements.

2.09 ELECTRIC STRIKES

- A. Electric Strikes: Complying with BHMA A156.31 and UL (DIR) listed as a Burglary-Resistant Electric Door Strike; style to suit locks.
- B. Manufacturers - Electric Strikes:
1. Assa Abloy Brands, HES; 5200: www.assaabloydss.com.
 2. Substitutions: See Section 01-6000 - Product Requirements.

2.10 EXIT DEVICES

- A. Exit Devices - Basis of Design: Von Duprin 98/99 Series Exit Devices.
- B. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
 - 1. Entry/Exit, Always-Unlocked: Outside lever unlocked, no outside key access, no latch holdback.
 - 2. Entry/Exit, Free Swing: Key outside retracts latch, latch holdback (dogging) for free swing during occupied hours, not fire-rated; outside trim must be specified as lever or pull.
 - 3. Entry/Exit, Always-Latched: Key outside locks and unlocks lever, no latch holdback (dogging).
 - 4. Entry/Exit, Always-Locked: Key outside retracts latchbolt but does not unlock lever, no latch holdback.
 - 5. Exit Only, Secure: No outside trim, no key entry, no latch holdback, deadlocking latchbolt.
- C. Manufacturers - Exit Devices:
 - 1. Von Duprin, an Allegion brand: www.allegion.com/us.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.

2.11 CLOSERS

- A. Closers - Basis of Design: LCN 4010 Series, or 281 Sargent.
- B. Closers: Complying with BHMA A156.4.
 - 1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
 - 2. Provide a door closer on every exterior door.
 - 3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
 - 4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
- C. Manufacturers - Surface Mounted Closers:
 - 1. LCN, an Allegion brand: www.allegion.com/us.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.

2.12 STOPS AND HOLDERS

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
 - 1. Provide wall stops, unless otherwise indicated.
 - 2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
 - 3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.
- B. Kick Down Holder: Ives FS 452.
- C. Wall Stops: Ives WS406/407CCV, concave wall bumper.
- D. Magnetic Holder/Releases: Complying with BHMA A156.15; fail safe; doors release to close automatically when electrical current is interrupted; holding force: 25 to 40 pounds-force.

- E. Door Guard: Ives 481 Change Door Guard.
- F. Manufacturers - Wall and Floor Stops/holders:
 1. Assa Abloy Brands, McKinney: www.assaabloydss.com.
 2. Ives.
 - a. 407-1/2 Wall Stops.
 - b. FS 452 Holdopen.
 3. Substitutions: See Section 01-6000 - Product Requirements.

2.13 GASKETING, THRESHOLDS AND DOOR PROTECTION

- A. Gasketing and Thresholds - Basis of Design: Pemko.
- B. Gaskets: Complying with BHMA A156.22.
 1. On each door in smoke partition, provide smoke gaskets; top, sides, and meeting stile of pairs. If fire/smoke partitions are not indicated on drawings, provide smoke gaskets on each door identified as a "smoke door" and 20-minute rated fire doors.
 - a. Pemko S88D.
 2. On each exterior door, provide weatherstripping gaskets, unless otherwise indicated; top, sides, and meeting stiles of pairs.
 - a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
 - b. Pemko 303 AV.
 3. On each exterior door, provide door bottom sweep, unless otherwise indicated; 216AV Pemko.
 4. On each exterior door, provide door top; 346AV Pemko.
 5. On doors indicated as "sound-rated", "acoustical", or with an STC rating, provide sound-rated gaskets and automatic door bottom; make gaskets completely continuous, do not cut or notch gaskets for installation.
 - a. Door Bottom Seal: 4301 ARL, Pemko.
 - b. Threshold/carpet Separator: 174A Pemko.
 - c. Sound Seal: S88D, Pemko.
- C. Thresholds: Complying with BHMA A156.21.
 1. At each exterior door, provide a threshold unless otherwise indicated, 6 inch wide typical, unless detailed otherwise.
 2. Field cut threshold to frame for tight fit.
 3. Pemko 1716 A.
- D. Fasteners At Exterior Locations: Non-corroding.

2.14 PROTECTION PLATES AND ARCHITECTURAL TRIM

- A. Protection Plates:
 1. Kickplate: Provide on push side of every door with closer, except aluminum storefront and glass entry doors.
- B. Drip Guard: Provide projecting drip guard over all exterior doors unless they are under a projecting roof or canopy.
 1. Assa Abloy Pemko Door Top 346.
- C. Manufacturers - Protection Plates and Architectural Trim:
 1. Assa Abloy Brands, McKinney: www.assaabloydss.com.
 2. Ives.
 3. Substitutions: See Section 01-6000 - Product Requirements.

2.15 GENERAL REQUIREMENTS FOR DOOR HARDWARE PRODUCTS

- A. Provide products that comply with the following:
 - 1. Applicable provisions of Federal, State, and local codes.

2.16 KEYING

- A. Door Locks: Grand master keyed.
- B. Supply keys in the following quantities:
 - 1. 2 master keys.
 - 2. 5 grand master keys.
 - 3. 3 change keys for each lock.

2.17 KEY CABINET

- A. Cabinet Construction: Sheet steel construction, piano hinged door with cylinder type lock master keyed to building system.
- B. Cabinet Size: Size for project keys plus 50 percent growth.
- C. Horizontal metal strips for key hook labelling with clear plastic strip cover over labels.
- D. Finish: Baked enamel, color as selected.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item. As indicated in following list; unless noted otherwise in Door Hardware Sets Schedule or on drawings.
 - 1. For steel doors: Comply with DHI (LOCS) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames".
 - 2. For Wood Doors: Comply with DHI WDHS.3 "Recommended Locations for Architectural Hardware for Flush Wood Doors".
 - 3. Locksets: 38 inch.
 - 4. Push/Pulls: 42 inch.
 - 5. Dead Locks: 42 inch.

- E. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

3.03 ADJUSTING

- A. Adjust work under provisions of Section 01-7000 - Execution and Closeout Requirements.

3.04 CLEANING

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION

- A. Protect finished Work under provisions of Section 01-7000 - Execution and Closeout Requirements.
- B. Do not permit adjacent work to damage hardware or finish.

HARDWARE SETS

4.01 HARDWARE SETS - GENERAL

- A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.
- B. Pairs of Swinging Doors: Provide one of each specified item on each leaf unless specifically stated otherwise. Treat pairs as two active leaves unless otherwise indicated.
- C. HW-CYL: Doors whose hardware is specified in other sections but which must be keyed to building system:
 - 1. Lock Cylinder, Mortise, keyed to building system.

4.02 SWING DOORS -- NOT REQUIRING KEY LOCKING

- A. HW-2: Latchset, Non-Fire-Rated.
 - 1. Hinges.
 - 2. Latchset, Passage.
 - 3. Wallstop.
- B. HW-2FS: Latchset, Fire-Rated (and not fire-rated if closer required), Dorm/Sound Door:
 - 1. Hinges, heavy duty for wide door.
 - 2. Closer.
 - 3. Exit Device, Rim, Entry/Exit, Always-Unlocked. Lever on exterior side for access. Latchset, no lock. With concealed vertical rod.
 - 4. Magnetic hold open.
 - 5. Wallstop.
 - 6. Smoke Seal.
 - 7. Door Bottom Seal, as required for 1-1/2 hr assembly.

4.03 SWING DOORS -- KEY REQUIRED TO LOCK, MAY BE LEFT UNLOCKED

- A. HW-20F: Intruder Classroom Lock, Fire-Rated or Non-Fire-Rated Where Self-Closing is Required:
1. Closer.
 2. Lockset, Intruder Classroom.
 3. Hinges.
 4. Kickplate.
 5. Smoke seal.
 6. Wallstop.

4.04 SWING DOORS -- ELECTRICAL ACCESS CONTROL

- A. HW-50: Entry Control, Electric Strike, Fail-Secure, Outswing, Fire-Rated and non-Fire-Rated:
1. Panic Device with vertical rods.
 2. Motorized Panic Device with vertical rods.
 3. Closers.
 4. Kickplates.
 5. Holdopens.
 6. Weatherstripping.
 7. Threshold.
 8. Door Top.
 9. Door Bottom.
 10. Card Reader.
 11. Door Position Switches.
 12. Request to Exit.
 13. Power Transfer.

NOTE: Door, one leaf, to provide hardware for Staff/authorized personnel to gain access with card reader when locked. Refer to electrical drawings for manuf/brand of access control hardware listed above. Staff may "dog-down" panic devices if desired.

END OF SECTION

**SECTION 08-8000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07-9005 - Joint Sealers: Sealant and back-up material.
- B. Section 08-1113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- C. Section 08-1416 - Flush Wood Doors: Glazed lites in doors.
- D. Section 08-5313 - Vinyl Windows: Glazing furnished by window manufacturer.

1.03 REFERENCE STANDARDS

- A. ASTM C1036 - Standard Specification for Flat Glass 2021.
- B. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- C. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- D. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual for glazing installation methods.

1.05 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.

1.06 WARRANTY

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 INSULATING GLASS UNITS

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glass, double glazed.
 - 1. Application: All exterior glazing unless otherwise indicated.
 - 2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.
 - c. U-value: 0.35 max.
 - d. Solar Heat Gain Coefficient (SHGC): .40 max.
 - 3. Inboard Lite: Annealed float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - 4. Total Thickness: 1 inch.
 - a. Argon filled.
 - b. 1/2 inch air space.
 - 5. Total Visible Light Transmittance ratio to Solar Heat Gain Coefficient (VT/SHGC): 1.10 percent, maximum assembly.
 - 6. Total Solar Heat Gain Coefficient: 0.36 percent, maximum assembly.

2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
 - 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 - 3. Glass thicknesses listed are minimum.

2.03 GLASS MATERIALS

- A. Float Glass Manufacturers:
 - 1. PPG Industries, Inc: www.ppgideascape.com.
 - 2. American-Saint Gobain Corp.
 - 3. Libbey-Owens-Ford Glass Co.
 - 4. Pittsburg Plate Glass Co.
 - 5. Viracon.
 - 6. Cardinal Glass Industries.
 - 7. Technical Glass Products.
 - 8. Substitutions: Refer to Section 01-6000 - Product Requirements.
- B. Float Glass: Provide float glass based glazing unless noted otherwise.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
 - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
 - 3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
 - 4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.

2.04 SEALED INSULATING GLASS UNITS

- A. Sealed Insulating Glass Units: Types as indicated.

1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Edge Spacers: Aluminum, bent and soldered corners.
3. Edge Seal: Glass to elastomer.
4. Purge interpane space with dry hermetic air.

2.05 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Silicone Sealant: Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.06 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION - EXTERIOR WET METHOD (SEALANT AND SEALANT)

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- C. Fill gaps between glazing and stops with glazing sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.04 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.05 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION

**SECTION 09-2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Gypsum wallboard.
- B. Joint treatment and accessories.
- C. Prime paint on walls and ceilings to receive textured finish.
- D. Textured finish system.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Building framing and sheathing.
- B. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 07-2100 - Thermal Insulation: Acoustic insulation.
- D. Section 07-9005 - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017 (Reapproved 2022).
- B. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- C. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2022.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- F. GA-216 - Application and Finishing of Gypsum Panel Products 2021.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.02 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum: www.americangypsum.com.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.

3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 4. Substitutions: See Section 01-6000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.
 3. Mold Resistant Paper Faced Products:
 - a. CertainTeed Corporation; ProRoc Brand Moisture & Mold Resistant Gypsum Board.
- C. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas, and all areas behind sinks, lavatory sinks, mop sinks, etc.
 2. Type: Regular and Type X, in locations indicated.
 3. Type X Thickness: 5/8 inch.
 4. Regular Board Thickness: 5/8 inch.
 5. Edges: Tapered.
- D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
 2. Thickness: 5/8 inch.
 3. Edges: Tapered.

2.03 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: As specified in Section 07-2100.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
- E. Textured Finish Materials: Latex-based compound; plain.
- F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- G. Adhesive for Attachment to Wood ASTM C557 and Wood ASTM C557:
- H. Acoustical Sound Board: Fibrous 1/2 inch thick board, installed behind gypsum board in sound rated walls as indicated in Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.05 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.06 TEXTURE FINISH

- A. Prime paint prior on all walls and ceilings designated to receive spray textured finish.
- B. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.
- C. Texture Required: Light orange peel texture.

3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

**SECTION 09-5100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2022.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2019.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2022.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2022.
- E. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples 12 by 12 inch in size illustrating material and finish of acoustical units.

1.05 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

- A. Manufacturers:
 - 1. Armstrong World Industries, Inc: www.armstrong.com.
 - 2. USG: www.usg.com.
 - 3. Or approved.
- B. Acoustical Tiles, Type ACT-1: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - 2. Finish: Ultima, fine texture
 - 3. Size: 24 by 48 inch.
 - 4. Thickness: 3/4 inch.
 - 5. Light Reflectance: .85 percent or higher, determined in accordance with ASTM E1264.
 - 6. NRC Range: .70 or higher, determined in accordance with ASTM E1264.
 - 7. CAC Range: 35 or higher
 - 8. Tile Edge: Square.
 - 9. Color: White.
 - 10. Suspension System: Concealed.

2.02 SUSPENSION SYSTEM

- A. Manufacturers:
 - 1. Same as for acoustical units.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Suspension System: Hot-dipped galvanized steel grid with aluminum cap.
 - 1. Profile: Tee; 15/16 inch face width.
 - 2. Finish: Baked enamel.
 - 3. Color: White.
 - 4. Products:
 - a. USG Corporation; Donn Brand ZXLA 15/16 inch Acoustical Suspension System: www.usg.com/ceilings/#sle.
 - b. Armstrong World Industries, Inc<>: www.armstrong.com..

2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Seismic Restraint
 - 1. Armstrong Seismic Rx Suspension System, ICC Report ESR-1308
 - 2. BERC-2 clips required on two adjacent walls, with grid attached to wall perimeter molding on opposite walls.
 - 3. BERC-2 clips attached to main grid beam and cross tees.
 - 4. Install in strict accordance with manufacture requirements to meet seismic requirements.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.
- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.
- I. Suspended ceiling system shall be braced for lateral loads. Contractor shall brace as follows or as required to meet ASTM C636 and as required to comply with Seismic Design Category D, per ASCE Standards.
 - 1. Contractor shall submit design calculations substantiating lateral restraint or shall install (4) no. 12 gauge wires to main runner within 2 inches of cross runner intersections and splayed out 90 degrees, at a maximum angle of 45 degrees. Lateral support wires to be spaced at 12'-0" maximum each way, 4'-0" maximum from wall. Attachment of the restraint wires to structure above shall be adequate for load imposed. Provide compression strut at each group of restraint wires.

3.02 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.

3.03 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

**SECTION 09-5153
DIRECT-APPLIED ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Acoustic units.
- B. Perimeter trim.

1.02 RELATED REQUIREMENTS

- A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 07-9005 - Joint Sealers.

1.03 REFERENCE STANDARDS

- A. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2022.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustic units after interior wet work is dry.

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on acoustic units.
- C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Acoustical Units: Quantity equal to 5 percent of total installed
- E. LEED Submittal: Documentation of recycled content and location of manufacture.

1.06 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Direct Applied Acoustical Ceilings:
 - 1. Armstrong World Industries, Inc: www.armstrong.com/#sle.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.
 - 3. USG: www.usg.com/#sle.
 - 4. Or approved.

2.02 MATERIALS

- A. Acoustic Tile: Mineral fiber, ASTM E1264 .
 - 1. Size: 12 by 12 inches.
 - 2. Thickness: 3/4 inches.
 - 3. Composition: Mineral.
 - 4. Light Reflectance: 86 percent.
 - 5. NRC Range: 65
 - 6. Joint: Kerfed.
 - 7. Surface Color: White.
 - 8. Surface Finish: Non-directional fissured where occurs match existing.
- B. Adhesive: Waterproof, gun grade; type recommended by tile manufacturer.
- C. Perimeter Moldings: Rolled steel profile, white color.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions and substrate flatness before starting work.
- B. Verify that substrate conditions are ready to receive the work of this section.

3.02 INSTALLATION

- A. Install system in accordance with manufacturer's instructions.
- B. Perimeter Molding:
 - 1. Use longest practical lengths.
- C. Center tile on room axis leaving equal border units.
- D. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- E. Install acoustic units level in uniform plane.

END OF SECTION

**SECTION 09-6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03-3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

1.03 REFERENCE STANDARDS

- A. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading 2022.
- B. ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering 2018.
- C. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01-6000 - Product Requirements, for additional provisions.

1.05 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 TILE FLOORING

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness.
 - 1. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
 - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
 - 3. Size: 12 by 12 inch.
 - 4. VOC Content Limits: As specified in Section 01-6116.
 - 5. Thickness: 0.125 inch.
 - 6. Manufacturers:
 - a. Match existing.
 - b. Or approved..

- B. Vinyl Tile - Type LVT-1, LVT-2: Printed film type, with transparent or translucent wear layer.
 - 1. Manufacturers:
 - a. See Finish List in Drawings for Basis of Design
 - b. Mohawk Group; www.mohawkgroup.com
 - c. <https://www.jjflooringgroup.com/>
 - d. Substitutions: See Section 01-6000 - Product Requirements.
 - 2. Square Tile Size: by finish schedule
 - 3. Total Thickness: 0.125 inch.
 - 4. Wear Layer 20 mil
 - 5. Pattern: Brick Ashlar

2.02 RESILIENT BASE

- A. Resilient Base - Type RB-1: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
 - 1. Height: 4 inch.
 - 2. Thickness: 0.125 inch.
 - 3. Finish: Satin.
 - 4. Color: Color as selected from manufacturer's standards.
 - 5. Accessories: Premolded external corners and internal corners.
 - 6. Manufacturers:
 - a. Burke Flooring: www.burkemercer.com.
 - b. Johnsonite, a Tarkett Company: www.johnsonite.com.
 - c. Roppe Corp: www.roppe.com.
 - d. Flexco: www.flexcofloors.com

2.03 ACCESSORIES

- A. Subfloor Filler: recommended by material manufacturer.

- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
 - 1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.

- C. Moldings, Transition and Edge Strips: as recommended by manufacture..

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 - 1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 - 1. Fit joints and butt seams tightly.
 - 2. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- E. Spread only enough adhesive to permit installation of materials before initial set.
- F. Fit joints and butt seams tightly.
- G. Set flooring in place, press with heavy roller to attain full adhesion.
- H. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- I. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- J. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.

- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.

3.05 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

3.07 SCHEDULE SEE ROOM FINISH SCHEDULE AT END OF THIS DIVISION 9.

END OF SECTION

**SECTION 09-6813
TILE CARPETING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Walk-off carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

- A. Section 01-6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03-3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.

1.03 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01-6000 - Product Requirements, for additional provisions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Tile Carpeting:
 - 1. Patcraft: www.patcraft.com.
 - 2. Or approved.

2.02 MATERIALS

- A. Tile Carpeting, Type WOT-1: Multi-Level Pattern Loop, manufactured in one color dye lot.
 - 1. Product: Prado, 10317 manufactured by Patcraft.
 - 2. Tile Size: by 24" x 24" inch, nominal.
 - 3. Thickness: .277" inch.
 - 4. Color: TBD.
 - 5. Gauge: .083 inch.
 - 6. Pile Weight: .144".

7. Primary Backing Material: Non-Woven Synthetic.
8. Secondary Backing Material: By manufacturer..

2.03 ACCESSORIES

- A. Edge Strips: Where required, as recommended by manufacturer.
- B. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in Monolithic pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Trim carpet tile neatly at walls and around interruptions.
- G. Complete installation of edge strips, concealing exposed edges.

END OF SECTION

**SECTION 09-9000
PAINTING AND COATING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, including that which is factory-finished.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically so indicated.
 - 6. Glass.
 - 7. Acoustical materials, unless specifically so indicated.
 - 8. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

1.05 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide data on all finishing products, including VOC content.
- C. Samples: Submit two paper chip samples, 8x8 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Benjamin Moore & Co: www.benjaminmoore.com/#sle.
 - 2. Sherwin-Williams.
- C. Transparent Finishes:
 - 1. Same as above.
- D. Stains:
 - 1. Same as above.
- E. Primer Sealers: Same manufacturer as top coats.
 - 1. Same as above.
- F. Substitutions: See Section 01-6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Supply each coating material in quantity required to complete entire project's work from a single production run.
 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Colors: As indicated on drawings.
1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat - unfinished wood trim, soffits:
1. One coat of latex primer sealer.
 2. Semi-gloss: Two coats of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.
- B. Paint WE-OP-2L - Wood, Opaque, Latex, 2 Coat - Preprimed Siding & Trim:
1. One coat of latex primer sealer - touch up as needed on bare surfaces, end cuts, etc.
 2. Semi-gloss: Two coat of latex enamel; Moorcraft Super Spec Latex House & Trim No. 170, applied at dry film thickness of not less than 1.1 mils per coat.
- C. Paint WE-TR-VS - Wood, Semi-Transparent Stain:
1. One coat of stain; Moorwood Alkyd Semi-Transparent Deck & Siding Stain.
- D. Paint ME-OP-3A - Ferrous Metals, Unprimed, Alkyd, 3 Coat:
1. One coat of alkyd primer.
 2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.
- E. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
 2. Semi-gloss: Two coats of alkyd enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.

2.04 PAINT SYSTEMS - INTERIOR

- A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
1. One coat of latex primer sealer.
 2. Semi-gloss: Two coats of latex enamel; Benjamin Moore Paints; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils per coat..
- B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:

1. One coat of stain; Benjamin Moore Paints; Benwood Wood Finishes Penetrating Stain (234).
 2. One coat sealer .
 3. Gloss: One coat of varnish; Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.
- C. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
1. One coat of latex primer.
 2. Gloss: Two coats of latex enamel.
- D. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
1. Touch-up with latex primer.
 2. Gloss: Two coats of latex enamel; Benjamin Moore Paints: IMC DTM Acrylic Semi-Gloss (M29). Applied at a dry film thickness of not less than 2.0 mils per coat.
- E. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
1. One coat of alkyd primer sealer.
 2. Eggshell: Two coats of latex enamel; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils per coat.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Gypsum Wallboard: 12 percent.
 2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- F. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- G. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- H. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- I. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- J. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- K. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- L. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
- M. Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- N. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's instructions.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Sand wood surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

END OF SECTION

**SECTION 10-1100
VISUAL DISPLAY UNITS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Tackstrips
- B. Chalkboards, Markerboards, and Tackboards.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Blocking and supports.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.
- E. Maintenance Data: Include data on regular cleaning, stain removal .

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.05 WARRANTY

- A. See Section 01-7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 10 warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle.
- B. MooreCo, Inc: www.moorecoinc.com/#sle.
- C. Substitutions: See Section 01-6000 - Product Requirements.

2.02 VISUAL DISPLAY BOARDS

- A. Markerboards: Magnetic Porcelain enamel on steel, laminated to core. Basis of Design: Claridge Series 4.
 - 1. Color: White.
 - 2. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
 - 3. Core: laminated to finish with moisture resistant backer sheet.
 - 4. Backing: Aluminum sheet, laminated to core.
 - 5. Height: 48 inches. See elevation for length. One piece.
 - 6. Frame: Extruded aluminum , with concealed fasteners.
 - 7. Frame Finish: Anodized, natural.
 - 8. Accessories: Provide tray.

- B. Tackboards: Fine-grained, homogeneous natural cork. Basis of Design: Claridge Series 4
 - 1. Cork Thickness: 1/4 inch min.
 - a. Will not crack, peel or crumble
 - b. Washable, stain resistant
 - c. Dimensionally stable
 - 2. Color: As selected from manufacturer's full range.
 - 3. Backing: Hardboard, 1/4 inch min thick, laminated to tack surface.
 - 4. Height: 48 inches. See elevation for length.
 - 5. Frame: Extruded aluminum , with concealed fasteners.
 - 6. Frame Finish: Anodized, natural.

- C. Tackstrips: Aluminum rail with cork insert.
 - 1. Height: 2 inches.
 - 2. Length: See elevations. Provide 8'6" long sections
 - 3. Accessories:
 - a. Provide end stops at each end.
 - b. Provide (2) metal map hooks per length

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install boards in accordance with manufacturer's instructions.
- B. Install with bottom of perimeter frame at 30 inches above finished floor.
- C. Secure units level and plumb.

3.03 CLEANING

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Provide temporary protective cover. Remove cover at Date of Substantial Completion.

**SECTION 10-1423
PANEL SIGNAGE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Panel signage.

1.02 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.03 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, indicating sign style, font, and method of attachment.
- E. Selection Samples: Where colors, materials, and finishes are not specified, submit two sets of color selection charts or chips.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.05 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain minimum ambient temperature during and after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Panel Signage:

1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
2. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.
3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

- A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

2.03 PANEL SIGNAGE

- A. Panel Signage:
 1. Application: Room and door signs.
 2. Description: Flat signs with engraved panel media, tactile characters.
 3. Sign Size: As indicated on drawings.
 4. Total Thickness: 1/8 inch.
 5. Color and Font, unless otherwise indicated:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper and lower case (title case).
 - c. Background Color: As scheduled.
 - d. Character Color: Contrasting color.
 6. Material: Laminated colored plastic engraved through face to expose core as background color.
 7. Profile: Flat panel in aluminum frame.
 - a. Frame Finish: Black anodized.
 8. Tactile Letters: Raised 1/32 inch minimum.
 9. Braille: Grade II, ADA-compliant.

2.04 SIGNAGE APPLICATIONS

- A. Room and Door Signs:
 1. Office Doors: Identify with room names and numbers to be determined later, not those indicated on drawings; provide "window" section for replaceable occupant name.

2.05 ACCESSORIES

- A. Tape Adhesive: Double-sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.
- C. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

END OF SECTION

**SECTION 10-2601
WALL AND CORNER GUARDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.
- B. Wall Protection.

1.02 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions.
- C. Samples: Submit two sections of bumper rail, 24 inch long, illustrating component design, configuration, color and finish.
- D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall and Corner Guards: See Section 09-0502 Finish Materials.
 - 1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
 - 2. Inpro: www.inprocorp.com.
 - 3. Substitutions: See Section 01-6000 - Product Requirements.

2.02 COMPONENTS

- A. Engineered PETG: Rigid sheet should be high-impact Acrovyn 4000 with standard Suede texture, nominal .060" (1.52mm) thickness. Chemical and stain resistance should be per ASTM D543 standards as established by the manufacturer.
 - 1. Color as selected from manufacturer's standard colors.
- B. Trim: Aluminum or colored anodized finish from manufacturer's standard colors.
- C. Corner Guards - Surface Mounted:
 - 1. Material: High impact vinyl with full height extruded aluminum retainer.
 - 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 - 3. Width of Wings: 2 inches.
 - 4. Corner: Square.
 - 5. Color: As selected from manufacturer's standard colors.
 - 6. Length: One piece.

2.03 FABRICATION

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on drawings.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to wall framing members only.
- B. Position corner guard 4 inches above finished floor to 48 inches high.

END OF SECTION

**SECTION 10-2800
TOILET, BATH, AND LAUNDRY ACCESSORIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Accessories for Classroom sinks, Owner Furnished, Contractor Install (OFCl)

1.02 RELATED REQUIREMENTS

PART 2 PRODUCTS

2.01 COMMERCIAL TOILET ACCESSORIES

- A. Paper Towel Dispenser: OSCI: LOCOR, Model D68.
 - 1. Mounting: Surface mounted. See elevations for location and height.
 - 2. Mechanical.
- B. Automated Soap Dispenser: OSCI: SCJohnson, Model Proline.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 06-1000 for installation of blocking in walls.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

- D. Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

END OF SECTION

**SECTION 10-4400
FIRE PROTECTION SPECIALTIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06-1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers 2022.
- B. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.

1.05 FIELD CONDITIONS

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, Inc: www.ansul.com or equivalent.
 - 2. Substitutions: See Section 01-6000 - Product Requirements.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. JL Industries, Inc: www.jlindustries.com.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
 - 3. Potter-Roemer: www.potterroemer.com/#sle.
 - 4. Substitutions: See Section 01-6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. FFFP - Foam Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
 - 1. Class: A:B type.
 - 2. Finish: Baked enamel, red color.
 - 3. Temperature range: 40 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS

- A. Metal: Formed primed steel sheet; 0.036 inch thick base metal.
- B. Cabinet Configuration: Recessed type.
 - 1. Sized to accommodate accessories and extinguisher.
 - 2. Trim: Returned to wall surface, with 3 inch projection, rolled edge.
- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.
- D. Door Glazing: Float glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- E. Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.
- G. Finish of Cabinet Interior: White colored enamel.

2.04 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Graphic Identification: Fire Extinguisher.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings, 48 inches from finished floor to inside bottom of cabinet.
- C. Place extinguishers in cabinets.
- D. Position cabinet signage at 8 feet above finished floor.

3.03 LOCATIONS

- A. Classrooms: Foam Type 10AB. (1) each cabinets and extinguishers.
- B. Hallways: Foam Type 10AB. Total of two (1) cabinets and extinguishers.

END OF SECTION

BLANK PAGE

**SECTION 12-2413
ROLLER WINDOW SHADES**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes roller shades with manual operation.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Ceiling suspension system members and attachment to building structure.
 2. Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
 3. Shade mounting assembly and attachment.
 4. Size and location of access to shade operator, and adjustable components.
 5. Minimum drawing scale: 1/4 inch = 1 foot.
- D. Samples:
1. Complete, full-size operating unit not less than 16 inches wide for each type or roller shade indicated.
 2. For the following products:
 - a. Shade Material: Not less than 12-inch-square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.
- E. Window Treatment Schedule: For roller shades. Use same designations indicated on Drawings.
- F. Product Certificates: For each type of roller shade, signed by product manufacturer.
- G. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
1. Methods for maintaining roller shades and finishes.
 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 3. Operating hardware.

1.03 QUALITY ASSURANCE

- A. Source limitations: Obtain roller shades through one source from a single manufacturer.

- B. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- C. Product Standard: Provide roller shades complying with WCMA A 100.1.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, lead-free designation, and location of installation using same designation indicated on Drawings and in a window treatment schedule.

1.05 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 PRODUCTS

2.01 2.1 ROLLER SHADES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated in Section 09-0502 Finish Materials (Draper, Inc.) or a comparable product by one of the following manufacturers:
 - 1. MechoShade System, Inc.
 - 2. Hunter Douglas, Inc.; Hunter Douglas Window Fashions Division.
 - 3. Lutron Shading Solutions by VIMCO.
 - 4. Nysan Shading Systems Ltd.
- B. Shade Band Material: Provide products listed in Section 09-0502 Finish Materials.
 - 1. Bottom Hem: Straight.
- C. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with removable spline fitting integral channel in tube for attaching shade material. Provide capacity for one roller shade band(s) per roller, unless otherwise indicated.

- D. Direction of Roll: Regular, from back of roller, and reverse, from front of roller, as indicated on Drawings for double-roller shades. Provide double height shade pocket at corner windows scheduled to receive window shades. Where double height pocket abuts single height pocket, provide closure cap to seal exposed portion of double height shade pocket.
- E. Mounting Brackets: Galvanized or zinc-plated steel.
- F. Pocket-Style Headbox: U-shaped, formed steel sheet or extruded aluminum; long edges returned or rolled; with bottom cover consisting of slot opening of minimum dimension to allow lowering and raising of shade and a removable or an openable, continuous metal access panel concealing shade roller, brackets, and operating hardware and operators within.
- G. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide exposed-to-view, external or concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- H. Audiovisual Light-Blocking shades: Designed for eliminating all visible light gaps when shades are fully closed; fabricated from blackout shade band material with pocket and bottom bar extended and formed for light-tight joints among shade components and between shade components and adjacent construction.
 - 1. Side Channels, Sill Channel or Angle, and Perimeter Seals: Manufacturer's standard design, including sill light seal attached to bottom bar, for eliminating light gaps when shades are closed.
 - 2. Shade Band Retention System: Manufacturer's standard design for guiding shade band material through range of travel and holding shade band flat with edges of material within side channels.
- I. Mounting: As indicated on Drawings, mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.
- J. Shade Operation: Manual; with continuous-loop bead-chain, clutch, and cord tensioner and bracket lift operator.
 - 1. Position of Clutch Operator: [Left] [Right] side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated on Drawings or in a window treatment schedule.
 - 2. Clutch: Capacity to lift size and weight of shade; sized to fit roller or provide adaptor.
 - 3. Lift-Assist Mechanism: Manufacturer's standard spring assist for balancing roller shade weight and lifting heavy roller shades.
 - 4. Loop Length: Length required to make operation convenient from floor level.
 - 5. Beach Chain: Stainless Steel.
 - 6. Cord Tensioner Mounting: As directed.
 - 7. Operating Function: Stop and hold shade at any position in ascending or descending travel.

2.02 ROLLER SHADE FABRICATION

- A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
- B. Concealed Component: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lifting Mechanism: With permanently lubricated moving parts.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
 2. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.
 3. Where any shade band required railroad seaming, all shade bands at that window shall be railroad seamed to match.
- D. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
- E. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, applications, baking, and minimum dry film thickness.
- F. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.
1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.03 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunctions throughout entire operational range.

3.04 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION

**SECTION 22-0000
PLUMBING BASIC REQUIREMENTS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work included in 22 00 00, Plumbing Basic Requirements applies to Division 22, Plumbing work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of plumbing systems for proposed project.
- B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.
- C. Definitions:
 - 1. Provide: To furnish and install, complete and ready for intended use.
 - 2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
 - 3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
 - 4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
 - 5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.02 RELATED SECTIONS

- A. Contents of Section applies to Division 22, Plumbing Contract Documents.
- B. Related Work:
 - 1. Additional conditions apply to this Division including, but not limited to:
 - a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
 - b. Drawings
 - c. Addenda
 - d. Owner/Architect Agreement
 - e. Owner/Contractor Agreement
 - f. Codes, Standards, Public Ordinances and Permits

1.03 REFERENCES AND STANDARDS

- A. References and Standards per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, individual Division 22, Plumbing Sections and those listed in this Section.
- B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:

1. State of Oregon:
 - a. OAR - Oregon Administrative Rules
 - b. 2021 OESC - Oregon Electrical Specialty Code
 - c. 2019 OFC - Oregon Fire Code
 - d. 2019 OMSC - Oregon Mechanical Specialty Code
 - e. 2021 OPSC - Oregon Plumbing Specialty Code
 - f. 2019 OSSC - Oregon Structural Specialty Code
 - g. 2021 OEESC - Oregon Energy Efficiency Specialty Code
 - h. 2011 Oregon Elevator Specialty Code

- C. Reference standards and guidelines include but are not limited to the latest adopted editions from:
 1. ABA - Architectural Barriers Act
 2. ADA - Americans with Disabilities Act
 3. AHRI - Air-Conditioning Heating & Refrigeration Institute
 4. ANSI - American National Standards Institute
 5. ASCE - American Society of Civil Engineers
 6. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
 7. ASHRAE Guideline 0, the Commissioning Process
 8. ASME - American Society of Mechanical Engineers
 9. ASPE - American Society of Plumbing Engineers
 10. ASSE - American Society of Sanitary Engineering
 11. ASTM - ASTM International
 12. AWWA - American Water Works Association
 13. CFR - Code of Federal Regulations
 14. CGA - Compressed Gas Association
 15. CISPI - Cast Iron Soil Pipe Institute
 16. ETL - Electrical Testing Laboratories
 17. EPA - Environmental Protection Agency
 18. FM - FM Global
 19. IAPMO - International Association of Plumbing and Mechanical Officials
 20. GAMA - Gas Appliance Manufacturers Association
 21. HI - Hydraulic Institute Standards
 22. ISO - International Organization for Standardization
 23. MSS - Manufacturers Standardization Society
 24. NEC - National Electric Code
 25. NEMA - National Electrical Manufacturers Association
 26. NFGC - National Fuel Gas Code
 27. NFPA - National Fire Protection Association
 28. NRCA - National Roofing Contractors Association
 29. NSF - National Sanitation Foundation
 30. OSHA - Occupational Safety and Health Administration
 31. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
 32. TEMA - Tubular Exchanger Manufacturers Association
 33. TIMA - Thermal Insulation Manufacturers Association
 34. UL - Underwriters Laboratories Inc.

- D. See Division 22, Plumbing individual Sections for additional references.

1.04 SUBMITTALS

- A. See Division 01, General Requirements for Submittal Procedures as well as specific individual Division 22, Plumbing Sections.
- B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.
2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Architect. At Contractor's option, two separate submittals may be provided, consisting of underground work and building work. Deviations will be returned without review.
3. Product Data: Provide Manufacturer's descriptive literature for products specified in Division 22, Plumbing Sections.
4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.
 - a. Label submittal to match numbering/references as shown in Contract Documents and schedules. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.
 - b. Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference Division 22, Plumbing Sections for specific items required in product data submittal outside of these requirements.
 - c. Provide pump curves, operation characteristics, capacities, ambient noise criteria, etc. for equipment.
 - d. For vibration isolation of equipment, list make and model selected with operating load and deflection. Indicate frame type where required. Submit manufacturer's product data.
 - e. See Division 22, Plumbing Sections for additional submittal requirements outside of these requirements.
5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.
6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer's comments. Identify Engineer's comments and provide an individual response to each of the Engineer's comments. Cloud changes in the submittals and further identify changes which are in response to Engineer's comments.
7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-16 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.
8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 22, Plumbing Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals.

9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.
10. Substitutions and Variation from Basis of Design:
 - a. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
 - b. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.
11. Shop Drawings: Provide coordinated Shop Drawings which include physical characteristics of all systems, equipment and piping layout plans, and control wiring diagrams. Reference individual Division 22, Plumbing Sections for additional requirements for Shop Drawings outside of these requirements.
 - a. Provide Shop Drawings indicating sanitary and storm cleanout locations and type to Architect for approval prior to installation.
 - b. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.
12. Samples: Provide samples when requested by individual Sections.
13. Resubmission Requirements:
 - a. Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.
 - 1) Resubmit for review until review indicates no exception taken or "make corrections as noted".
 - 2) When submitting drawings for Engineers re-review, clearly indicate changes on drawings and "cloud" any revisions. Submit a list describing each change.
14. Operation and Maintenance Manuals, Owner's Instructions:
 - a. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Include valve charts. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.
 - 1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.
 - 2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment: belts, motors, lubricants, and filters.

- 3) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.
 - 4) Include copy of startup and test reports specific to each piece of equipment.
 - 5) Include copy of final water systems balancing log along with pump operating data.
 - 6) Include commissioning reports.
 - 7) Include copy of pressure, flow, leakage and purity test data and water systems test data, as applicable. Include copy of third-party and state and local jurisdiction inspection reports.
 - 8) Include copy of valve charts/schedules.
 - 9) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
 - 10) Include product certificates of warranties and guarantees.
 - 11) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.
- b. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 22 00 00, Plumbing Basic Requirements article titled "Demonstration".
 - c. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.
15. Record Drawings:
- a. Maintain at site at least one set of drawings for recording "As-constructed" conditions. Indicate on Drawings changes to original documents by referencing revision document, and include buried elements, location of cleanouts, and location of concealed mechanical items. Include items changed by field orders, supplemental instructions, and constructed conditions.
 - b. Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.
 - c. At completion of project, input changes to original project on CAD Drawings and make one set of black-line drawings created from CAD Files in version/release equal to contract drawings. Submit CAD Files and drawings upon substantial completion.
 - d. Provide Invert elevations and dimensioned locations for water services, building waste, and storm drainage piping below grade extending to 5-feet outside building line.
 - e. See Division 22, Plumbing individual Sections for additional items to include in record drawings.

1.05 QUALITY ASSURANCE

- A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.
- B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

- C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturers equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e., piping) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.
- D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.
- E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.
- F. Provide products that are UL listed.
- G. Piping Insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.
- H. All potable water system components, devices, material, or equipment containing a weighted average of greater than 0.25 percent lead are prohibited, and shall be certified in accordance with current editions of the Safe Drinking Water Act (SDWA), NSF 61 & NSF 372. Endpoint devices used to dispense water for drinking shall meet the requirements of NSF 61.
- I. ASME Compliance: ASME listed water heaters and boilers with an input of 200,000 BTUH and higher, hot water storage tanks which exceed 120 gallons, and hot water expansion tanks which are connected to ASME rated equipment or required by code or local jurisdiction.
- J. Provide safety controls required by National Boiler Code (ASME CSD 1) for boilers and water heaters with an input of 400,000 BTUH and higher.

1.06 WARRANTY

- A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Contracting and Procurement Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty in Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.07 COORDINATION DOCUMENTS

- A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, cable trays, lights, and electrical services with architectural and structural requirements, and other trades (including ceiling suspension, and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.
- B. Advise Architect in the event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.
- C. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

1.08 WORK INCLUDED

- A. Furnish and install sleeves, inserts and anchorage required for the installation, which are embedded in work of other trades. Sleeve, wrap and seal piping in concrete.
- B. Electrical: For plumbing trim/devices/equipment, provide, from the line voltage connection by Division 26, the low voltage electrical connections and wiring as required for complete and operable system. Includes, but is not limited to: Low voltage electrical raceway, wiring and accessories, such as step-down transformers as necessary for function of sensors and automatic valve and faucet controls. Supply step-down transformers and size wiring as recommended by manufacturer of plumbing trim/faucets requiring electrical low voltage connection.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer, including but not limited to fixtures, pumps, drains and equipment.

2.02 STANDARDS OF MATERIALS AND WORKMANSHIP

- A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL listed and labeled or be approved by State, County, and City authorities prior to procurement and installation.
- B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.
- C. Hazardous Materials:
 - 1. Comply with local, State of Oregon, and Federal regulations relating to hazardous materials.
 - 2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.
 - 3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.01 ACCESSIBILITY AND INSTALLATION

- A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Install equipment requiring access (i.e., drain pans, drains, control operators, valves, motors, cleanouts and water heaters) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in obvious passageways, doorways, scuttles or crawlspaces which would impede or block intended usage.

- C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.
- D. Earthwork:
 - 1. Confirm Earthwork requirements in Contract Documents. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
 - a. Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with the provisions of related earthwork Sections/divisions. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.
 - b. Excavation: Do not excavate under footings, foundation bases, or retaining walls.
 - c. Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.
- E. Firestopping:
 - 1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
 - a. Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping, ductwork and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
- F. Pipe Installation:
 - 1. Provide installation of piping systems coordinated to account for expansion and contraction of piping materials and building as well as anticipated settlement or shrinkage of building. Install work to prevent damage to piping, equipment, and building and its contents. Provide piping offsets, loops, expansion joints, sleeves, anchors or other means to control pipe movement and minimize forces on piping. Verify anticipated settlement and/or shrinkage of building with Project Structural Engineer. Verify construction phasing, type of building construction products and rating for coordinating installation of piping systems.
 - 2. Include provisions for servicing and removal of equipment without dismantling piping.
- G. Plenums:
 - 1. Provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

3.02 SEISMIC CONTROL

- A. Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 22 Plumbing Sections.
- B. General:
 - 1. Earthquake resistant designs for Plumbing (Division 22) equipment and distribution, i.e. motors, plumbing systems, piping, equipment, water heaters, boilers, etc. to conform to regulations of jurisdiction having authority.

2. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.
 3. Provide stamped Shop Drawings from licensed Structural Engineer of seismic bracing and seismic movement assemblies for piping equipment and water heaters. Submit Shop Drawings along with equipment submittals.
 4. Provide stamped Shop Drawings from licensed Structural Engineer of seismic flexible joints for piping and crossing building expansion or seismic joints. Submit Shop Drawings along with seismic bracing details.
- C. Piping:
1. Per "Seismic Restraints Manual Guidelines for Mechanical Systems" latest edition published by SMACNA or local requirements.
- D. Provide means to prohibit excessive motion of plumbing equipment during earthquake.

3.03 REVIEW AND OBSERVATION

- A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:
1. Underground piping installation prior to backfilling.
 2. Prior to covering walls.
 3. Prior to ceiling cover/installation.
 4. When main systems, or portions of, are being tested and ready for inspection by AHJ.
- C. Bear responsibility and cost to make piping accessible, to expose concealed lines, or to demonstrate acceptability of the system. If Contractor fails to notify Architect at times prescribed above, costs incurred by removal of such work are the responsibility of the Contractor.
- D. Final Punch:
1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Plumbing Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the plumbing systems are ready for final punch.
 2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.04 CONTINUITY OF SERVICE

- A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
1. During remodeling or addition to existing structures, while existing structure is occupied, current services to remain intact until new construction, facilities or equipment is installed.
 2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new piping, and wiring to point of connection.
 3. Coordinate transfer time to new service with Owner. If required, perform transfer during off peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.

- a. If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.
4. Organize work to minimize duration of power interruption.

3.05 CUTTING AND PATCHING

- A. Confirm Cutting and Patching requirements in Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
 1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
 2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.
 3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
 4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing piping and devices are removed as part of this project. Where alterations disturb lawns, paving, and walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
 5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.06 EQUIPMENT SELECTION AND SERVICEABILITY

- A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.07 DELIVERY, STORAGE AND HANDLING

- A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
 1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Insulation and lining that becomes wet from improper storage and handling to be replaced before installation. Products and/or materials that become damaged due to water, dirt and/or dust as a result of improper storage to be replaced before installation.
 2. Protect equipment and pipe to avoid damage. Close pipe openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
 3. Protect bright finished shafts, bearing housings and similar items until in service.

3.08 DEMONSTRATION

- A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

- B. Upon completion of work and adjustment of equipment and test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.
- D. Training and Demonstration per Section 01 91 13, General Commissioning Requirements.

3.09 CLEANING

- A. Confirm cleaning requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Upon completion of installation, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.10 INSTALLATION

- A. Confirm installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.
- C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
 - 1. Do not place equipment in sustained operation prior to initial balancing of plumbing systems.
 - 2. Provide pump impellers to obtain Basis of Design design capacities.
- D. Provide miscellaneous supports/metals required for installation of equipment and piping.

3.11 PAINTING

- A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:
 - 1. Ferrous Metal: After completion of plumbing work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces, i.e., hangers, hanger rods, equipment stands, with one coat of black asphalt for exterior or black enamel for interior, suitable for hot surfaces.
 - 2. In a mechanical room, on roof or other exposed areas, machinery and equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.

3. See individual equipment Specifications for other painting.
4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
5. Piping: Clean, primer coat and paint exposed piping on roof or at other exterior locations with two coats paint suitable for metallic surfaces and exterior exposures. Color selected by Architect.
6. Covers: Covers such as manholes, cleanouts and the like will be furnished with finishes which resist corrosion and rust.

3.12 DEMOLITION

- A. Confirm Demolition requirements in Division 01, General Requirements and Division 02, Existing Conditions. In absence of specific requirements, comply with individual Sections in Division 22, Plumbing and the following:
 1. Scope:
 - a. It is the intent of these documents to provide necessary information and adjustments to plumbing system required to meet code, and accommodate installation of new work.
 - b. Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas.
 - c. Existing Conditions: Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to exactly locate and preserve underground utilities. Replace damaged items with new material to match existing. Promptly notify Owner if utilities are found which are not shown on Drawings.
 2. Equipment: Unless otherwise directed, equipment, fixtures, or fittings being removed as part of demolition process are Owner's property. Remove other items not scheduled to be reused or relocated from job site as directed by Owner.
 3. Unless specifically indicated on Drawings, remove exposed, unused piping to behind finished surfaces (floor, walls, ceilings, etc.). Cap piping and patch surfaces to match surrounding finish.
 4. Unless specifically indicated on Drawings, remove unused equipment, fixtures, fittings, rough-ins, and connectors. Removal is to be to a point behind finished surfaces (floors, walls, and ceilings).

3.13 ACCEPTANCE

- A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Sections in Division 22, Plumbing and the following:
 1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
 - a. Testing and Balancing Reports
 - b. Cleaning
 - c. Operation and Maintenance Manuals
 - d. Training of Operating Personnel
 - e. Record Drawings
 - f. Warranty and Guaranty Certificates
 - g. Start-up/Test Document and Commissioning Reports

3.14 FIELD QUALITY CONTROL

- A. Confirm Field Quality Control requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.
- B. Tests:
 - 1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.
 - 2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.15 LETTER OF CONFORMANCE

- A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that plumbing items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.16 ELECTRICAL INTERLOCKS

- A. Where equipment motors are to be electrically interlocked with other equipment for simultaneous operation, utilize plumbing equipment wiring diagrams to coordinate with electrical systems so that proper wiring of equipment involved is affected.

END OF SECTION

BLANK PAGE

**SECTION 22-0523
GENERAL-DUTY VALVES FOR PLUMBING PIPING**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Valves, General
 - 2. Ball Valves

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. NSF 61, Annex G and/or NSF/ANSI 372 for potable water services. Valves must be 3rd-party certified.
 - 2. ISO 9001 Certified.
 - 3. IAPMO Certified for Low Lead.
- C. Source Limitations for Valves: Obtain each type of valve from a single source and from a single manufacturer.
- D. Model numbers indicated as Basis-of-Design indicate valve characteristics. All valves are to meet code Low Lead/Lead Free Standards.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Source Limitations for Valves: Obtain each type of valve from a single source and from a single manufacturer.

- B. Valves, General:
 - 1. Apollo
 - 2. Armstrong
 - 3. Crane
 - 4. Clow
 - 5. Josam
 - 6. Kennedy
 - 7. Milwaukee
 - 8. Nibco
 - 9. Watts
 - 10. Wilkins
 - 11. Zurn
 - 12. Or approved equivalent.

- C. Ball Valves:
 - 1. See Valves General above.
 - 2. NSF Valves:
 - a. Clow
 - b. Kennedy
 - c. Nibco
 - d. Or approved equivalent.

2.02 VALVES - GENERAL

- A. General:
 - 1. Sizes: Unless otherwise indicated, provide valves of same size as upstream pipe size.
 - 2. Operators: Provide handwheels, fastened to valve stem, for valves other than quarter-turn. Provide lever handle for quarter-turn valves 6-inches and smaller.
 - 3. Valve Identification: Manufacturer's name (or trademark) and pressure rating clearly marked on valve body.

- B. Valves in Insulated Piping: With 2-inch stem extension and following features:
 - 1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation on valve without breaking the vapor seal or disturbing insulation and memory stops that are fully adjustable after insulation is applied.

- C. Valve-End Connections:
 - 1. Solder Joint: With sockets according to ASME B16.18.
 - 2. Threaded: With thread according to ASME B1.20.1.

- D. Building Service:
 - 1. Shutoff and Isolation Valves:
 - a. Pipe Sizes 3-inches and Smaller: Ball Valve.
 - 2. Drain Service: Ball Valves.
 - 3. Strainer Blow-Off: Ball Valve.

2.03 BALL VALVES

- A. All ball valves on brazed piping are to be three-piece.

- B. 2-1/2 Inches and Smaller: MSS SP-110, 400-600 PSI, two-piece full port ball configuration, bronze body, extended soldered ends for copper pipe and threaded ends for iron pipe, lead-free brass or stainless steel ball, lead-free brass stem, Teflon seat, extended steel handle. Apollo 77CLF 100 Series two-piece.

- C. 3 Inches and Larger: MSS SP-110, 400-600 PSI, three-piece full port ball configuration, bronze body, extended soldered ends for copper pipe and threaded ends for iron pipe, lead-free brass or stainless steel ball, lead-free brass stem, Teflon seat, extended steel handle. Apollo 82-100/82A 140 Series three-piece.
- D. Full Port Ball Valve: 2- to 4-inch ductile iron, ASTM A536, micro finish steel chrome plated or stainless steel ball and stem. TFE seats, 600 PSI.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and weld ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- B. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher than ambient dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Inspect the shipping container before unpacking to look for damage that could have occurred during transport, and report it to the transportation company immediately. After visual inspection, remove the valve from the shipping container. Make sure the faces are free of any scratches and that there is not any obvious damage to the actuator assembly or valve body.
- D. Make sure to note the valve's model number during the unpacking process. The model number will need to be provided when purchasing replacement parts.
- E. Purge and clean all piping to be connected to valve.
- F. Install per manufacturer's recommendations.
- G. Determine that the valve and its plumbing piping is adequately supported when installed. If a valve is not adequately supported, this could prevent the valve from operating and sealing correctly. Be sure that all mating flanges are in line and parallel to minimize straining on joints and valve body.
- H. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
- I. Install valves with stems pointed up, in vertical position where possible, but in no case with stems pointed downward from horizontal plane unless unavoidable. Install valve drains with hose end adapter and cap on chain for each valve that must be installed with stem below horizontal plane. Ensure installation provides full stem movement.
- J. Insulation: Where insulation is indicated, install extended stem valves, arranged in proper manner to receive insulation.
- K. When soldering, use paste flux that are approved by the manufacturer for use with lead free alloys.
- L. If valve applications are not indicated on Drawings, use the following:
 - 1. Shutoff Service: Ball valves.

- M. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- N. Valves, except wafer/butterfly types, with the following end connections:
 - 1. For Copper Tubing, 2-inches and Smaller. Threaded ends except where solder-joint valve-end.
 - 2. For Copper Tubing, 2-1/2-inches to NPS 4-inches. Flanged ends except where threaded valve-end.
 - 3. For Steel Piping, 2-inches and Smaller: Threaded ends.
- O. Valve Adjusting and Cleaning:
 - 1. Inspect valves for leaks. Adjust or replace packing to stop leaks. Replace valve if leak persists.
 - 2. Valve Identification. Tag valves per Section 22 05 53, Identification for Plumbing Piping and Equipment.

3.02 BALL VALVES

- A. See General Installation Requirements above.

END OF SECTION

SECTION 22-0529
HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Pipe Hangers and Supports for Plumbing Piping and Equipment
 - 2. Wall and Floor Sleeves
 - 3. Building Attachments
 - 4. Flashing
 - 5. Miscellaneous Metal and Materials

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. ASCE 7-16, Minimum Design Loads for Buildings and Other Structures.
 - 2. Hanger spacing installation and attachment to meet all manufacturer's requirements and MSS SP-58.
 - 3. Terminology: As defined in MSS SP-90 "Guidelines on Terminology for Pipe Hangers and Supports".
 - 4. Install piping per SMACNA's requirements.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.07 PERFORMANCE REQUIREMENTS

- A. General - Provide pipe and equipment hangers and supports in accordance with the following:
 - 1. When supports, anchorages, and seismic restraints for equipment, and supports, anchorages, and seismic restraints for piping are not shown on the Drawings, the contractor is responsible for their design.

2. Connections to structural framing are not to introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.
- B. Engineered Support Systems:
1. Support frames such as pipe racks or stanchions for piping and equipment which provide support from below.
 2. Equipment and piping support frame anchorage to supporting slab or structure.
- C. Provide channel support systems, for piping to support multiple pipes capable of supporting the combined weight of supported systems, system contents and test water.
- D. Provide heavy-duty steel trapezes for piping to support multiple pipes capable of supporting the combined weight of supported systems, system contents and test water.
- E. Provide seismic restraint hangers and supports for piping and equipment.
- F. Obtain approval from AHJ for seismic restraint hanger and support system to be installed for piping and equipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Pipe Hangers and Supports for Plumbing Piping and Equipment:
1. Pipe Hangers/Supports:
 - a. B-Line Systems Inc.
 - b. Anvil International
 - c. HOLDRITE
 - d. Erico Co. Inc.
 - e. Snappitz Thermal Pipe Shield Manufacturing
 - f. Rilco Manufacturing Co. Inc.
 - g. Nelsen-Olson Inc.
 - h. Or approved equivalent.
 2. Channel Support Systems:
 - a. B-Line Systems Inc.
 - b. Anvil International, Anvit-Strut
 - c. Erico Hanger Co. Inc.; O-Strut Div.
 - d. Unistrut Corp.
 - e. HOLDRITE EZ-Strut Systems
 - f. Or approved equivalent.
 3. Thermal-Hanger Shield Inserts:
 - a. Erico Hanger Co. Inc.
 - b. Pipe Shields, Inc.
 - c. Rilco Manufacturing Co. Inc.
 - d. HOLDRITE Insulation Couplings
 - e. Or approved equivalent.
 4. Freestanding Roof Supports:
 - a. Miro
 - b. Nelson-Olsen Inc. / Quick "Pipe" Block
 - c. Eaton / B-Line / Dura-Blok
 - d. Mifab
 - e. Or approved equivalent.
 5. Pipe Alignment and Secondary Supports:
 - a. HOLDRITE
 - b. Starquick

- c. Or approved equivalent.
- B. Wall and Floor Sleeves:
- 1. Below Grade and High Water Table Areas:
 - a. Modular Link Sealing System at Pipe Sleeves:
 - 1) Thunderline Corporation
 - 2) Or approved equivalent.
 - 2. Pre-Engineered Firestop Pipe Penetration Systems:
 - a. HOLDRITE HydroFlame
 - b. Proset
 - c. Or approved equivalent.
- C. Building Attachments:
- 1. Anchor-It
 - 2. Gunnebo Fastening Corp.
 - 3. ITW Ramset / Red Head
 - 4. Masterset Fastening Systems, Inc.
 - 5. Or approved equivalent.
- D. Flashing:
- 1. Fastenal
 - 2. Or approved equivalent.
- E. Miscellaneous Metal and Materials:
- 1. See Miscellaneous Metal and Materials article below.
 - 2. Powder-Actuated Fastener Systems:
 - a. Gunnebo Fastening Corp.
 - b. Hilti, Inc.
 - c. ITW Ramset / Red Head
 - d. Masterset Fastening Systems, Inc.
 - e. Or approved equivalent.

2.02 PIPE HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

- A. Horizontal Piping Hangers and Supports - Horizontal and Vertical Piping, and Hanger Rod Attachments:
- 1. Factory fabricated horizontal piping hangers and supports to suit piping systems in accordance manufacturer's published product information.
 - 2. Use only one type by one manufacturer for each piping service.
 - 3. Select size of hangers and supports to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle or shield for insulated piping.
 - 4. Provide copper-plated hangers and supports for uninsulated copper piping systems.
 - 5. Provide padded pipe hangers, clamps and supports for thermoplastic piping system.
 - 6. Install no hub cast iron pipe and fittings per CISPI 301-09 Installation Procedures for Hubless Cast Iron Pipe and Fittings for Sanitary and Storm Drain Waste and Vent Piping Applications. Brace hubless cast iron pipe and fittings 5-inch and larger with HOLDRITE No Hub Pipe Restraints or approved equivalent.
- B. Pipe Hangers, Guides and Channel Systems:
- 1. Hanger Rods: Hanger rods continuously threaded or threaded ends only in concealed spaces and threaded ends only in exposed spaces; finish electro-galvanized or cadmium-plated in concealed spaces and prime painted in exposed spaces; sizes per MSS.
 - 2. Hanger Rod Couplings: Malleable iron rod coupling with elongated center sight gap for visual inspection; to have same finish as hanger rods.
 - 3. Pipe Rings for Hanger Rods: Pipe sizes 2-inch and smaller, MSS SP Type 6 or Type 10, or approved equivalent. Pipe sizes 2-1/2-inches and larger, clevis type hangers with adjustable nuts on rod. MSS SP Type 1. Pipe rings to have same finish as hanger rods.

4. Pipe Slides: Type 35 reinforced Teflon slide material (3/32-inch minimum thickness) bonded to steel; highly finished steel or stainless steel contact surfaces to resist corrosion; 60-80 PSI maximum active contact surface loading; steel parts 3/16-inch minimum thickness; attachment to pipe and framing by welding.
 5. Pipe Guides:
 - a. Furnish and install pipe guides on continuous runs where pipe alignment must be maintained. Minimum two on each side of expansion joints, spaced per manufacturer's recommendations for pipe size. Fasten guides securely to pipe and structure. Any contact with chilled water pipe is not to permit heat to be transferred in sufficient quantity to cause condensation on any surface.
 - b. Furnish and install guides approximately 4 pipe diameters (first guide) and 14 diameters (second guide) away from each end of expansion joints. Guides are not to be used as supports and are in addition to other pipe hangers and supports.
 6. Channel Type Pipe Hanging System: Framing members No. 12 gauge formed steel channels, 1-5/8-inch square, conforming to ASTM A1011 GR33; one side of channel to have a continuous slot with in-turned lips; framing nut with grooves and spring 1/2-inch size, conforming to ASTM 675 GR60; screws conforming to ASTM A307; fittings conforming to ASTM A575; parts enamel painted or electro-galvanized.
- C. Pipe Saddles and Shields:
1. Factory fabricated saddles or shields under piping hangers and supports for insulated piping.
 2. Size saddles and shields for exact fit to mate with pipe insulation. 1/2 round, 18 gauge, minimum 12-inches in length (4-inch pipe and larger to be three times longer than pipe diameter).
- D. Thermal-Hanger Shield Inserts: 100-PSI (690-kPa) minimum compressive strength insulation, encased in sheet metal shield.
1. Material for Cold Piping: Water-repellent-treated, ASTM C533, Type I calcium silicate with vapor barrier.
 2. Material for Hot Piping: Water-repellent-treated, ASTM C533, Type I calcium silicate.
 3. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.
 4. For Clevis or Band Hanger: Insert and shield to cover lower 180 degrees of pipe.
 5. Insert Length: Extend 2-inches beyond sheet metal shield for piping operating below ambient air temperature.
 6. Thermal Hanger Shield Inserts should be provided at the hanger points and guide locations on pipes requiring insulation. The Inserts should consist of Polyisocyanurate (urethane or phenolic insulation) encircling the entire circumference of the pipe with a 360 degree PVC (1.524 mm thick) with a living hinge and J lock and installed during the installation of the piping system.
- E. Roller Hangers:
1. Adjustable roller hanger. Black steel yoke, cast iron roller. MSS Type 41.
- F. Concrete Inserts:
1. Malleable iron body, hot dipped galvanized finish. Lateral adjustment. MSS Type 18.
- G. Continuous Concrete Insert:
1. Steel construction, minimum 12 gauge. Electro-galvanized finish. Pipe clamps and insert nuts to match.
- H. Beam Clamps:
1. MSS Type 19 and 23, wide throat, with retaining clip.
 2. Universal Side Beam Clamp: MSS Type 20.
- I. Below Ground:

1. Pipe Hangers: Adjustable Clevis type, Federal Specification WW-H-171 (Type 1), UL listed, stainless steel Type 316. MSS Type 1. If PVC piping to be used, provide Type 1 hanger, coated for PVC piping.
 2. Rod: 5/8-inch stainless steel Type 316.
 3. Eyebolt: Stainless steel Type 316.
 4. Nuts and Washers: Stainless steel Type 316.
- J. Hangers for Pipe Size 2-inches and Smaller:
1. Adjustable swivel ring hanger, UL listed, Type 6 or Type 10.
- K. Hangers for Pipe Size 2-1/2-inches and Larger:
1. Adjustable clevis type, UL listed, Type 1.
- L. Riser Clamps:
1. Steel, UL listed. MSS Type 8.
- M. Plumbers Tape:
1. Not permitted as pipe hangers or pipe straps.
- N. Pipe Alignment and Secondary Support Systems:
1. Secondary Pipe supports for general applications (Non-Acoustical).
 - a. Supports will be manufactured in compliance with IAPMO Product Standard PS 42-96. All products provided will be listed by IAPMO for secondary pipe support.
 - b. Supports may be used when sound and/or vibration transfer is not a concern.
 2. Secondary pipe supports for sound and vibration attenuation (Acoustical).
 - a. Supports will be manufactured in compliance with IAPMO Product Standard PS 42-96. All products provided will be listed by IAPMO for secondary pipe support.
 - b. Acoustical pipe supports will be manufactured and installed in compliance with International Organization for Standardization (ISO) 3822-1 with current amendments.
 - c. Supports will be used when sound and/or vibration transfer is a concern. Locations where acoustical supports will be provided and include but are not limited to partition walls between living units, tenant spaces, retail units, mechanical rooms and lobbies.
 - d. Support Products:
 - 1) Support to Wall Brace and Wall Stud Penetrations: HOLDRITE #261, #262, #263, and #264, or approved equivalent.
 - 2) Pipe Wrap for Pipe Clamps and Channel-Mounted Pipe Clamps: HOLDRITE #270, or approved equivalent.
 - 3) Pipe Wrap for Pipe Hangers: HOLDRITE #271, #272-2, and #272-4, or approved equivalent.
 - 4) Drop-Ear Fitting Support: HOLDRITE #265, or approved equivalent.
 - 5) Floor Riser Isolation Pads: HOLDRITE #275-T, or approved equivalent.
 - 6) Floor Isolation Pads (General Applications): HOLDRITE #274, #275, #276, and #278, or approved equivalent.
- O. Freestanding Roof Pipe Supports:
1. Polyethylene high-density UV resistant block with foam pad or 100 percent UV resistant recycled rubber. With galvanized strut/channel.

2.03 WALL AND FLOOR SLEEVES

- A. Below Grade and High Water Table Areas:

1. Modular Link Sealing System at Pipe Sleeves: Neoprene gasket links bolted together around an interior sleeve forming a watertight seal. Use a modular link sealing system at sleeves to continuously fill the annular space between the pipe and the wall opening. Provide Link-seal Type C unless otherwise noted. OS with S-316 stainless construction for continuous water/tank walls.
 2. Sleeves through concrete foundation walls and floors. Ductile iron pipe. Class 50 or 51 pipe conforming to ANSI/AWWA C151/A21.51. Pipe sleeve will extend a minimum of 6-inches beyond outside perimeter of foundation. Final placement of sleeve will be confirmed with project's structural engineer. In areas with a high water table, provide AWWA C900, Class 235 plastic pipe in lieu of ductile iron pipe.
- B. Pre-Engineered Firestop Pipe Penetration Systems: UL listed assemblies for maintaining fire rating of piping penetrations through fire-rated assemblies. Comply with ASTM E814.
- C. Insulating Caulking: Eagle or Pitcher Super 66 high temperature cement.
- D. Fabricated Accessories:
1. Steel Pipe Sleeves: Fabricate from Schedule 40 black or galvanized steel pipe. Remove end burrs by grinding.
 2. Sheet Metal Pipe Sleeves: Fabricate from G-90 galvanized sheets closed with lock-seam joints. Provide following minimum gauges for sizes indicated:
 - a. Sleeve Size 4-inches in Diameter and Smaller: 18 gauge.
 - b. Sleeve Sizes 5-inches to 6-inches: 16 gauge.
 - c. Sleeve Sizes 7-inches and Larger: 14 gauge.
 - d. Fire-Rated Safing Material:
 - 1) Rockwool Insulation: Complying with FS-HH-I-558, Form A, Class IV, 6 lbs./cu.ft. density with melting point of 1985 degrees F and K value of 0.24 at 75 degrees F.
 - 2) Calcium Silicate Insulation: Noncombustible, complying with FS-HH-I-523, Type II, suitable for 100 degrees F to 1200 degrees F service with K value of 0.40 at 150 degrees F.

2.04 BUILDING ATTACHMENTS

- A. General: Anchor supports to existing masonry, block and tile walls per anchoring system manufacturer's recommendations or as modified by project Structural Engineer. Provide anchor bolts suitable for cracked concrete.
- B. Anchor Bolts:
1. Anchor Bolts (Cast-In-Place): Steel bolts, ASTM A307. Nuts to conform to ASTM A194. Design values for shear and tension not more than 80 percent of the allowable listed loads.
 2. Anchor (Expansion) Bolts: Carbon steel to ASTM A307; nut to conform to ASTM A194; drilled-in type. Design values for shear and tension not more than 80 percent of the allowable listed loads.
 3. Anchor (Adhesive) Bolts: Consisting of two-part adhesive cartridge and zinc-plated Type A307 steel anchor bolt rod assembly with ASTM A194 nut.
- C. Beam Clamps:
1. MSS Type 19 and 23, wide throat, with retaining clip.
 2. Universal Side Beam Clamp: MSS Type 20.
- D. Powder-Actuated Drive Pin Fasteners:
1. Powder-Actuated Drive-Pin Fasteners: Powder actuated type, drive pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

- E. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.
- F. Grout: ASTM C1107, Grade B, factory mixed and packaged, non-shrink and nonmetallic, dry, hydraulic-cement grout.
 - 1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
 - 2. Properties: Non-staining, noncorrosive, and non-gaseous.
 - 3. Design Mix: 5000-PSI (34.5-MPa), 28-day compressive strength.

2.05 FLASHING

- A. Steel Flashing: 26 gauge galvanized steel.
- B. Safes: 8 mil thick neoprene.
- C. Caps: Steel, 22 gauge minimum, 16 gauge at fire-resistant structures.
- D. Provide hot dipped galvanized components for items exposed to weather.

2.06 MISCELLANEOUS METAL AND MATERIALS

- A. Miscellaneous Metal: Provide miscellaneous metal items specified hereunder, including materials, fabrication, fastenings and accessories required for finished installation, where indicated on Drawings or otherwise not shown on drawings, that are necessary for completion of the project. The Contractor is responsible for their design.
 - 1. Fabricate miscellaneous units to size, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- B. Structural Shapes: Where miscellaneous metal items are needed to be fabricated from structural steel shapes and plates, provide members constructed of steel conforming with requirements of ASTM A36 or approved equivalent.
- C. Steel Pipe: Provide seamless steel pipe conforming to requirements of ASTM A53, Type S, Grade A, or Grade B. Weight and size required as specified.
- D. Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items; surface-applied fasteners are specified elsewhere.
- E. Bolts: Low carbon steel externally and internally threaded fasteners conforming with requirements of ASTM A307; include necessary nuts and plain hardened washers. For structural steel elements supporting mechanical material or equipment from building structural members or connection thereto, use fasteners conforming to ASTM A325.
- F. Miscellaneous Materials: Provide incidental accessory materials, tools, methods and equipment required for fabrication.
- G. Provide hot dipped galvanized components for items exposed to weather.
- H. Use straps, threshold rods and wire with sizes required by SMACNA to support piping.
- I. Grout: ASTM C1107, Grade B, factory mixed and packaged, non-shrink and nonmetallic, dry, hydraulic-cement grout.

1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
2. Properties: Non-staining, noncorrosive, and non-gaseous.
3. Design Mix: 5000-PSI (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Examination:
 1. Verify building materials to have hangers and attachments affixed in accordance with hangers to be used. Provide supporting calculations.
- B. Preparation:
 1. Examine Drawings and coordinate for verification of exact locations of fire and smoke rated walls, partitions, floors and other assemblies. Indicate, by shading and labeling on Record Drawings such locations and label as "1-Hour Wall," "2-Hour Fire/Smoke Barrier," and the like. Determine proper locations for piping penetrations. Set sleeves in place in new floors, walls or roofs prior to concrete pour or grouting.
- C. Install hangers, supports, anchors and sleeves after required building structural work has been completed in areas where the work is to be installed. Coordinate with project structural engineer proper placement of inserts, anchors and other building structural attachments.

3.02 PIPE HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

- A. Hangers and Supports:
 1. Comply with MSS SP-58. Pipe Hanger and Support Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. For horizontally hung grooved-end piping, provide a minimum of 2 hangers per pipe section.
 2. Pipe Ring Diameters:
 - a. Uninsulated and Insulated Pipe, except where oversized pipe rings are specified: Ring inner diameter to suit pipe outer diameter.
 - b. Insulated Piping Where Oversized Pipe Rings are Specified and Vibration Isolating Sleeves: Ring inner diameter to suit outer diameter of insulation or sleeve.
 3. Oversize Pipe Rings: Provide oversize pipe rings of 2-inch and larger size.
 4. Pipe Support Brackets: Support pipe with pipe slides.
 5. Steel Backing in Walls: Provide steel backing in walls to support fixtures and piping hung from steel stud walls.
 6. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems.
 - a. Field assemble and install according to manufacturer's written instructions.
 7. Pipe Guides:
 - a. Install on continuous runs where pipe alignment must be maintained. Provide a minimum of two on each side of expansion joints, spaced per manufacturer's recommendations for pipe size. Fasten guides to pipe structure. Any contact with chilled water pipe should not permit heat to be transferred in sufficient quantity to cause condensation on any surface.
 - b. Install approximately 4 pipe diameters (first guide) and 14 diameters (second guide) away from each end of expansion joints. Do not use as supports. Provide in addition to other required pipe hangers and supports.
 8. Heavy-Duty Steel Trapeze Installation: Arrange for grouping of parallel runs of horizontal piping and support together on field -fabricated, heavy-duty trapezes.

- a. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - b. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D-1.1
9. Group parallel runs of horizontal piping to be supported together on trapeze-type hangers.
 10. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe.
 11. Do not support piping from other piping.
 12. Fire protection piping will be supported independently of other piping.
 13. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.
 14. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.
 15. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchor, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.
 16. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
 17. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping" is not exceeded.
 18. Insulated Piping: (comply with the following)
 - a. Attach clamps and spacers to piping.
 - 1) Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
 - 2) Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
 - 3) Do not exceed pipe stress limits according to ASME B31.9.
 - b. Install MSS SP-58, Type 39 protection saddles, if insulation without a vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
 - 1) Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.
 - c. Install MSS SP-58, Type 40 protective shields on cold piping having a vapor barrier. Shields to span arc of 180 degrees.
 - 1) Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.
 - d. Shield Dimensions for Pipe, not less than the following:
 - 1) NPS 1/4 to NPS 3-1/2 (DN8 to DN 90): 12-inches long and 0.048-inch thick.
 - 2) NPS 4 (DN100): 12-inches long and 0.06-inch thick.
 - 3) NPS 5 and NPS 6 (DN125 and DN150): 18-inches long and 0.06-inch thick.
 - 4) NPS 8 to NPS 14 (DN200 to DN350): 24-inches long and 0.075-inch thick.
 - 5) NPS 16 to NPS 24 (DN400 to DN600): 24-inches long and 0.105-inch thick.
 - e. Pipes NPS 8 (DN200) and Larger: Include wood inserts.
 - f. Insert Material: Length at least as long as protective shield.
 - g. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

19. Equipment Clearances: Do not route equipment or piping through electrical rooms, transformer vaults, elevator equipment rooms, IT rooms, MPOE rooms, or other electrical or electronic equipment spaces and enclosures and the like. Within equipment rooms, provide minimum 3-foot lateral clearance from all sides of electric switchgear panels. Do not route piping or equipment above any electric power or lighting panel, switchgear, or similar electric device. Coordinate with Electrical and coordinate exact equipment or pipe routing to provide proper clearance with such items.
 20. Pipe supports and hanger spacing (pipe supported from structure or floor-supported) to meet the requirements of References and Standards Article in Part 1 above.
- B. Pipe Curb Assemblies:
1. Provide for piping and electrical conduit which penetrates the structural roof deck to service equipment above the roof level (e.g., piping, electrical power and control wiring). Meet requirements of roof warranty.
 2. Provide prefabricated units for roof membrane and insulation penetrations related to equipment. Coordinate with roofing system. Set supports on the structural deck. Do not set supports on insulation or roofing. Provide level supports by prefabricated pitch built into the curb.
 3. Piping above roof to be supported with freestanding roof pipe supports unless detailed otherwise. At roofing applications, the adhesion mastic is to be specifically submitted to and approved by the roofing system manufacturer/installer to maintain the integrity of all warranties.
 4. At concrete floors, install a polyurethane mastic to the support block and adhere in place.
- C. Vertical Piping:
1. Support with U-clamps fastened to wall to hold piping away from wall unless otherwise approved.
 2. Riser clamps to be directly under fitting or welded to pipe. Provide neoprene pads for all systems except natural gas.
 3. Riser to be supported at each floor penetration.
 4. Provide structural steel supports at the base of pipe risers. Size supports to carry forces exerted by piping system when in operation.
- D. Adjusting and Painting:
1. Adjust hangers so as to distribute loads equally on attachments. Provide grout under supports to bring piping and equipment to proper level and elevations.
 2. Prime paint ferrous nongalvanized hangers, accessories, and supplementary steel which are not factory painted.

3.03 WALL AND FLOOR SLEEVES

- A. "Link-Seal" Pipe Sleeves: Install at slab on grade floor/below grade piping penetrations. Provide manufacturer's sleeve appropriate to seal type for pre-cast penetrations (except for DWV piping at slab on grade). Provide manufacturer's sleeve appropriate to seal type for pre-cast penetrations.
- B. Fabricated Pipe Sleeves:
1. Provide either steel or sheet metal pipe sleeves accurately centered around pipe routes. Size such that piping and insulation, if any, will have free movement within the sleeve, including allowance for thermal expansion. Sleeve diameter to be determined by local seismic clearance requirement, and by waterproofing requirements.
 2. Length: Equal to thickness of construction penetrated, except extend floor sleeves 1-inch above floor finish.
 3. Provide temporary support of sleeves during placement in concrete and other work around sleeves. Provide temporary end closures to prevent concrete and other materials from entering pipe sleeves.

4. Seal each end airtight with a resilient nonhardening sealer, UL listed and fire rated per ASTM 814.

3.04 BUILDING ATTACHMENTS

- A. Install within concrete slabs or attach to structural steel or wood. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints and at changes in direction of piping.
- B. Attachment to Wood Structure: Provide MSS Type 34 for attachment to wooden beam or approved attachment for a wood structure.
- C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Install concrete inserts before concrete is placed; fasten insert secure to forms. Where concrete with compressive strength less than 2500 PSI is indicated, install reinforcing bars through openings at top in inserts.
- E. Install powder-actuated drive pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Test powder-actuated insert attachments with a minimum load of 100 pounds.
- F. Bolting: Provide bored, drilled or reamed holes for bolting to miscellaneous structural metals, frames or for mounts or supports. Flame cut, punched or hand sawn holes will not be accepted.
- G. Anchor Bolts:
 1. Install anchor bolts for mechanical equipment and piping as required. Tightly fit and clamp base-supported equipment anchor bolts at equipment support points. Provide locknuts where equipment and piping are hung.
 2. Anchor Bolts (Cast-In-Place): Embed anchor bolts in new cast-in-place concrete to anchor equipment. Install a pipe sleeve around the anchor bolt for adjustment of the top 1/3 of the bolt embedment; sizes and patterns to suit the installation conditions of the equipment to be anchored.
- H. Pipe Anchors: Provide anchors to fasten piping which is subject to expansion and contraction, and adjacent to equipment to prevent loading high forces onto the equipment.
- I. Escutcheon Plates: Install around horizontal and vertical piping at visible penetrations through walls, partitions, floors, or ceilings, including penetrations through closets, through below ceiling corridor wall, and through equipment room walls and floors.
- J. Installation of metallic or plastic piping penetrations through non fire-rated walls and partitions and through smoke-rated walls and partitions:
 1. Install fabricated pipe sleeve.
 2. After installation of sleeve and piping, tightly pack entire annular void between piping or piping insulation and sleeve identification with specified material.
 3. Seal each end airtight with a resilient nonhardening UL listed fire resistant ASTM 814 sealant.
- K. Piping Penetrations Through Fire-Rated (1 to 3 hour) Assemblies:
 1. Select and install pre-engineered pipe penetration system in accordance with the UL listing and manufacturer's recommendation.
 2. Provide proper sizing when providing sleeves or core-drilled holes to accommodate the penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet the requirements of ASTM E814. Use HOLDRITE HydroFlame or approved equivalent.

- L. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

3.05 FLASHING

- A. Flash and counter flash where piping passes through weather or waterproofed walls, floors and roofs.
- B. Flash vent soil pipes with flashings per Division 01, General Requirements.
- C. Flash floor drains over finished areas and roof drains, 10-inches clear on sides, minimum 36-inches by 36-inches sheet size. See Division 01, General Requirements. Fasten flashing to drain with clamping device.
- D. Install built up fixtures (mop sinks, shower stalls, shower floors) with water sealing systems/membranes to meet Code and as prescribed by Division 01, General Requirements and Section 22 00 00, Plumbing Basic Requirements. Meet all Code testing requirements. Provide drainage devices with appropriate flanges, clamps, etc. to meet these installation requirements and ensure a water-tight installation.

3.06 MISCELLANEOUS METAL AND MATERIALS

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required. Avoid cutting concrete reinforcing when drilling for inserts. Reference structural drawings and reinforcing shop drawings and determine locations of stirrups prior to drilling into concrete.
- C. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- E. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
 - 1. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- F. Fabrication:

1. General: Verify dimensions prior to fabrication. Form metal items to accurate sizes and configurations as indicated on Drawings and otherwise required for proper installation; make with lines straight and angles sharp, clean and true; drill, countersink, tap, and otherwise prepare items for connections with work of other trades, as required. Fabricate to detail of structural shapes, plates and bars; weld joints where practicable; provide bolts and other connection devices required. Include anchorages; clip angles, sleeves, anchor plates and similar devices. Hot dip galvanize after fabrication items installed in exterior locations. Set accurately in position as required and anchor securely to building construction. Construct items with joints formed for strength and rigidity, accurately machining for proper fit; where exposed to weather, form to exclude water.
2. Finishes:
 - a. Ferrous Metal: After fabrication, but before erection, clean surfaces by mechanical or chemical methods to remove rust, scale, oil, corrosion, or other substances detrimental to bonding of subsequently applied protective coatings. For metal items exposed to weather or moisture, galvanize in manner to obtain G90 zinc coating in accordance with ASTM A123. Provide other non-galvanized ferrous metal with 1 coat of approved rust-resisting paint primer, in manner to obtain not less than 1.0 mil dry film thickness. Touch-up damaged areas with primer of same material before installation. Apply zinc coatings and paint primers uniformly and smoothly; leave ready for finish painting as specified elsewhere.
 - b. Metal in contact with Concrete, Masonry and Other Dissimilar Materials:
 - 1) Where metal items are to be erected in contact with dissimilar materials, provide contact surfaces with coating of an approved zinc-chromate primer in manner to obtain not less than 1.0 mil dry film thickness, in addition to other coatings specified in these specifications.
 - c. For Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

G. Metal Fabrication:

1. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.
2. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.
3. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of weld and methods used in correcting welding work, and with the following:
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove welding flux immediately.
 - d. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.
4. Provide hot dipped galvanized components for items exposed to weather.

END OF SECTION

BLANK PAGE

**SECTION 22-0553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Plastic Nameplates
 - 2. Tags
 - 3. Plastic Pipe Markers

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, submit Valve Schedule for each piping system, in tabular format using Microsoft Word or Excel software. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses by special "flags" in margin of schedule. In addition to mounted copies, furnish extra copies for maintenance manuals. Provide schedules organized as follows:
 - 1. Equipment Type:
 - a. Identification:
 - b. Background:
 - 1) Size:
 - 2) Color:
 - c. Lettering:
 - 1) Size:
 - 2) Color:

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required.
 - 2. Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices unless otherwise indicated.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 22, Plumbing Sections. Where more than a single type is specified for application, provide single selection for each product category.
- B. Plastic Nameplates:
 - 1. Brady Corporation
 - 2. Or approved equivalent.
- C. Tags:
 - 1. Brady Corporation
 - 2. Brimar
 - 3. Champion America Inc.
 - 4. Craftmark
 - 5. Seton Identification Products
 - 6. Or approved equivalent.
- D. Plastic Pipe Markers:
 - 1. Brady Corporation
 - 2. Brimar
 - 3. Champion America Inc.
 - 4. Craftmark
 - 5. Seton Identification Products
 - 6. Or approved equivalent.

2.02 PLASTIC NAMEPLATES

- A. Description: Engraving stock melamine plastic laminate 1/8-inch thick, engraved with engraver's standard letter style of the sizes and wording indicated.
 - 1. Letter Color: White.
 - 2. Letter Height: 1/2 inch.
 - 3. Background Color: Black.
 - 4. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.
 - 5. Access Panel Markers: Manufacturer's standard 1/16-inch thick engraved plastic laminate access panel markers, with abbreviations and numbers corresponding to concealed valve or devices/equipment. Include center hole to allow attachment.
 - 6. Signage for hot water outlets on 140 degree F hot water systems not protected by ASSE 1070 mixing valves; hose bibbs, janitor sinks, and fixtures used by trained personnel.
 - a. Manufacturer's standard 1/8-inch thick engraved plastic laminate signage 4 by 4-inches.
 - b. Letter Color: Red.
 - c. Letter Height: 1/2 inch.
 - d. Background Color: White.
 - e. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

2.03 TAGS

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2-inch diameter.
- B. Metal Tags: Polished Brass with stamped letters; tag size minimum 1-1/2-inch diameter with smooth edges.
- C. Valve designations to be coordinated with existing valve identifications to ensure no repetitive designations are utilized.
- D. Chart/Schedules: Valve Schedule Frames. For each page of a valve schedule, provide glazed display frame with removable mounting as appropriate for wall construction upon which frame is to be mounted. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.
- E. Valve Tag Fasteners: Solid brass chain (wire link or beaded type), or solid brass S-hooks.
- F. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
 - 1. Size: Approximately 4 by 7-inches.
 - 2. Fasteners: Brass grommet and wire.
 - 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
 - 4. Color: Yellow background with black lettering.

2.04 PLASTIC PIPE MARKERS

- A. Color: Conform to ASME A13.1 and ANSI Z535.1.
- B. Plastic Pipe Markers (for external diameters of 6-inches and larger including insulation): Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- C. Plastic Tape Pipe Markers (for external diameters less than 6-inches including insulation): Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Minimum information indicating flow direction arrow and identification of fluid being conveyed.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Lettering and Graphics:
 - 1. General: Coordinate names, abbreviations and other designations used in plumbing identification work with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.
 - 2. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: Chiller No. 3, Air Handling Unit No. 42, Standpipe F12, and the like).
- B. Preparation: Degrease and clean surfaces to receive adhesive for identification materials.

- C. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.
- D. Install valve schedule at each mechanical room.
- E. Access Doors: Provide markers on each access door and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions.

3.02 PLASTIC NAMEPLATES

- A. Identify pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates riveted to equipment body.
- B. Identify control panels and major control components outside panels with plastic nameplates riveted to equipment body.
- C. Install plastic nameplates with corrosive-resistant mechanical fasteners.

3.03 TAGS

- A. Small devices, such as in-line pumps, may be identified with tags. Use metal tags on piping 3/4-inch diameter and smaller.
- B. Identify valves in main and branch piping with metal tags. Indicate valve function and the normally open or closed positions on the valve tag.
- C. Coordinate with the facility maintenance personnel to ensure consistency with the existing tagging system.
- D. Tag balancing valves with balanced GPM or CFM indicated after balancing is completed and accepted.
- E. Install tags with corrosion resistant chain.

3.04 PLASTIC PIPE MARKERS

- A. Install plastic pipe markers in accordance with manufacturer's instructions.
- B. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- C. For exterior underground piping installations, install underground plastic pipe markers with tracer wire 6 to 8-inches below finished grade directly above buried pipe.
- D. Identify piping, concealed or exposed, with plastic tape pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20-feet (reduced to 10-feet in congested areas and mechanical equipment rooms) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction. Locate near branches, valves, control devices, equipment connections, access doors, floor/wall penetrations.

END OF SECTION

**SECTION 22-0700
PLUMBING INSULATION**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Type 1, Glass Wool Pipe Insulation
 - 2. Type 2, Flexible Elastomeric Insulation
 - 3. Accessories
 - 4. Pipe Fitting Insulation Covers

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. Piping insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, provide:
 - 1. Installer qualifications.
 - 2. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
 - 3. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets with requirements indicated. Include dates of tests.
 - 4. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.
 - 5. Submit manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements apply to this Section.
- B. In addition, meet the following:
 - 1. Formaldehyde Free: Should be third-party certified with UL Environment Validation.
 - 2. Recycled Content: A minimum of 40 percent post-consumer recycled glass content certified and UL validated.
 - 3. Low Emitting Materials: For all thermal and acoustical applications of Glass Mineral Wool Insulation products, provide materials complying with the testing and products requirements of UL GREENGUARD Gold Certification.

4. Installer to have minimum 5 years' experience in the business of installing insulation.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.07 FIRE HAZARD CLASSIFICATION

- A. Maximum fire hazard classification of the composite insulation construction as installed to be not more than a Flame Spread Index (FSI) of 25 and Smoke Developed Index (SDI) of 50 as tested by current edition of ASTM E84 (NFPA 255) method.
- B. Test pipe insulation in accordance with requirements of current edition of UL "Pipe and Equipment Coverings".

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Type 1, Glass Wool Pipe Insulation:
 1. Owens-Corning
 2. Johns Manville
 3. Or approved equivalent.
- B. Type 2, Flexible Elastomeric Insulation:
 1. Insulation:
 - a. Armacell LLC Armaflex
 - b. K-Flex
 - c. Or approved equivalent.
 2. Glue:
 - a. Armacell LLC Armaflex Low VOC Adhesive
 - b. K-Flex
 - c. Or approved equivalent.
 3. Paint:
 - a. Armacell LLC Armaflex
 - b. K-Flex
 - c. Or approved equivalent.
- C. Accessories:
 1. ITW Insulation Systems
 2. Or approved equivalent.
- D. Pipe Fitting Insulation Covers:
 1. Zeston Johns Manville
 2. ITW Insulation Systems
 3. Or approved equivalent.

2.02 TYPE 1, GLASS WOOL PIPE INSULATION

- A. Glass Fiber: ASTM C547 Type I and IV; rigid molded, noncombustible.
 1. Thermal Conductivity Value: 0.27 BTU*in/(hr*sf°F) at 75 degrees F.
 2. Maximum Service Temperature: 850 degrees F to 1000 degrees F.
 3. Vapor Retarder Jacket: White Kraft paper reinforced with glass fiber and bonded to aluminum foil, with self-sealing longitudinal laps and butt strips or vapor barrier mastic.

2.03 TYPE 2, FLEXIBLE ELASTOMERIC INSULATION

- A. Elastomeric Foam: ASTM C534; flexible, cellular elastomeric, molded or sheet.
 - 1. Thermal Conductivity Value: 0.25 BTU*in/(hr*sf°F) at 75 degrees F.
 - 2. Maximum Service Temperature of 220 degrees F.
 - 3. Maximum Flame Spread: 25.
 - 4. Maximum Smoke Developed: 50 (3/4-inch thick and below).
 - 5. Connection: Waterproof vapor retarder adhesive as needed.
 - 6. UV Protection: UV outdoor protective coating per manufacturer's requirements.
- B. Glue: Contact adhesive specifically manufactured for cementing flexible elastomeric foam.
- C. Paint: Nonhardening high elasticity type, specifically manufactured as a protective covering of flexible elastomeric foam insulation for prevention of degradation due to exposure to sunlight and weather.

2.04 ACCESSORIES

- A. Equipment Insulation Compounds: Provide adhesives, cement, sealers, mastics and protective finishes as recommended by insulation manufacturer for applications indicated.
- B. Provide staples, bands, wire, wire netting, tape corner angles, anchors, stud pins and metal covers as recommended by insulation manufacturer for applications indicated. Accessories, i.e., adhesives, mastics, cements and tape to have same flame and smoke component ratings as insulation materials with which they are used. Shipping cartons to bear a label indicating that flame and smoke ratings do not exceed those listed above. Provide permanent treatment of jackets or facings to impart flame and smoke safety. Provide non-water soluble treatments. Provide UV protection recommended by manufacturer for outdoor installation.

2.05 PIPE FITTING INSULATION COVERS

- A. PVC Plastic Fitting Covers: Schuller Zeston 2000, Knauf Proto Fitting or approved equivalent. One-piece molded type fitting covers and jacketing material, gloss white. Connections: Tacks; pressure sensitive color matching vinyl tape.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION INFORMATION

- A. Verification of Conditions:
 - 1. Do not apply insulation until pressure testing and inspection of piping has been completed.
 - 2. Examine areas and conditions under which insulation will be installed. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Preparation: Clean and dry surfaces to be insulated.
- C. Installation:
 - 1. Insulation: Continuous through walls, floors and partitions except where noted otherwise.
 - 2. Piping and Equipment:

- a. Install insulation over clean, dry surfaces with adjoining sections firmly butted together and covering surfaces. Fill voids and holes. Seal raw edges. Install insulation in a manner such that insulation may be split, removed, and reinstalled with vapor barrier tape on strainer caps and unions. Do not install insulation until piping has been leak tested and has passed such tests. Do not insulate manholes, equipment manufacturer's nameplates, handholes, and ASME stamps. Provide beveled edge at such insulation interruptions. Repair voids or tears.
- D. Provide accessories as required. See Part 2 Article "Accessories" above.
- E. Protection and Replacement: Protect installed insulation during construction. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
- F. Labeling and Marking: Provide labels, arrows and color coding on piping. Attach labels and flow direction arrows to jacketing per Section 22 05 53, Identification for Plumbing Piping and Equipment.
- G. Insulation Shields: Provide hangers and shields (18 gauge minimum) outside of insulation for cold piping (<60 degrees F). Hot water piping hangers may penetrate insulation to contact pipe directly. Provide 18-inch long, noncompressible insulation section at insulation shields for lines 1-1/2-inches and larger (hot and cold piping).
- H. Piping Surfaces to be Insulated:

Item to be Insulated	System Insulation Type	Pipe Size	Insulation Thickness
Hot Water Piping Above Grade (105F to 140F)	1	Runouts =<1-1/4-inch (uncirculated branches located in partitions within conditioned spaces)	1-inch
		Mains =<1-1/4-inch	1-inch
		Mains >1-1/4-inch	1-1/2-inch
Hot Water Circulation Piping Above Grade (105F to 140F)	1	Mains =<1-1/4-inch	1-inch
		Mains >1-1/4-inch	1-1/2-inch
Cold Water Piping Above Grade	1	=<1-1/2-inch	1/2-inch
		>1-1/2-inch	1-inch
Above Grade Roof Drain/Overflow Drain Piping	1, 2	All	1/2-inch
Roof Drain Underbodies	5, 6	N/A	1-inch
Overflow Roof Drain Underbodies	5, 6	N/A	1-inch
Condensate Drain Piping	1, 2	All	1/2-inch

3.02 TYPE 1, GLASS WOOL PIPE INSULATION

- A. See General Installation Requirements above.
- B. Install in accordance with manufacturer's instructions for below grade installation.

- C. Lap seal insulation with waterproof adhesive. Do not use staples or other methods of attachment which would penetrate vapor barrier. Apply fitting covers with seated tacks and vapor barrier tape.
- D. Apply insulation to pipe and seal with self-sealing lap. Use self-sealing butt strips to seal butt joints. Insulate fittings, valves and unions with single or multiple layers of insulation and cover to match pipe or use preformed PVC molded insulation covers.
- E. Above Grade Roof Drain/Overflow Drain Piping: Cover all roof drain piping and overflow drain piping with sectional pipe covering.

3.03 TYPE 2, FLEXIBLE ELASTOMERIC INSULATION

- A. See General Installation Requirements above.
- B. Install in accordance with manufacturer's instructions for below grade installation.
- C. Slip insulation on pipe prior to connection. Butt joints sealed with manufacturer's adhesive. Insulate fitting with miter-cut pieces. Cover insulation exposed to weather and undergrade with two coats of finish as recommended by manufacturer.
- D. Above Grade Roof Drain/Overflow Drain Piping: Cover all roof drain piping and overflow drain piping with sectional pipe covering.
- E. Flexible Elastomeric Tubing: Slip insulation over piping or if piping is already installed, it should be slit and snapped over piping. Joints and butt ends must be adhered with 520 adhesive.

3.04 ACCESSORIES

- A. See General Installation Requirements above.
- B. Install in accordance with manufacturer's instructions.
- C. Furnish and install accessories for all insulation types listed in this Section.

3.05 PIPE FITTING INSULATION COVERS

- A. See General Installation Requirements above.
- B. Install in accordance with manufacturer's instructions.

END OF SECTION

BLANK PAGE

**SECTION 22-1000
PLUMBING PIPING**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Sanitary, Drainage (Rain/Stormwater) DWV Piping, Buried Within 5-feet of Building
 - 2. Sanitary, Drainage (Rain/Stormwater) DWV Piping, Above Grade
 - 3. Hot and Cold Domestic Water Above Grade
 - 4. Condensate Piping
 - 5. Piping Specialties
 - 6. Cleanouts

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. NSF 61, Annex G.
 - 2. Steel pipe to conform to ASTM and ANSI Standards as specified in this Section.
 - 3. Copper piping to conform to ASTM B88, B306 and B208 and the standards of Copper Development Association (CDA), and American Welding Society, (AWS).
 - 4. Cast Iron Piping to conform to standards of ASTM A-74, CISPI 301 and FM 1680.
 - 5. Manufacturer's Standards Society (MSS) for valving and support reference standard.
 - 6. American Water Works Association (AWWA) for Valving Assembly Standards.
 - 7. American Society of Sanitation Engineers (ASSE) for Valving Standards.
 - 8. American National Standards Institute (ANSI) for Piping Standards.
 - 9. NFPA Standard 51B - "Fire Prevention in Use of Cutting and Welding Processes".
 - 10. Crosslinked polyethylene (PEX) pipe conforming to ASTM F876, F877 and CSA B1375, or DIN 16892 and 16893.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. See component manufacturers listed in individual articles below.
- B. ADS
- C. American-USA
- D. Cerro
- E. Charlotte
- F. Clamp-All
- G. Conbraco/Apollo Press
- H. Elkhart
- I. Enfield
- J. Fuseseal
- K. Gruvlok
- L. Husky
- M. Ideal
- N. Mifab
- O. Mueller
- P. Nibco
- Q. Orion
- R. Sioux Chief
- S. Spears
- T. Tyler
- U. Zurn
- V. Or approved equivalent.
- W. Cleanouts:
 - 1. J.R. Smith
 - 2. Mifab
 - 3. Sioux Chief
 - 4. Wade
 - 5. Watts
 - 6. Zurn
 - 7. Or approved equivalent.
- X. Firestopping Penetrations in Fire Rated Wall Floor Assemblies:
 - 1. Hilti

2. Proset
3. Or approved equivalent.

2.02 GENERAL

- A. Provide pipe, tube and fittings of the same type, fitting requirements, grade, class and the size and weight indicated or required for each service, as indicated in other Division 22, Plumbing Specifications. Where type, grade, or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.
- B. Manufactured materials delivered, new to the project site and stored in their original containers.
- C. Product Marking: Furnish each item with legible markings indicating name brand and manufacturer, manufacturing process, heat number and markings as required per ASTM and UL/FM Standards.

2.03 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, BURIED WITHIN 5-FEET OF BUILDING

- A. Cast Iron Pipe: ASTM A888/CISPI 301 hubless.
 1. Fittings: Cast iron.
 2. Coupling Assembly:
 - a. Heavy Duty: ASTM C1540, Clamp-All Hi-Torq 125, Husky SD 4000, Mifab QXHUB, Mission HeavyWeight couplings.
 - b. Mechanical joint coupling for hubless pipe and fittings is to consist of an elastomeric sealing sleeve and a metallic shield that comply with CISPI 310, ASTM C or ASTM C 1540. The elastomeric sealing sleeve is to conform to ASTM C564 or CSA B602 and is to be provided with a center stop. Mechanical joint couplings are to be installed in accordance with the manufacturer's instructions.
- B. PVC Pipe: ASTM D 2665 IPS Schedule 40, **SOLID WALL** piping for drainage/waste and vent (DWV).
 1. Fittings: PVC DWV ASTM D2665.
 2. Joints: Solvent welded, with ASTM D2564 solvent cement, 2-step glue (primer and glue) is required.

2.04 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, ABOVE GRADE

- A. Cast Iron Pipe: ASTM A888/CISPI 301 hubless.
 1. Fittings: Cast iron.
 2. Coupling Assembly:
 - a. Standard Duty: ASTM C1277 or CISPI 310.

2.05 HOT AND COLD DOMESTIC WATER ABOVE GRADE

- A. Copper Tube: 2-1/2-inches and smaller. ASTM B88 (ASTM B88M), Type L (B), Drawn.
 1. Fittings: ASME B16.18 copper.
 2. Joints: ASTM B32, alloy Sn95 solder.

2.06 CONDENSATE PIPING

- A. Copper Tube: ASTM B 88 (ASTM B898M), Type L (B).
 1. Fittings: ASME B16.29, wrought copper.
 2. Joints: ASTM B32, alloy Sn50 solder.

- B. Use chemical resistant piping for drainage of condensate from combustion fuel sources (such as condensing boilers and water heaters), as noted in this Section for area of application.
- C. CPVC (Chlorinated Polyvinyl Chloride) Pipe and Fittings - Except Exterior of the Building and in Plenums and Rated Assemblies:
 - 1. Pipe and Fittings: Schedule 40, NSF-14, ASTM 439, IAPMO IS20-96, socket fittings, solvent weld.

2.07 PIPING SPECIALTIES

- A. Pipe Escutcheons:
 - 1. Provide pipe escutcheons as specified with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish pipe escutcheons with nickel or chrome finish for occupied areas, prime zinc base paint finish for unoccupied areas.
 - 2. Pipe Escutcheons for Moist Areas: For waterproof floors, and areas where water and condensation can be expected to accumulate, provide stainless steel, cast brass or sheet brass escutcheons, solid or split hinged.
 - 3. Pipe Escutcheons for Dry Areas: Provide stainless steel escutcheons, solid or split hinged.
- B. Low Pressure Y-Type Pipeline Strainers:
 - 1. Provide strainers full line size of connecting piping, with ends matching piping system materials. Select strainers for 125 percent of the working pressure of piping system with Type 304 stainless steel screens made with 1/16-inch perforations on 4-inch and smaller strainers, and 1/8-inch perforations on 6-inch and larger strainers.
 - 2. Threaded Ends, 2-inch and Smaller: Cast-iron body, screwed screen retainer with centered blowdown fitted with plus.
 - 3. Flanged Ends, 2-1/2-inch and Larger: Cast-iron body, bolted screen retainer with off-center blowdown fitted with hose bibb.
- C. Air Vent with Valves:
 - 1. Install automatic air vents in all closed and open-loop water systems at high points and at any other point necessary to free system of air. Provide shut-off valve in riser to each automatic vent valve to facilitate servicing. Manual type vent may be used in lieu of automatic type, where specifically shown on the Drawings.
 - 2. Manufacturer: Hoffman #79.
- D. Dielectric Waterways:
 - 1. Provide standard products recommended by manufacturers in service indicated, which effectively isolate ferrous from non-ferrous piping (eliminating electrical conductance) to prevent galvanic action and stop corrosion.
 - 2. Provide dielectric waterways or brass nipple fitting for transitions between dissimilar metal piping.
- E. Unions:
 - 1. Unions to comply with the following schedule:
 - a. Black Steel, 2-inch and smaller: 150 PSI screwed malleable iron, ground joint, brass to iron seat.
 - b. Black Steel, 2-1/2-inch and larger: 150 PSI cast iron screwed flanged, flat faced, full faced gasket.
 - c. Soldered Copper or Brass Pipe, 2-inch and smaller: 150 PSI cast bronzed or copper, ground joint, non-ferrous seat with soldered ends.
 - d. Screwed Copper or Brass Pipe, 2-inch and smaller: 150 PSI cast brass, ground joint, brass to brass seat, threaded ends.

- e. Flanged Copper or Brass Pipe, 2-1/2-inch and larger: Two 150 PSI cast bronze flanges.
 - f. Manufacturer: EPCO, Mueller, Stanley G. Flagg, Watts, or approved equivalent.
- F. Flexible Piping Connectors - Expansion Loops or Seismic Joints:
1. Provide flexible expansion loops of size and material noted on Drawings. Design flexible loops to impart no thrust loads on the anchors. The loop consists of two flexible sections of hose and braid, two 90 degree elbows, and a 180 degree return. Install loops in a neutral, precompressed, or pre-extended condition as required for the application. Provide drain plug for loops installed hanging down. Loops installed straight up may be fitted with an automatic air release valve to purge air from the high point of the loop. Loops installed in any position other than hanging down must have the 180 degree return supported.
 2. Copper Pipe: Copper fittings, bronze hose and braid sweat solder ends, Metraloop Series MLS 8000.
 3. Steel Pipe: Schedule 40 carbon steel fittings, stainless steel hose and braid,
 4. Threaded Ends: Metraloop Series MLT 80000
 5. Flanged Ends: Metraloop Series MLF 80000
 6. Welded Ends: Metraloop Series MLW 80000
 7. Grooved Ends: Metraloop Series MLG 80000
 8. Gas Lines, CSA Approved: Metraloop - Gas MLT or MLF Series.
 9. Provide expansion joints by Mason, Flexionics, or Shur Fit, for vertical and horizontal straight run hot water and domestic hot water recirculation piping exceeding 1,000-feet. Install per manufacturer's installation directions.

2.08 CLEANOUTS

- A. Locate cleanouts as shown on Drawings and as required by local code. Cleanouts same size as pipe except that greater than 4-inches will not be required. Plastic components not allowed, except unless specifically noted.
- B. Types:
1. Tile Floor Cleanouts: J. R. Smith 4020 with round heavy-duty nickel bronze top, taper thread, ABS plug and standard screws.
 2. Carpeted Floor Cleanout: J. R. Smith 4020-X with carpet clamping frame, round heavy-duty nickel bronze top, taper thread, ABS plug, carpet clamping device and standard screws.
 3. Concrete Floor Cleanout (General): J. R. Smith 4020 with round heavy-duty nickel bronze top, taper thread and ABS plug with standard screws.
 4. Parking, Drives and Concrete Floor Cleanouts (Heavy Load): J. R. Smith 4100 with round heavy-duty nickel bronze top, taper thread and ABS plug with standard screws.
 5. Wall Cleanout: J. R. Smith 4472-U, countersunk bronze taper thread plug, stainless steel shallow cover and vandalproof screws.
 6. Outside Area Walks: J. R. Smith 4020-U with round heavy-duty nickel bronze top, taper thread, ABS plug and top secured with vandalproof screws. Install in 18- by 18- by 6-inch deep concrete pad flush with grade.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. Underground Piping Systems:
1. Examination: Verify that excavations are to required grade, dry, and not over-excavated.
 2. Perform necessary excavation and backfill required for installation of plumbing work. Repair piping or other work at no expense to Owner.

3. Water: Keep excavations free of standing water. Re-excavate and fill back excavations damaged or softened by water or frost to original level with sand, crushed rock or other approved material at no expense to Owner.
4. Tests: During progress of work for compacted fill, Owner reserves right to request compaction tests made under direction of testing laboratory.
5. Trench Excavation: Excavate trenches to necessary depth and width, removing rocks, unstable soil (muck, peat), roots and stumps. Excavation material is classified as "base fill" and "native." Base fill excavation material consisting of placed crushed rock may be used as backfill above "Pipe Zone." Remove and dispose off site native excavation material. Adequate width of trench for proper installation of piping or conduit.
6. Support Foundations:
 - a. Foundations: Excavate trenches located in unstable ground areas below elevation required for installation of piping to depth which is determined by Architect as appropriate for conditions encountered. Place and compact approved foundation material in excavation up to "Bedding Zone." Dewatering, placement, compaction and disposal of excavated materials to conform to requirements contained in other Specification Sections or Drawings.
 - b. Over-Excavations: Where trench excavation exceeds required depths, provide, place and compact suitable bedding material to proper grade or elevation at no additional cost to Owner.
 - c. Foundation Material: Where native material has been removed, place and compact necessary foundation material to form base for replacement of required thickness of bedding material.

	Class A		Class B	
Material Passing	Min.	Max.	Min.	Max.
3/4-inch Square Opening	27	47	0	1

- d. Bedding Material: Full bed piping on sand, pea gravel, or 3/4-inch minus crushed rock. Place minimum 4-inch deep layer of sand, pea gravel, or crushed rock on leveled trench bottom for this purpose. Remove bedding to necessary depth for piping bells and couplings to maintain contact of pipe on bedding for its entire length. Provide additional bedding in excessively wet, unstable, or solid rock trench bottom conditions as required to provide firm foundation.
7. Backfilling:
 - a. Following installation and successful completion of required tests, backfill piping in lifts.
 - 1) In "Pipe Zone" place backfill material and compact in lifts not to exceed 6-inches in depth to height of 12-inches above top of pipe. Place backfill material to obtain contact with entire periphery of pipe, without disturbing or displacing pipe.
 - 2) Place and compact backfill above "Pipe Zone" in layers not to exceed 12-inches in depth.
 - b. Backfill Material:
 - 1) Backfill Material in "Pipe Zone": 3/4-inch minus crushed rock, sand or pea gravel.
 - 2) Crushed rock, fill sand or other backfill material approved elsewhere in Specifications may be used above "Pipe Zone."
8. Compaction of Trench Backfill:
 - a. Where compaction of trench backfill material is required, use one of following methods or combination thereof:
 - 1) Mechanical tamper,
 - 2) Vibratory compactor, or
 - 3) Other approved methods appropriate to conditions encountered.

- b. Architect to have right to change methods and limits to better accommodate field conditions. Compaction sufficient to attain 95 percent of maximum density at optimum moisture content unless noted otherwise on Drawings or elsewhere in Specifications. Water "puddling" or "washing" is prohibited.

B. General Installation:

1. Work performed by experienced journeyman plumbers. No exceptions.
2. Provide access panels for concealed valves, shock arrestors, trap primers and the like.
3. Install pipes and pipe fittings in accordance with recognized industry practices and manufacturer's recommendations.
4. Align piping accurately at connections, within 3/32-inch misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.
5. Locate piping runs, as indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details, and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, and other structural and permanent-enclosure elements of building. Limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1-inch clearance outside insulation. Whenever possible in finished and occupied spaces, conceal piping from view by locating it in column enclosures, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as indicated.
 - a. Do not run piping through transformer vaults, telephone, elevator, electrical or electronic equipment spaces or enclosures unless indicated on Drawings.
 - b. Concealed Piping Above Suspended Ceiling: Plan and coordinate to avoid interferences; install to maintain suspended ceiling heights shown on Architectural Drawings. Allow sufficient space above removable ceiling panels for panel removal. Locate piping so that valves are visible and accessible within 24-inches horizontally and vertically from point of access to the ceiling space. Provide plenum rated materials for ceiling spaces which are being used as plenums.
 - c. Exposed Work: Run pipes parallel to the closest wall unless otherwise shown on Drawings; maintain maximum headroom; avoid light fixtures.
 - d. Insulation Space Allowance: In piping work, allow space for pipe insulation and jackets. If interferences occur, move the piping to accommodate insulation thickness specified.
 - e. Pipe Lengths: Do not use short lengths or nipples at locations where a full length of pipe will fit.
 - f. Alignment Prior to Supporting and Anchoring: Place piping in proper alignment and position prior to connection to anchors, expansion loops, and equipment. Furnish jacking devices, temporary steel structural members, and assembled structures as necessary. Remove temporary equipment and structures supplied by contractor at completion; such items to remain Contractor property.
 - g. Valve and Equipment Connections: Piping not to place undue stress on flanged valves and equipment connections. Install mating flange faces true and parallel to each other and not requiring springing of piping for assembly. Pipe hangers and supports to carry the full weight of the pipe and fluid.
 - h. Piping Leaks: Correct immediately; use new materials; leak-sealing compounds or peening not permitted.
 - i. Pressure Ratings of Fittings, Valves, and Devices in Piping Systems: Pressure rating to be equal to, or greater than, the maximum working pressure of the system.
 - j. Equipment Vents and Drains: Provide for coils and vessels which contain water. Provide isolation valves and outlet valves at piping high and low points to permit venting and draining of the vessel without venting and draining connected piping. Provide hose connections and caps on drain lines.

- k. Escutcheon Plates: Where exposed insulated and uninsulated piping passes through walls, floors or ceilings; provide spring clip type. Provide plates on both sides of wall or floor.
- C. Testing:
1. General:
 - a. Provide temporary equipment for testing, including pumps, compressors, tanks, and gauges, as required. Test piping systems before insulation (if any) is installed and remove or disengage control devices before testing. Where necessary, test sections of each piping system independently, but do not use piping valves to isolate sections where test pressures exceed local valve operating pressure rating. Fill each section with water, compressed air, or nitrogen and pressurize for the indicated pressure and time.
 - b. Notify Architect and local Plumbing Inspector 2 days before tests.
 - c. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.
 - d. Water Piping: Eliminate air from system. Fill and test at 125 PSIG or minimum 1-1/2 times static pressure at connection to serving utility main for period of two hours with no loss in pressure.
 - e. Send test results to Architect for review and approval and include in Operation and Maintenance Manual.
 2. Testing of Pressurized Systems:
 - a. Test each pressurized piping system at 150 percent of operating pressure indicated, but not less than 125 PSIG test pressure.
 - b. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 2 percent of test pressure.
 3. Test hot and cold domestic water piping systems upon completion of rough-in and before connection to fixtures at hydrostatic pressure of 125 PSIG.
- D. Corrosive Soil Conditions:
1. Wrap steel, iron, copper or other metal piping materials/fittings with Protecto Wrap 200, 30 mils or greater. Maintain a 1/2-inch overlap and install per manufacturer's recommendations.
 2. Provide epoxy coated cast iron pipe and fittings for drainage systems.
 3. Obtain and review project soils report for verification of requirements concerning corrosive soils.
- E. Protection:
1. Keep pipe openings closed by means of plugs or caps to prevent entrance of foreign matter. Protect piping, ductwork, fixtures, equipment and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore to its original condition or replace fixtures, equipment or apparatus damaged prior to final acceptance of work.
- F. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:
1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.
- G. Cut piping squarely, free of rough edges and reamed to full bore. Insert piping fully into fittings.
- H. Provide joints of type indicated in each piping system.

- I. Thread pipe in accordance with ANSI/ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Remove excess cutting oil from piping prior to assembly. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
- J. Sleeves:
 - 1. Pipe Sleeves:
 - a. Layout work in advance of pouring concrete, furnish, and set sleeves necessary to complete work.
 - b. Floor Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Extend sleeve 1-inch above finished floor. Caulk pipes passing through floor with non-shrinking grout or approved caulking compound (Except DWV Piping penetrating a concrete slab set on finish grade), provide "Link-Seal" sleeve sealing system for concrete/slab penetrations which are below grade. Caulk/seal piping passing through fire rated building assembly with UL rated assemblies. Provide fire-rated assemblies per local AHJ requirements
 - c. Wall Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Provide sleeve flush with finished face of wall. Caulk pipes passing through walls with non-shrinking caulking compound. Provide modular link sealing system for concrete penetrations which are below grade. Caulk/seal piping passing through fire-rated assemblies per local AHJ requirements.
 - d. Beam Sleeves: Coordinate with trades for locations of pipe sleeves in reinforced concrete and steel beams. Indicate penetrations on structural shop drawings. See Drawings and Specifications for specific sleeve location limitations. Plumbing Drawings are diagrammatic. Offset piping as required to meet these limitations. Pipe sleeve locations must be indicated on reinforced concrete and steel beam shop drawings. Field cutting of beams not allowed without written approval of structural engineer. No extra costs allowed for failure to coordinate beam penetrations prior to reinforced concrete and steel beam shop drawing submittal.
 - 2. Installation of metallic or plastic piping penetrations through non fire-rated walls and partitions and through smoke-rated walls and partitions:
 - a. Install fabricated pipe sleeve.
 - b. After installation of sleeve and piping, tightly pack entire annular void between piping or piping insulation and sleeve identification.
 - c. Seal each end airtight with a resilient nonhardening seal per code.
 - 3. Piping penetrations through fire-rated (1 to 3 hour) assemblies:
 - a. Select and install pre-engineered pipe penetration system in accordance with UL listing and manufacturer's recommendation.
 - b. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E84.

3.02 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, BURIED WITHIN 5-FEET OF BUILDING

- A. Excavation and Backfill:
 - 1. See 3.01 above.
- B. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.

- C. Corrosive Soil Conditions:
 1. Wrap steel, iron, copper or other metal piping materials/fittings with Protecto Wrap 200, 30 mils or greater. Maintain a 1/2-inch overlap and install per manufacturer's requirements.
 2. Provide epoxy coated cast iron pipe and fittings for drainage systems.
- D. Cast-Iron Joints: Comply with coupling manufacturer's Cast Iron Soil Pipe Institute Standards and installation instructions.
- E. Sanitary and Storm Drainage:
 1. Grade piping at a uniform pitch of 2 percent unless otherwise noted on Drawings.
 2. Indirect Waste or Drain Piping: Extend piping to discharge as shown on Drawings. Maintain minimum air gap. Provide traps on indirect waste or drain piping exceeding 60-inches.
 3. Fixture Carriers: Concealed fixture carriers for wall hung plumbing fixtures are specified in Section 22 40 00, Plumbing Fixtures.
 4. Drains:
 - a. Install drains to suit finished floor. Install drains and components per manufacturer's instructions. Slope flooring to floor drain or sink a minimum of 1/2-inch below finished floor elevation.
 - b. Install P-traps for hub drains, floor drains and floor sinks. P-traps to be of the same materials as soil and waste piping. Provide trap primer assembly for each drain or floor sink.
 5. Wall Access Panel: Secure to wall framing and install so that flange forms a close fitting joint with the finished wall surface.
 6. Heat trace and insulate P-traps exposed to freezing conditions. Provide heat trace and electronic components to Division 26 for installation.
 7. Insulate horizontal branch lines from floor sinks, receptors and drains receiving cold discharge from equipment and appliances.
- F. Epoxy Coated Cast Iron Pipe and Fittings: Coat the piping terminus of any cut piping with an applied epoxy per manufacturer's instructions. Denso Protal 7200 fast-cure epoxy repair coating.

3.03 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, ABOVE GRADE

- A. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.
- B. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:
 1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.
- C. Solder copper tube and fitting joints with lead free nickel/silver bearing solder meeting ASTM Std. B-32, in accordance with IAPMO Is 3-93, ASTM B-828 and Copper Development Association recommended procedures. Clean joints by other than chemical means prior to assembly. "Shock" cooling is prohibited. Fluxes to be water soluble for copper and brass potable water applications, and meeting CDA standard test method 1.0 and ASTM B813-91. Apply solder until a full fillet is present around the joint. Do not apply solder and flux in such excessive quantities as to run down interior of pipe. Lead solder or corrosion flux not to be present at the jobsite.

- D. Cast-Iron Joints: Comply with coupling manufacturer's Cast Iron Soil Pipe Institute Standards and installation instructions.
- E. Sanitary and Storm Drainage:
 - 1. Grade piping at a uniform pitch of 2 percent unless otherwise noted on Drawings.
 - 2. Indirect Waste or Drain Piping: Extend piping to discharge as shown on Drawings. Maintain minimum air gap. Provide traps on indirect waste or drain piping exceeding 60-inches.
 - 3. Fixture Carriers: Concealed fixture carriers for wall hung plumbing fixtures are specified in Section 22 40 00, Plumbing Fixtures.
 - 4. Drains:
 - a. Install drains to suit finished floor or roof surface. Install drains and components per manufacturer's instructions. Slope flooring to floor drain or sink a minimum of 1/2-inch below finished floor elevation.
 - b. Install P-traps for hub drains, floor drains and floor sinks. P-traps to be of the same materials as soil and waste piping. Provide trap primer assembly for each drain or floor sink.
 - 5. Wall Access Panel: Secure to wall framing and install so that flange forms a close fitting joint with the finished wall surface.
 - 6. Heat trace and insulate P-traps exposed to freezing conditions. Provide heat trace and electronic components to Division 26 for installation.
 - 7. Insulate horizontal branch lines from floor sinks, receptors and drains receiving cold discharge from equipment and appliances.

3.04 HOT AND COLD DOMESTIC WATER ABOVE GRADE

- A. Water Piping: Eliminate air from system. Fill and test at 125 PSIG or minimum 1-1/2 times static pressure at connection to serving utility main for period of two hours with no loss in pressure.
- B. Testing of Pressurized Systems:
 - 1. Test each pressurized piping system at 150 percent of operating pressure indicated, but not less than 125 PSIG test pressure.
 - 2. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 2 percent of test pressure.
- C. Test hot and cold domestic water piping systems upon completion of rough-in and before connection to fixtures at hydrostatic pressure of 125 PSIG.
- D. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:
 - 1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.
- E. Solder copper tube and fitting joints with lead free nickel/silver bearing solder meeting ASTM Std. B-32, in accordance with IAPMO Is 3-93, ASTM B-828 and Copper Development Association recommended procedures. Clean joints by other than chemical means prior to assembly. "Shock" cooling is prohibited. Fluxes to be water soluble for copper and brass potable water applications, and meeting CDA standard test method 1.0 and ASTM B813-91. Apply solder until a full fillet is present around the joint. Do not apply solder and flux in such excessive quantities as to run down interior of pipe. Lead solder or corrosion flux not to be present at the jobsite.

- F. Braze copper tube and fitting socket with BCuP series filler metal without flux. Use listed brazing flux for joining of copper tube to brass or bronze fittings, meeting AWS FB3A or FB3C. "Shock" cooling is prohibited. A continuous fillet is to be visible around the completed joint. After cooling, thoroughly remove flux residue with warm water and a brush prior to testing. Do not use BCuP filler on copper alloys containing over 10 percent nickel. Cap or plug piping during construction to prevent entry of foreign material.
- G. Domestic Water:
1. "Piping" to include pipes, fittings, nipples, valves and accessories connected thereto.
 2. Run piping generally parallel to the axis of the building, arranged to conform to the building requirements and to suit the necessities of clearance for other mechanical ducts, flues, conduits and work of other trades, and as close to ceiling or other construction as practical, free of unnecessary traps or bends.
 3. Grade water supply piping for complete drainage of the system. Install hose bibbs at low points.
 4. Use unions for piping connections to equipment.
 5. Provide sufficient elbows, swings and offsets to permit free expansion and contraction.
 6. Use reducers or increasers. Use no bushings.
 7. Ream or file each pipe to remove burrs. Inspect each length of pipe and each fitting for workmanship and clear passageways.
 8. Cover, cap or otherwise protect open ends of piping during construction to prevent damage to threads or flanges and prevent entry of foreign matter. Disinfect and sterilize water supply piping as specified. Furnish written report on final water quality results.
 9. Install exposed connections to equipment with special care, showing no tool marks or threads at fittings and piping. No bowed or bent piping permitted.
 10. Make ferrous to non-ferrous connections with dielectric fittings.
 11. Use extra heavy pipe for nipples, where unthreaded portion is less than 1-1/2-inches. Use no close nipples. Use only shoulder-type nipples.
 12. Through-Wall Pipes: Type 'L' copper tubing for through-wall pipes which connect to exposed stops at wall surface. Anchor the pipes in the wall; attach pipe with U-bolts to steel back-up plates or steel angles anchored in the wall. Provide wrought copper elbow which securely anchors ears in wall at through-wall pipes.
 13. Provide drain valves at base of risers and at low points on the system.
 14. Backflow Preventers: Pipe relief to nearest drain. Slope at 2 percent.
- H. Sterilization of Domestic Water System:
1. General: Upon completion of tests and necessary replacements, thoroughly flush and disinfect domestic water piping.
 2. Method: After thoroughly flushing system with water to remove sediment, fill system with a solution containing 50 parts per million of chlorine for not less than 24 hours or 200 parts per million of chlorine for not less than 3 hours. After retention, drain, reflush and return system to service.
 3. Certification: Provide copy of domestic water chlorination certificate in each operations and maintenance manual.
 4. Provide water line disinfections performed by a licensed contractor with training in potable water line disinfections.

3.05 CONDENSATE PIPING

- A. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:
1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

3.06 PIPING SPECIALTIES

- A. Excavation and Backfill:
 - 1. See 3.01 above.
- B. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.
- C. Corrosive Soil Conditions:
 - 1. Wrap steel, iron, copper or other metal piping materials/fittings with Protecto Wrap 200, 30 mils or greater. Maintain a 1/2-inch overlap and install per manufacturer's requirements.
 - 2. Provide epoxy coated cast iron pipe and fittings for drainage systems.
- D. Cast-Iron Joints: Comply with coupling manufacturer's Cast Iron Soil Pipe Institute Standards and installation instructions.

3.07 CLEANOUTS

- A. Install in aboveground piping and building drain piping as indicated, as required by code; at each change in direction of piping greater than 135 degrees; at minimum intervals of 100-feet; and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping. Select type to match adjacent building finish. Provide shop drawings to Architect to coordinate locations and types of cleanouts with Architect prior to installation.

END OF SECTION

BLANK PAGE

**SECTION 22-4000
PLUMBING FIXTURES**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Hose Bibbs
 - 2. Roof/Overflow Drains
 - 3. Stainless Steel Drainage Fittings

1.02 RELATED SECTIONS

- A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.04 SUBMITTALS

- A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. Comply with lead free (less than or equal to 0.25 percent) products in drinking water systems.
 - 2. NSF 61, Annex G, Drinking Water System Components, Compliant.
 - 3. ISO 9001, Quality Management Standard Certified.
 - 4. IAPMO Low Lead Certification.
 - 5. Provide fixtures, faucets and accessories to meet barrier free requirements of the governing code with respect to plumbing fixtures provided for the physically handicapped.
 - 6. Items approved for use by State of Oregon.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. "Or approved equivalent" as defined in 22 00 00, Plumbing Basic Requirements. Substitution process requirements apply to approved equivalent products.

- B. Hose Bibbs:
 - 1. Chicago
 - 2. JR Smith
 - 3. Mifab
 - 4. Wade
 - 5. Woodford
 - 6. Zurn
 - 7. Or approved equivalent.

- C. Roof/Overflow Drains:
 - 1. JR Smith
 - 2. Mifab
 - 3. Sioux Chief
 - 4. Watts
 - 5. Zurn
 - 6. Or approved equivalent.

- D. Stainless Steel Drainage Fittings:
 - 1. Blucher
 - 2. Josam
 - 3. JR Smith
 - 4. Kusel
 - 5. Zurn
 - 6. Or approved equivalent.

2.02 HOSE BIBBS

- A. See Schedule on Drawings for types.

2.03 ROOF/OVERFLOW DRAINS

- A. See Schedule on Drawings for type.
- B. Plastic components are not allowed.

2.04 STAINLESS STEEL DRAINAGE FITTINGS

- A. Austenitic Stainless Steel of Material type (304/316) and gauge as listed in the plumbing fixture schedule.

PART 3 - EXECUTION

3.01 HOSE BIBB INSTALLATION

- A. Install components in accordance with manufacturer's instructions and approved product data submittals.
- B. Set plumb, level and rigid.

3.02 ROOF/OVERFLOW DRAINS INSTALLATION

- A. Install components in accordance with manufacturer's instructions and approved product data submittals.
- B. Set plumb, level and rigid.

3.03 STAINLESS STEEL DRAINAGE FITTINGS

- A. Install components in accordance with manufacturers instructions and approved product data submittals.
- B. Set plumb, level and flush to surrounding surfaces unless specifically noted otherwise.
- C. As applicable install clamping devices-flanges to receive surface finish products (flooring, membranes etc.).

END OF SECTION

BLANK PAGE

**SECTION 23-0800
COMMISSIONING OF HVAC**

PART 1 - GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Definitions, warranties, test equipment requirements, and mechanical commissioning requirements.

1.02 RELATED SECTIONS

- A. Contents of Division 23, HVAC and Division 01, General Requirements apply to this Section.
- B. In addition, reference the following:
 - 1. Section 01 91 13, General Commissioning Requirements.

1.03 REFERENCES AND STANDARDS

- A. References and Standards as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.
- B. In addition, meet the following:
 - 1. Current edition of ASHRAE Guideline 0, The Commissioning Process.

1.04 SUBMITTALS

- A. Submittals as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.
- B. In addition, provide:
 - 1. Certificates of readiness.
 - 2. Certificates of completion of installation, prestart, and startup activities.
 - 3. Operation and Maintenance Manuals.
 - 4. Test reports.
 - 5. Control Drawings Submittal
 - a. Provide a key to abbreviations.
 - b. Provide graphic schematic depictions of the systems and each component.
 - c. Include the system and component layout of any equipment that the control system monitors, enables or controls, even if the equipment is primarily controlled by packaged or integral controls.
 - d. Provide a full points list with at least the following included for each point:
 - 1) Controlled system
 - 2) Point abbreviation
 - 3) Point description
 - 4) Display unit
 - 5) Control point or set point (Yes / No)
 - 6) Monitoring point (Yes / No)
 - 7) Intermediate point (Yes / No)
 - 8) Calculated point (Yes / No)
 - 6. Architect forwards one set of submittals for systems to be commissioned to Commissioning Agent at same time as design team.

7. Commissioning Agent forwards comments to design team for consideration in their submittal response.
8. Design team sends consolidated response to submittals and copies to Commissioning Agent.

1.05 QUALITY ASSURANCE

- A. Quality assurance as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.
- B. Test Equipment Calibration Requirements: Contractors will comply with test manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately after instruments have been repaired resulting from being dropped or damaged. Affix calibration tags to test instruments. Furnish calibration records to Commissioning Authority upon request.

1.06 WARRANTY

- A. Warranty of materials and workmanship as required by Section 23 00 00, HVAC Basic Requirements and Division 01, General Requirements.
- B. In addition, provide:
 1. Commissioning, inspecting, and testing will not modify terms or time periods of mechanical equipment, systems, and controls warranties including related equipment and systems, and adjacent work.
 2. Control system warranty period starts from date of Commissioning Agent acceptance.

1.07 COORDINATION

- A. Reference Section 01 91 13, General Commissioning Requirements, for requirements pertaining to coordination during the commissioning process.

1.08 PURPOSE

- A. Purpose of commissioning process is to provide Owner assurance that systems have been installed in prescribed manner and will operate within performance guidelines. Commissioning is intended to enhance quality of system startup and aid in orderly transfer of systems to beneficial use by Owner.
- B. Commissioning procedures and results will be observed by Commissioning Authority or Owner's staff. Contractor is expected to verify functional readiness of systems to be tested prior to performing the tests in presence of Owner's witness. A high rate of test failure will indicate that Contractor has not adequately verified readiness of systems.

PART 2 - PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide standard testing equipment required to perform startup, initial checkout and functional performance testing for the equipment being tested. For example, the mechanical contractor of Division 23, HVAC will ultimately be responsible for standard testing equipment for the HVAC&R system and controls system in Division 23, HVAC, except for the equipment specific to and used by TAB in their commissioning responsibilities. Provide a sufficient quantity of two-way radios by each subcontractor.

- B. Include special equipment, tools and instruments (specific to a piece of equipment and only available from vendor) required for testing in the base bid price to the Owner and leave on site, except for stand-alone data logging equipment that may be used by the Commissioning Authority.
- C. Manufacturer of equipment to provide proprietary test equipment and software required for programming and/or start-up, whether specified or not. Manufacturer provides the test equipment, demonstrates its use, and assists in the commissioning process as needed. Proprietary test equipment (and software) become the property of the Owner upon completion of the commissioning process.
- D. Data logging equipment and software required to test equipment will be provided by the Commissioning Authority, and will not become the property of the Owner.
- E. Use only testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers have a certified calibration within the past year to an accuracy of 0.5 degree F and a resolution of plus or minus 0.1 degree F. Pressure sensors have an accuracy of plus or minus 2.0 percent of the value range being measured (not full range of meter) and have been calibrated within the last year.

PART 3 - EXECUTION

3.01 GENERAL DOCUMENTATION REQUIREMENTS

- A. With assistance from the installing contractors, the Commissioning Authority will prepare prefunctional checklists for commissioned components, equipment, and systems
- B. Red-Lined Drawings:
 1. Verify equipment, systems, instrumentation, wiring and components are shown correctly on red-lined drawings.
 2. Preliminary red-lined drawings must be made available to the Commissioning Team for use prior to the start of Functional Performance Testing.
 3. Changes, as a result of Functional Testing, must be incorporated into the final as-built drawings, which will be created from the red-lined drawings.
 4. The contracted party, as defined in the Contract Documents will create the as-built drawings.
- C. Operation and Maintenance (O&M) Data:
 1. Contractor will provide a copy of O&M literature within 45 days of each submittal acceptance for use during the commissioning process for commissioned equipment and systems.
 2. The Commissioning Authority will review the O&M literature once for conformance to project requirements.
 3. The Commissioning Authority will receive a copy of the final approved O&M literature once corrections have been made by the Contractor.
- D. Demonstration and Training:
 1. Contractor will provide demonstration and training as required by the specifications.
 2. A complete training plan and schedule must be submitted by the contractor to the Commissioning Authority four weeks prior to any training.
 3. A training agenda for each training session must be submitted to the Commissioning Authority one week prior the training session.

4. Notify the Commissioning Authority at least 72 hours in advance of scheduled tests so that testing may be observed by the Commissioning Authority and Owner's Authorized Representative. Provide a copy of the test record to the Commissioning Authority, Owner, and Architect.
5. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specific equipment.
6. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, trouble shooting, servicing, and maintaining equipment.
7. Review data in O&M Manuals.

3.02 CONTRACTOR'S RESPONSIBILITIES

- A. Mechanical, Controls and TAB Contractors. The commissioning responsibilities applicable to each of the mechanical, controls and TAB contractors of Division 23, HVAC are as follows (references apply to commissioned equipment only):
 1. Perform commissioning tests at the direction of the Commissioning Authority.
 2. Attend construction phase controls coordination meetings.
 3. Attend testing, adjusting, and balancing review and coordination meetings.
 4. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the Commissioning Authority.
 5. Provide information requested by the Commissioning Authority for final commissioning documentation.
 6. Include requirements for submittal data, operation and maintenance data, and training in each purchase order or subcontract written.
 7. Prepare preliminary schedule for mechanical system orientations and inspections, operation and maintenance manual submissions, training sessions, pipe and duct system testing, flushing and cleaning, equipment start-up, testing and balancing and task completion for owner. Distribute preliminary schedule to commissioning team members.
 8. Update schedule as required throughout the construction period.
 9. During the startup and initial checkout process, execute the related portions of the prefunctional checklists for commissioned equipment.
 10. Contractor to participate and complete checklists using the Commissioning Authority's web based commissioning software Facility Grid. A desktop, laptop, tablet, or iPad will be required.
 11. Assist the Commissioning Authority in verification and functional performance tests.
 12. Gather operation and maintenance literature on equipment, and assemble in binders as required by the specifications. Submit to Commissioning Authority 45 days after submittal acceptance.
- B. Coordinate with the Commissioning Authority to provide 48 hour advance notice so that the witnessing of equipment and system start-up and testing can begin.
- C. Notify the Commissioning Authority a minimum of two weeks in advance of the time for start of the testing and balancing work. Attend the initial testing and balancing meeting for review of the official testing and balancing procedures.
- D. Participate in, and schedule vendors and contractors to participate in the training sessions.
- E. Provide written notification to the Construction Manager/General Contractor (CM/GC) and Commissioning Authority that the following work has been completed in accordance with the Contract Documents, and that the equipment, systems, and sub-system are operating as required.
 1. HVAC&R equipment including fans, air handling units, ductwork, dampers, terminals, and other equipment furnished under this Division.
 2. Fire stopping in the fire rated construction, including fire and smoke damper installation, caulking, gasketing and sealing of smoke barriers.
 3. Fire detection and smoke detection devices furnished under other divisions of the specification.

- F. Equipment supplier to document the performance of his equipment.
- G. Test, Adjust and Balance Contractor:
 1. Attend initial commissioning coordination meeting scheduled by the Commissioning Authority.
 2. Participate in verification of the testing and balancing report, which will consist of repeating measurements contained in the testing and balancing reports. Assist in diagnostic purposes when directed.
- H. Provide training of the Owner's operating staff using expert qualified personnel, as specified.
- I. Equipment Suppliers:
 1. Provide requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner, to keep warranties in force.
 2. Assist in equipment testing per agreements with contractors.
 3. Provide information requested by Commissioning Authority regarding equipment sequence of operation and testing procedures.
- J. Reference Section 01 91 13, General Commissioning Requirements for additional contractor responsibilities.

3.03 DESIGN PROFESSIONAL'S RESPONSIBILITIES

- A. Reference Section 01 91 13, General Commissioning Requirements for Design Professional's Responsibilities.

3.04 COMMISSIONING AUTHORITY'S RESPONSIBILITIES

- A. Reference Section 01 91 13, General Commissioning Requirements for Commissioning Authority's Responsibilities.

3.05 TESTING PREPARATION

- A. Certify in writing to the Commissioning Authority that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify in writing to the Commissioning Authority that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify in writing that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Place systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the Commissioning Authority.

3.06 TESTING, ADJUSTING AND BALANCING VERIFICATION

- A. Prior to performance of Testing, Adjusting and Balancing work, provide copies of reports, sample forms, checklists, and certificates to the Commissioning Authority.
- B. Notify the Commissioning Authority at least 10 days in advance of testing and balancing Work, and provide access for the Commissioning Authority to witness testing and balancing Work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the Commissioning Authority.
 - 1. The Commissioning Authority will notify testing and balancing subcontractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
 - 2. Testing and balancing subcontractor to use the same instruments (by model and serial number) that were used when original data were collected.
 - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items to result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB to result in rejection of final testing. Variations in background noise must be considered.
 - 4. Remedy the deficiency and notify the Commissioning Authority so verification of failed portions can be performed.

3.07 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the Commissioning Authority.
- B. Scope of HVAC&R testing to include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing to include measuring capacities and effectiveness of operational and control functions.
- C. Test operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The Commissioning Authority along with the HVAC&R contractor, testing and balancing Subcontractor, and HVAC&R Instrumentation and Control Subcontractor to prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the Commissioning Authority and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The Commissioning Authority may direct that set points be altered when simulating conditions is not practical.
- H. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.08 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Equipment Testing and Acceptance Procedures: Testing requirements are specified in individual Division 23, HVAC Sections. Provide submittals, test data, inspector record, and certifications to the Commissioning Authority.
- B. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 23, HVAC Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the Commissioning Authority with preparation of testing plans.
- C. Pipe System Cleaning, Flushing, Hydrostatic Tests, and Chemical Treatment: Test requirements are specified in Division 23, HVAC Piping Sections. HVAC&R Contractor to prepare a pipe system cleaning, flushing, and hydrostatic testing plan. Provide cleaning, flushing, testing, and treating plan and final reports to the Commissioning Authority. Plan to include the following:
 - 1. Sequence of testing and testing procedures for each section of pipe to be tested, identified by pipe zone or sector identification marker. Markers keyed to Drawings for each pipe sector, showing the physical location of each designated pipe test section. Provide drawings keyed to pipe zones or sectors formatted to allow each section of piping to be physically located and identified when referred to in pipe system cleaning, flushing, hydrostatic testing, and chemical treatment plan.
 - 2. Description of equipment for flushing operations.
 - 3. Minimum flushing water velocity.
 - 4. Tracking checklist for managing and ensuring that pipe sections have been cleaned, flushed, hydrostatically tested, and chemically treated.
- D. The work included in the commissioning process involves a complete and thorough evaluation of the operation and performance of components, systems and sub-systems. Evaluate the following equipment and systems:
 - 1. New HVAC Equipment and Systems
 - 2. Building Automation System

3.09 DEFICIENCIES/NONCONFORMANCE, COST OF RETESTING, FAILURE DUE TO MANUFACTURER DEFECT

- A. Reference Division 01, General Requirements for requirements pertaining to deficiencies/nonconformance, cost of retesting, or failure due to manufacturer defect.

END OF SECTION

BLANK PAGE

**SECTION 31-1000
SITE CLEARING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Demolition of existing structures to be removed and Removal of existing debris.
- C. Remove and eradicate all noxious weeds as determined by the Oregon Department of Agriculture State and County Noxious Weed Lists per OAR 603-052-1200 Oregon Noxious Weed Quarantine Requirements.

1.02 RELATED REQUIREMENTS

- A. Section 01 1100 - Summary: Limitations on Contractor's use of site and premises.
- B. Section 01-5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- C. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- D. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- E. Section 31-2200 - Grading: Topsoil removal.
- F. Section 31-2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fill Material: As specified in Section 31-2323 - Fill .

PART 3 EXECUTION

3.01 SITE CLEARING

- A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits. Owner will obtain SHPO Clearance.

- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.
- E. Call for utility locates prior to digging and wait for location field marks.

3.03 VEGETATION

- A. Scope: Remove trees, shrubs, brush, noxious weeds and stumps in areas to be covered by paving, gravel shoulders, sidewalks, underground utilities, concrete apron, and other improvements shown on the Drawings.
- B. Do not begin clearing until vegetation to be relocated has been removed.
- C. Do not remove or damage vegetation beyond the limits indicated on drawings.
 - 1. 5 feet outside the construction limits.
 - 2. Exception: Specific trees and vegetation indicated on drawings to be removed.
 - 3. Exception: Selective thinning of undergrowth specified elsewhere.
- D. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
 - 1. At vegetation removal limits.
 - 2. Around trees to remain within vegetation removal limits; locate no closer to tree than at the drip line.
 - 3. Around other vegetation to remain within vegetation removal limits.
 - 4. See Section 01 5100 Construction Facilities and Temporary Controls and 01 5639 Tree and Planting Protection for fence construction requirements.
- E. In areas where vegetation must be removed but no construction will occur other than landscaping, remove vegetation including all noxious weeds with minimum disturbance of the subsoil.
- F. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
 - 2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 3. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
 - 4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
 - 5. Noxious weeds.
- G. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Break up as required and remove existing concrete designated for removal.
- C. Leave site in clean condition, ready for subsequent work.

- D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

BLANK PAGE

**SECTION 31-2200
GRADING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Removal of topsoil.
- B. Rough grading the site for site structures.
- C. Finish grading for planting.

1.02 RELATED REQUIREMENTS

- A. Section 31-2323 - Fill: Filling and compaction.
- B. Section 32-9200 - Seeding: Finish ground cover.
- C. Section 32-9300 - Plants: Topsoil in beds and pits.

1.03 SUBMITTALS

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Topsoil: See Section 31-2323.
- B. Other Fill Materials: See Section 31-2323.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.

- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
- G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
- H. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Strip the pavement areas as required to remove existing vegetation and roots. Stripping depths are generally expected to be 12" or less. Dispose of all strippings outside of construction areas. Refer to Geotechnical Report.
- E. Excavate as required to accommodate the minimum pavement section in areas requiring cuts. Overexcavate any soft subgrade and replace it with compacted Select Fill or Granular Site Fill. Compact the subgrade during dry weather as specified above.
- F. Do not remove wet subsoil , unless it is subsequently processed to obtain optimum moisture content.
- G. When excavating through roots, perform work by hand and cut roots with sharp axe.
- H. See Section 31-2323 for filling procedures.
- I. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- J. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of surface water control.

3.04 FINISH GRADING

- A. Before Finish Grading:
 1. Verify building and trench backfilling have been inspected.
 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 6 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 6 inches.
- E. Place topsoil in areas where seeding, sodding, and planting are indicated.
- F. Place topsoil where required to level finish grade.

- G. Place topsoil to the following uncompacted thicknesses:
 - 1. Areas to be Seeded with Grass: 6 inches.
 - 2. Areas to be Sodded: 4 inches.
 - 3. Shrub Beds: 18 inches.
 - 4. Other areas not noted; 4 inches.
- H. Place topsoil during dry weather.
- I. Remove roots, weeds, rocks, and foreign material while spreading.
- J. Near plants spread topsoil manually to prevent damage.
- K. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- L. Roll placed topsoil.
- M. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.05 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).
- C. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.
- D. Top Surface of Finish Grade: Plus or minus 1/2 inch.

3.06 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.07 FIELD QUALITY CONTROL

- A. See Section 31-2323 for compaction density testing.

3.08 CLEANING

- A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

BLANK PAGE

**SECTION 31-2316.13
TRENCHING**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Utility Trench Excavation, Bedding, and Backfill.
- B. This section consists of furnishing all labor, materials, incidentals and equipment, as well as performing all work required for excavation, foundation stabilization, pipe bedding, pipe zone material, trench backfill, compaction, final grading, hauling and disposal of material resulting from the construction of utility piping, and all related appurtenances. Included also is the locating and protecting of existing utilities and other improvements (see Division 1), shoring, and bracing, excepting only such work as is covered and included under other sections of this Division, or other Divisions of these Contract Documents.
- C. Excavation must be in accordance with ORS 757.541 to 757.571 and all other applicable laws and regulations.

1.02 RELATED REQUIREMENTS

- A. Section 31-2200 - Grading
- B. Section 31-2319 - Dewatering
- C. Section 31-4100 - Shoring
- D. Section 01-4000 - Quality Requirements

1.03 DEFINITIONS

- A. Trench Excavation - Trench excavation consists of the removal of all material encountered in the trench to the limits shown on the Plans or as directed. Trench excavation shall be classified as either unclassified excavation or rock excavation.
 - 1. Unclassified excavation is defined as the removal of all material as required to complete the planned improvements, regardless of type, nature or condition of materials encountered, except that which is designated as rock excavation.
 - 2. Rock excavation is defined as the removal of boulders composed of igneous, sedimentary or metamorphic stone material which have a least dimension of 36-inches or more, or a displacement of one cubic yard or more; or the removal of solid ledge rock which, in the opinion of the Engineer, requires for its removal drilling and blasting, wedging, sledging, barring or breaking with power operated tools.
 - a. No soft or disintegrated rock; hard-pan or cemented gravel that can be removed with a hand pick or power operated excavator or shovel; no loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere; and no rock outside of the minimum limits of measurement allowed, which may fall into the excavation, will be measured or allowed.
 - b. When solid rock layers have an overburden of non-rock material (unclassified material) which cannot practically be stripped and handled separately, and/or when solid rock is interspersed with non-rock material, the entire mass will be classified as solid rock if the actual solid rock fraction exceeds 85% of the entire volume.

- B. Trench Foundation - Trench foundation is defined as the bottom of the trench on which the pipe bedding is to lay and which provides support for the pipe.
- C. Foundation Stabilization - Foundation stabilization is defined as the furnishing, placing and compacting of specified materials for any unsuitable material removed from the bottom of an excavation, as directed by the Engineer, to provide a firm trench foundation.
- D. Pipe Bedding - Pipe bedding is defined as the furnishing, placing and compacting of specified materials on the trench foundation so as to uniformly support the barrel of the pipe. The total bedding depth shall be as shown on the Contract Drawings.
- E. Pipe Zone - Pipe zone is defined as the furnishing, placing and compacting of specified materials for the full width of the trench and extending from the top of the bedding to a level above the top outside surface of the barrel of the pipe as shown on the Contract Drawings.
- F. Trench Backfill - Trench backfill is defined as the furnishing, placing and compacting of material in the trench extending from the top of the pipe zone to the bottom of pavement base, ground surface or surface material. Plans generally show locations for each type of backfill class.
- G. Drain Rock - Drain rock is defined as the furnishing, placing and compacting of specified free draining material for the full width of the drain trench (perforated pipe drains) and extending to a level as specified above the top outside surface of the pipe barrel.

1.04 REFERENCES

- A. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012. ASTM D698-12e2.
- B. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2015. ASTM D6938-15.
- C. Oregon Standard Specifications (OSS) - The Oregon Department of Transportation, ODOT/APWA Oregon Chapter Standard Specifications for Construction; 2021 Edition.

1.05 SUBMITTALS

- A. See Section 01 7800 Closeout Submittals for Shop Drawings, Product Data, Samples for submittal procedures.
- B. Samples: 10 lb sample of each type of fill; submit in air-tight containers to testing laboratory. Submit at least 2 weeks in advance of use.
- C. Materials Sources: Submit name of imported materials source.
- D. Compaction Density Test Reports.
- E. Drawings, data, methods and use plans for shoring and bracing.
- F. Drawings, data, method and use plans for bypass pumping and dewatering.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where designated.
 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 2. Prevent contamination. Maintain stockpiles neat and orderly.

3. Access to all fire hydrants, water valves and meters, manholes, and other equipment and valves shall be maintained. Stockpiles shall not be permitted to block any stormwater drainage ditches, gutters, drain inlets, culverts or natural water courses.
4. Protect stockpiled material which is to be later incorporated into the work so that excessive wetting or drying of the material does not occur. Material shall be brought to near optimum moisture content prior to placement and compaction. Depending on the moisture content of stockpiled materials, necessary processing may include aeration, mixing and/or wetting. No additional payment will be allowed for protecting or preparing native backfill materials.
5. If approved native materials become unsuitable (too wet or mixed with unsuitable materials) due to negligence by the Contractor, then imported granular materials may be required for backfilling at the subject location at no additional cost to the Owner.
6. Comply with all requirements of the 1200-C Construction Stormwater Permit (if applicable).
7. Protect stockpiles from erosion and deterioration of materials. Provide necessary protection so that silt-laden runoff does not occur and to prevent wind blown dust. Grade to prevent surface water from ponding on stockpiles.
8. Remove promptly any materials no longer needed at Site. Clean storage and stockpile areas when complete to a condition equal to or better than previous.

PART 2 - PRODUCTS

2.01 TRENCH FILL MATERIALS

- A. Trench Foundation - the trench foundation shall be undisturbed native material when suitable. Where ground water or other unstable conditions exist and the native material cannot properly support the pipe, additional excavation may be required. The trench shall be stabilized with foundation stabilization material when such conditions are present in the opinion of the engineer.
- B. Foundation Stabilization - Foundation Stabilization: 2½"-0, 2"-0, or 1½"-0 dense graded aggregate base rock meeting OSS Sections 00641 and 02630. Required when native trench foundation material contains groundwater, or is unsuitable to provide a firm foundation in the opinion of the Engineer.
- C. Pipe Bedding - Material for pipe bedding shall be clean, hard, sound, durable, well-graded, ¾"-0 or 1"-0 crushed rock, free from organic matter meeting OSS Section 02630.10.
- D. Pipe Zone - Material for pipe zone shall be the same material used for bedding.
- E. Trench Backfill
 1. Class "A" Backfill: Native or common excavated material, free from organic or other deleterious material, free from rock larger than 2-inches, and which meets the characteristics required for the specific surface loading or other criteria of the backfill zone in the opinion of the Engineer. If stockpiled material becomes saturated or unsuitable, Class B Backfill shall be substituted. Engineer must approve material prior to use.
 2. Class "B" Backfill: 1"-0 or ¾"-0 dense-graded aggregate meeting OSS Section 02630.10.
 3. Class "C" Backfill: Clean, well-graded sand.
 4. Class "E" Backfill (CLSM or CDF): Controlled Low-Strength Material (cement slurry) conforming to OSS Section 00442.
 - a. Slurry shall consist of a highly flowable lean concrete mix; mixture of Portland cement, fly ash, fine aggregates, water and admixtures as required for a mixture that results in a hardened, dense, non-settling, hand excavatable fill.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify proper approved plans are in place for shoring, bypass pumping, dewatering, traffic control, etc.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Clearing & Grubbing and removal of obstructions to be completed prior to excavation.
- C. Incidental to excavation shall be the furnishing, installing and removal of all shoring, sheeting, bracing and pumping equipment as required to support adjacent earth banks and structures, keep excavations free from water, and to provide for the safety of the public and all personnel working in excavations.
- D. Locate, identify, and protect utilities that remain and protect from damage.
- E. Saw-cut existing pavements where required to proper limits in clean and straight lines as required.
- F. Notify utility company for new services and/or removal and relocation of existing utility connections.
- G. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, curbs, and service connections to remain from excavating equipment and vehicular traffic.
- H. Protect plants, lawns, rock outcroppings, and other features to remain.
- I. Coordinate and provide all utility locates prior to any excavation as required by local, state and federal laws and regulations. When the precise location of subsurface structures and/or utilities is unknown, locate such items by hand excavation prior to utilizing mechanical excavation equipment. Use hand excavation when mechanical equipment might damage existing improvements which are to remain undisturbed. See Division 1 for other requirements.

3.03 TRENCHING

- A. Notify Architect or Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

- G. Remove, haul, and dispose of all formations and materials, natural or man-made, irrespective of nature or conditions encountered, within lines and grades shown on the Plans or defined herein, and as necessary for completion of the proposed improvements. The method of excavation shall be as determined by the Contractor, and as required for special protection of existing improvements. Special care shall be taken to avoid overexcavation below subgrades. Store and protect materials suitable for use as backfill where applicable.
- H. Remove excavated material that is unsuitable for re-use from site.
- I. Remove excess excavated material from site.
- J. Excavate to the lines and grades shown on the project Plans, allowing for forms, shoring, working space and bedding. Provide a minimum clearance around pipe barrel in all directions or greater in accordance with the standard trench detail drawing.
- K. Shoring and Bracing
 1. Sheet and brace excavation as necessary to prevent caving and to protect adjacent structures, property, workers and the public.
 2. The design, planning, installation and removal of all sheeting, shoring, sheet piling, lagging and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soil below and adjacent to the excavation.
 3. Horizontal strutting below the barrel of a pipe and the use of pipe as support are not acceptable.
 4. All sheeting, shoring and bracing shall conform to safety requirements of OSHA and other Federal, State and local agencies.

3.04 PREPARATION FOR UTILITY PLACEMENT

- A. Compact subgrade to density equal to or greater than requirements for subsequent fill material. Over-excavate and place Foundation Stabilization material where necessary or directed.
- B. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.
- C. When, in the opinion of the Engineer, the trench foundation materials are not suitable for the support of the pipe, soft soils shall be removed and Foundation Stabilization materials, as specified, shall be placed and compacted in lifts not exceeding 6-inches in compacted thickness to the required grade. Each lift shall be compacted to at least 95% of the maximum dry density in accordance with ASTM D698.

3.05 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials. Fill up to subgrade elevations unless otherwise indicated. Employ a placement method that does not disturb or damage other work. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- B. Maintain optimum moisture content of fill materials to attain required compaction density. Before placing the material, condition, aerate, or wet the material so that the moisture content of each layer is within minus 4% to plus 2% of optimum moisture content.
- C. Place and compact pipe bedding material before placing pipe in the trench. Dig depression for pipe bells to provide uniform bearing along the entire pipe length. Place and compact bedding material in even lifts not exceeding 6-inches in depth until the required depth is obtained. Thoroughly compact each lift of bedding material to at least 95% of the maximum dry density in accordance with ASTM D698.

- D. Place materials in the pipe zone, in layers not exceeding 6-inches thick, in a manner that equalizes the pressure on the pipe and minimizes stress. As required under the haunches of pipe and areas not accessible to mechanical tampers or to testing, compact with hand methods to ensure thorough contact between the material and the pipe. Thoroughly compact.
- E. Backfill the trench above the pipe zone in successive lifts not exceeding 9-inches in loose thickness. Do not allow the backfill to free-fall into the trench until at least 3 feet of cover is provided over the top of the pipe. Each lift shall be compacted, using suitable mechanical or pneumatic equipment, to a minimum of 95% of the maximum dry density as determined by ASTM D698. If the specified compaction is not obtained, the Contractor may be required to use a modified compaction procedure and/or reduce the thickness of lifts. If approved materials meeting the specifications cannot be compacted to the required density regardless of compactive effort or method, the Engineer may reduce the required density or direct that alternate materials be used. In no case shall excavation and pipe laying operations proceed until the Contractor is able to compact the backfill to the satisfaction of the Engineer.
- F. CLSM. When CLSM Backfill is required, backfill above pipe zone with CLSM material. If the CLSM is to be used as a temporary surfacing, backfill to top of the trench and strike off to provide a smooth surface. If CLSM is not to be used as a temporary surface, backfill to bottom of the proposed resurfacing. Use steel plates to protect the CLSM from traffic a minimum of 24 hours.
- G. When backfilling is complete; the Contractor shall finish the surface area as specified. In paved or graveled areas, the Contractor shall maintain the surface of the trench backfill level with
- H. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Use specified Foundation Material, compacted to minimum 95 percent of maximum dry density.
- I. Reshape and re-compact fills subjected to vehicular traffic.

3.06 FIELD QUALITY CONTROL

- A. Perform compaction density testing on compacted fill in accordance with ASTM D6938.
- B. See Section 01-4000 for quality requirements.

END OF SECTION

**SECTION 31-2316
EXCAVATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavating for building volume below grade, footings, slabs-on-grade, and utilities within the building.
- B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

- A. Section 31-2200 - Grading: Grading.
- B. Section 31-2323 - Fill: Fill materials, backfilling, and compacting.

1.03 PROJECT CONDITIONS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.
 - 1. Resurvey benchmarks during installation of excavation support and protection systems and notify Owner if any changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31-2200 for topsoil removal.
- C. Locate, identify, and protect utilities that remain and protect from damage.
- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
- B. Building Foundation Excavation:
 - 1. Excavate for the footings using a hoe equipped with a smooth-edged bucket. The excavation depth should accommodate a minimum of 6 inches of compacted Select Fill beneath the footings, or as required in Section 31-2323 FILL. The fill should extend at least 6 inches beyond the edges of all footings.
 - 2. Overexcavation will be required for footing excavations terminating in soft material, clay or unsuitable fill. The finished footing excavations should be observed by Architect to confirm the foundation soils and determine if any additional excavation is required.
- C. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- D. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- E. Cut utility trenches wide enough to allow inspection of installed utilities.
- F. Hand trim excavations. Remove loose matter.
- G. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31-2323.
- H. Provide temporary means and methods, as required, to remove all water from excavations until directed by Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- I. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect. If the proposed excavation extends more than 1 foot into the excavation, control groundwater intrusion with a comprehensive dewatering procedures.
- J. Remove excavated material that is unsuitable for re-use from site.
- K. Stockpile excavated material to be re-used in area designated on site.
- L. Remove excess excavated material from site.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.05 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

BLANK PAGE

**SECTION 31-2319
DEWATERING**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Controlling surface water runoff, dewatering pipeline trenches and structural excavations and other elements required for control of water if work conditions should dictate the need.

1.02 RELATED SECTIONS

- A. Section 31-4100 - Shoring.
- B. Section 31-2323 - Fill.
- C. Section 31-2316 - Excavation
- D. Section 31-2316.13 - Trenching

1.03 SUBMITTAL

- A. Prior to commencing excavation, the Contractor shall submit a statement of the method, installation and details of proposed dewatering system to Engineer. The statement shall also include disposal.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials and equipment required for control of water shall be furnished and maintained as required to perform the construction.

PART 3 - EXECUTION

3.01 GENERAL

- A. The necessary machinery, appliances and equipment shall be provided and operated to keep excavations free from water during construction, and to dispose of the water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. Sufficient pumping equipment and machinery in good working condition shall be provided for all emergencies including power outage, and sufficient workers shall be available at all times for the operation of the pumping equipment.
- B. The dewatering system shall not be shut down between shifts, on holidays or weekends or during work stoppages without written permission from the Architect.

3.02 CONTROL OF WATER

- A. Control of groundwater such that softening of the bottom of excavations, or formation of “quick” conditions or “boils” during excavation, shall be prevented. Dewatering systems shall be designed and operated so as to prevent removal of the natural soils. Natural or compacted soils softened by saturation with groundwater or standing surface water shall be removed and replaced as instructed by the Engineer at no additional expense to the Owner.
- B. During construction of structures, installation of pipelines, placing of structure and trench backfill and the placing and setting of concrete, excavations shall be kept free of water. Surface runoff shall be controlled so as to prevent entry or collection of water in excavations. The static water level shall be drawn a minimum of one foot below the bottom of the excavation, except two feet below the bottom of excavations for structures, so as to maintain the undisturbed state of the foundation soils and allow the placement of fill or backfill to the required density. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.
- C. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures and pipelines. Underdrain systems and hydrostatic relief valves shall be operational prior to release of groundwater.
- D. The Contractor shall not obstruct any component of the existing storm drain system but shall use proper measures to provide for the free passage of surface water.
- E. Provisions shall be made to take care of surplus water, mud, silt, or other runoff pumped from excavations and trenches or resulting from sluicing or other operations. Siltation of completed or partially completed structures and pipelines by surface water or by disposal of water from dewatering operations shall be cleaned up at the Contractor’s expense.
- F. Discharge of ground and surface runoff water shall be to the existing drainage ways and storm systems. Contractor shall comply with all applicable federal, state and local laws and regulations pertaining to erosion control and discharge of water off-site.
- G. The Contractor shall be responsible for any damages to existing on- and off-site facilities and work in-place resulting from mechanical or electrical failure of the dewatering system.
- H. Pumping of native silts and sands shall be avoided.

END OF SECTION

**SECTION 31-2323
FILL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for curbs, footing subgrades, building volume below grade, footings, slabs-on-grade, paving, site structures, utilities within the building, and sidewalks.
- B. Top soil filling in lawn and planter areas.
- C. Backfilling and compacting for utility trenches shall be as specified in 31 2316.13 - Trenching.
- D. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.
- E. Filling with Cobble Stone at drainage swales.

1.02 RELATED REQUIREMENTS

- A. Section 01-5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- B. Section 31-2200 - Grading: Site grading.
- C. Section 31-2316 - Excavation: Removal and handling of soil to be re-used.
- D. Section 31 2316.13 - Trenching: Excavating and Fill for utility trenches .
- E. Section 31-2319 - Dewatering.
- F. Section 32-1123 - Aggregate Base Course.
- G. Section 32-1313 - Concrete Paving.

1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS

- A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates 2019.
- B. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method 2015, with Editorial Revision (2016).
- C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)) 2012 (Reapproved 2021).
- D. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method 2015.
- E. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

- F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth) 2017a, with Editorial Revision (2021).

1.05 SUBMITTALS

- A. See Section 01 7000 - Shop Drawings, Product Data, Samples for submittal procedures.
- B. Soil Samples: 10 pounds sample of each type of fill; submit in air-tight containers to testing laboratory.
- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- E. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. General Fill- Fill Type Class A: Use native or common material excavated from within limits of the project, free from vegetation and other detrimental material and containing no frozen ground. Maximum particle size shall be 3 inches. Architect will make approval prior to placement. Compact to at least 95 percent of the maximum dry density, as determined by ASTM D 698.
- B. Granular Fill- Fill Type Class B: Use high quality, dense-grade, 1"-0 crushed rock, with less than 5 percent passing the U.S. Standard No. 200 sieve, compact to at least 98 percent of the maximum dry density, as determined by ASTM D698.
- C. Structural Fill: Use high quality, clean, dense-grade **1"-0** crushed rock conforming to Section 02630 of ODOT/APWA 2018 Oregon Standard Specifications for Construction. Compact to at least 95 percent of the maximum dry density, as determined by ASTM D1557.
- D. Sand- Fill Type Class C: Clean sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
 - 1. Graded in accordance with ASTM C136/C136M; within the following limits:
 - a. No. 200 sieve: Less than 5 percent passing.
- E. Drainrock Fill - Fill Type Class D: Use granular permeable material; coarse, clean, free drain open graded 1 inch to 2 inch minus crushed rock containing no fines or round rock, less than 2 percent passing the #200 sieve.
- F. Fill Type Class E

1. Use controlled low strength material (CLSM), a highly flowable lean concrete mix; a mixture of fly ash, Portland cement, fine aggregates and water which results in a harden, dense, non-settling fill and is excavatable. CLSM shall conform to Section 004420 of the ODOT/APWA 2018 Standard Specification for Construction.
- G. Topsoil- Fill Type Class F: Friable loam, imported borrow.
1. Graded.
 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
 3. Soil analysis shall be performed to determine the following:
 - a. Soil PH
 - b. Soluble Salts
 - c. Excess Carbonate
 - d. Organic Matter
 - e. Nutrient readings for:
 - 1) Nitrogen, Phosphorus, Potassium
 - 2) Magnesium, Calcium, Sodium, Manganese, Sulfur, Zinc, Copper, Iron, Boron
 - f. Cation Exchange Capacity
 - g. Percent Based Saturation Sodium
 - h. Tests shall include analysis and interpretation of results. Soil testing methods shall be compliant with recognized agronomic testing standards for revegetation of disturbed sites.
 - i. Soil analysis shall determine if material meets ASTM D5268 requirements.
- H. Compost Fill: Shall be the result of the biological degradation and transformation of plant-derived materials under conditions designed to promote aerobic decomposition. The material shall be well composted, free of viable weed seeds, and stable with regard to oxygen consumptions and carbon dioxide generation. The compost shall have no visible free water and produce no dust when handled. It shall meet the following criteria:
1. 100 percent passing thru 1/2 inch screen.
 2. pH shall between 6 and 8.
 3. Manufactured inert material (plastic, concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight.
 4. Organic matter content shall be between 35 and 65 percent.
 5. Soluble salt content shall be less than 6.0 mmhos/cm.
 6. Germination (an indicator of maturity) shall be greater than 80%.
 7. Submittal Requirements: Two 5 gallon buckets of the blended material for approval prior to installation.
- I. Bioinfiltration Treatment Soil Mix - Fill Type Class G: Blend of Compost Fill (30

2.02 ACCESSORIES

- A. Separation Geotextile Fabric: Non-biodegradable, **non-woven, permeable stabilization fabric, 5 oz/yd weight minimum.**
1. Mean Average Roll Value (MARV) strength properties meeting the requirements of an AASHTO M 288-17 Class 2 geotextile.
 2. Flow Rate (ASTM D4491): 110 gpm/sf.
 3. Permittivity greater than 0.1 sec-1. The permittivity is required to reduce the risk of subgrade pumping during wet weather.
 4. Apparent opening size (AOS): 0.6 mm (max average roll value).
 5. Grab Strength (ASTM D 4632): 200 lbs minimum.
 6. Grab Elongation (ASTM D 4632): 50 percent.
- B. Geotextile Filter Fabric: Same as above.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the Work are as indicated.
- B. Identify required lines, levels, contours, and datum locations.
- C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.
- D. Verify structural ability of unsupported walls to support imposed loads by the fill.
- E. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

- A. Scarify, compact and proof roll subgrade surface to a depth of 6 inches to identify soft spots. Proof roll in the presence of the Architect. Do not place any fill in the building zone until proof rolling has been performed and observed by the Architect.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type B or Structural Fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, place 4 inches of compacted granular structural backfill over footing subgrades to protect the footing subgrades from foot traffic and the elements. Maintain excavations and prevent loose soil from falling into excavation.

3.03 SEPARATION GEOTEXILE FABRIC

- A. Place the Separation Geotextile over the approved subgrade prior to placing Select Fill. The geotextile should be laid smooth, without wrinkles or folds, in the direction of construction traffic. Overlap adjacent rolls a minimum of 2 feet. Pin fabric overlaps or place the Select Fill in a manner that will not separate the overlap during construction. Seams that have separated will require removal of the Select Fill to establish the required overlap.

3.04 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

- H. Correct areas that are over-excavated.
 1. Load-bearing foundation surfaces: Use structural fill, flush to required elevation, compacted to 98 percent of maximum dry density.
 2. Other areas: Use Fill Type B, flush to required elevation, compacted to minimum 98 percent of maximum dry density.
- I. Reshape and re-compact fills subjected to vehicular traffic.
- J. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.05 FILL AT SPECIFIC LOCATIONS

- A. Use **general granular Fill (Type B)** unless otherwise specified or indicated.
- B. Structural Fill at Building pads, under foundation:
 1. Use structural fill.
 2. Fill up to subgrade elevations as noted per Drawings.
 3. Maximum depth per lift: 8 inches, compacted.
 4. Minimum thickness: No minimum thickness required as the foundation is pile supported and structural fill not required for foundation support/base. However a gravel working pad is recommended for wet weather construction.
 5. Compact to minimum 95 percent of maximum dry density per ASTM D 698.
- C. Structural Fill at Foundation:
 1. See note above regarding proof rolling preparation.
 2. Use structural fill.
 3. Fill up to subgrade elevations.
 4. Minimum thickness: 8 inches under footings, and 8 inches beyond the edges of all footings.
 5. Compact to minimum 95 percent of maximum dry density per ASTM D 698.
- D. Structural Fill at Slab-on-Grade:
 1. Use Structural Fill.
 2. Fill up to subgrade elevations.
 3. Maximum depth per lift: 8 inches, compacted.
 4. Minimum thickness: 8 inches.
 5. Compact to minimum 95 percent of maximum dry density per ASTM D1557.
- E. Structural Fill at overexcavated areas:
 1. Use Structural Fill.
 2. Maximum depth per lift: 8 inches, compacted.
 3. Compact to minimum 100 percent of maximum dry density per ASTM D1557.
 4. Locations:
 - a. At fill sections areas below the specified fill thicknesses required above.
 - b. At overexcavated areas as needed upon proofrolling per Preparation above, and Excavation: Section 31-2316.
- F. At Foundation Walls:
 1. Use Fill Type C (drainrock), B (free draining aggregate, and A. Refer to Detail Drawings for location and placement.
 2. Do not backfill against unsupported foundation walls.
- G. Over Subdrainage Piping at drainage areas as shown in drawings - behind retaining walls:

1. Drainage fill, Fill Type Class D and geotextile fabric.
2. Cover drainage fill with Fill Type Class F.
3. Fill up to subgrade elevation as shown in drawings.
4. Compact to 95 percent of maximum dry density.

H. At Lawn Areas:

1. Use Top Soil Fill Type Class F with blended 50% Compost Fill.
2. Depth: Areas to be Seeded with Grass: 6 inches.
3. Depth: Areas to be Sodded: 4 inches.
4. Compact to [65] percent of maximum dry density.

I. At Shrub Areas :

1. Use Fill Type Class F, with blended 50% Compost Fill.
2. Depth: 18 inches minimum or as noted on Drawings.
3. Compact to 65 percent of maximum dry density.
4. See Section 31-2200 for topsoil placement.

J. At All Other Planting Areas:

1. Use Fill Type Class F, with blended 50% Compost Fill.
2. Depth: 4 inches.
3. Compact to 65 percent of maximum dry density.

3.06 TOLERANCES

- A. Top Surface of General Filling: Plus or minus 1/2 inch from required elevations.
- B. Top Surface of Filling Under Paved Areas: Plus or minus 1/4 inch from required elevations.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4500 - Quality Control, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.
- C. When using the nuclear method of ASTM D6938, the gauge shall be field calibrated according to ASTM standards.
- D. For general fill, Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 ("standard Proctor").
- E. For "Structural Fill" evaluate results in relation to compaction curve determined in accordance with ASTM D1557 ("modified proctor").
- F. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- G. Frequency of Tests: For structural fill, tests shall be taken each day of production.

3.08 CLEANING

- A. See Section 01 7400 - Cleaning for construction waste management and disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

BLANK PAGE

**SECTION 32-1313
CONCRETE PAVING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks, extruded curbs and concrete ramps, stair steps, extruded curbs and concrete ramps, integral curbs, extruded curbs and concrete ramps, and extruded curbs and concrete ramps.

1.02 RELATED REQUIREMENTS

- A. Section 03-1000 - Concrete Forming and Accessories.
- B. Section 03-3000 - Cast-in-Place Concrete.
- C. Section 31-2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- D. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide 2022.
- B. ACI 301 - Specifications for Concrete Construction 2020.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- E. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2022a.
- G. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- H. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- I. ASTM D1752 - Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction 2018.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES

- A. Comply with applicable requirements of ACI 301.

- B. Concrete Sidewalks and Median Barrier: 3,000 psi 28 day concrete, 4 inches thick, Portland cement, exposed aggregate finish.

2.02 FORM MATERIALS

- A. Form Materials: As specified in Section 03-1000, conform to ACI 301.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
 - 1. Thickness: 1/2 inch.

2.03 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 80 (80,000 psi) yield strength; deformed billet steel bars; unfinished.

2.04 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03-3000.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Concrete Properties:
 - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3000 psi.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
 - 4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.
 - 5. Water-Cement Ratio: Maximum 40 percent by weight.
 - 6. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
 - 7. Maximum Slump: 4 inches.
 - 8. Maximum Aggregate Size: 1-1/2 inch.

2.06 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. See Section 32-1123 for construction of base course for work of this Section.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement at midheight of slabs-on-grade.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

3.07 EXTRUDED CURBS

- A. The pavement shall be dry and cleansed of loose or deleterious Materials prior to curb placement.
- B. Extruded cement concrete curb shall be placed, shaped and compacted true to line and grade with an approved extrusion machine. The extrusion machine shall be capable of shaping and thoroughly compacting the concrete to the required cross section.
- C. The cement concrete mixture shall be homogeneously mixed to conform with above when delivered to the hopper of the curb machine. Each hopper load of cement concrete shall be run through the curb laying machine, adjusted properly to form and compact the cement mix for the concrete curb.

- D. Joints in the extruded cement concrete curb shall be spaced at 15-foot intervals or shall match existing transverse joints or cracks in existing pavement. Joints shall be cut vertically.

3.08 JOINTS

- A. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
- B. Provide scored joints.
 - 1. At 3 feet intervals, unless shown otherwise.
 - 2. Between sidewalks and curbs.

3.09 FINISHING

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Median Barrier: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

3.11 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

**SECTION 32-3113
CHAIN LINK FENCES AND GATES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wire fabric.
- B. Concrete.
- C. Manual swinging gates with related hardware.
- D. Rolling Gates.
- E. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03-3000 - Cast-in-Place Concrete: Concrete anchorage for posts.
- B. 08-7100 - Hardware Schedule: Locksets for gate hardware.

1.03 REFERENCE STANDARDS

- A. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric 2011a (Reapproved 2022).
- B. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- C. ASTM F567 - Standard Practice for Installation of Chain-Link Fence 2014a (Reapproved 2019).
- D. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework 2018 (Reapproved 2022).
- E. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures 2018 (Reapproved 2022).
- F. CLFMI WLG 2445 - Wind Load Guide for the Selection of Line Post and Line Post Spacing 2018.
- G. FS RR-F-191/1D - Fencing, Wire and Post Metal (Chain-Link Fence Fabric) 1990.

1.04 SUBMITTALS

- A. See Section 01-3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

PART 2 PRODUCTS

2.01 COMPONENTS

- A. Gate Posts: 3-1/2 inch diameter.
- B. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- C. Bottom Rail: 1.66 inch diameter, plain end, sleeve coupled.
- D. Gate Frame: 1.66 inch diameter for welded fabrication.
- E. Fabric: 2 inch diamond mesh interwoven wire, 6 gauge, 0.1920 inch thick, top selvage knuckle end closed, bottom selvage twisted tight.
- F. Tension Wire: 6 gauge, 0.1920 inch thick steel, single strand.
- G. ASTM A1011/A1011M, Designation SS; hot-rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi; zinc coating complying with ASTM F1043 and ASTM F1083.
- H. Terminal, Corner, Rail, Brace, and Gate Posts: Type I round in accordance with FS RR-F-191/1D.
 - 1. ASTM A392 zinc coated steel chain link fabric.
- I. Concrete: ASTM C 94/C 94M, ready-mixed; Normal portland Cement, 3000 psi strength at 28 days, 3 inch slump; 3/4 inch nominal sized coarse aggregate.

2.02 COMPONENTS

- A. Line Posts: 2.38 inch diameter.
- B. Corner and Terminal Posts: 2.88 inch diameter.
- C. Gate Posts: 3-1/2 inch diameter.
- D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.66 inch diameter for welded fabrication.
- F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage, 0.1144 inch thick, top selvage twisted tight, bottom selvage twisted tight.
- G. Tension Wire: 6 gage, 0.1920 inch thick steel, single strand.
- H. Tension Band: 14 inches on center spacing at posts.
- I. Tie Wire: steel wire.

2.03 MANUAL GATES AND RELATED HARDWARE

- A. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position. Weld latch to post, with cold galvanize coating.
 - 1. Location and Quantity: See Drawings.
 - a. Provide (2) two gates, 4'-0" wide.
 - b. Location: See Drawings.

- B. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position. Weld latch to post, with cold galvanize coating.
 - 1. Location and Quantity:
 - a. Provide (3) three, 6'-0" wide.
 - 1) Provide LockeyUSA GB900 Gate Box, or similar, for receiving door lockset hardware, aluminum, 7 inch x 1 3/4 inch.
 - 2) Provide LockeyUSA strikeplate, per each lockset.
 - 3) Provide (2) gate closer, (1) per leaf, LockeyUSA TB950 Magnum Gate Closer and mounting hardware, or similar. Or SUMO SSC stainless steel safeclose self-closing gate hinges.
 - 4) Provide (2) hold open, (1) per leaf, LockeyUSA
 - b. Provide (1) one, 10'-0" wide.
 - c. Location: See Drawings

2.04 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

2.05 FINISHES

- A. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.
- B. Accessories: Same finish as framing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.02 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with ASTM F567.
- B. Place fabric on outside of posts and rails.
- C. Set intermediate posts plumb, in concrete footings with top of footing 2 inches above finish grade. Slope top of concrete for water runoff.
- D. Line Post Footing Depth Below Finish Grade: ASTM F567.

- E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.
- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- H. Install center brace rail on corner gate leaves.
- I. Do not stretch fabric until concrete foundation has cured 28 days.
- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 2 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire stretched taut between terminal posts.
- O. Install support arms sloped outward and attach barbed wire; tension and secure.
- P. Do not attach the hinged side of gate to building wall; provide gate posts.
- Q. Install hardware and gate with fabric to match fence.
- R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.03 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Position: 1 inch.
- C. Do not infringe on adjacent property lines.

3.04 CLEANING

- A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.
- B. Clean fence with mild household detergent and clean water rinse well.

END OF SECTION

**SECTION 33-4113
STORM DRAIN PIPE AND FITTINGS**

PART 1 GENERAL

1.01 SUMMARY

- A. This item shall include furnishing and installing the storm drain pipe and fittings as identified on the Drawings.
- B. The Contractor shall provide manufacturer's certifications, including test results for all piping, fittings and appurtenances supplied. All submittals shall be in conformance with the requirements of Section 01300.
- C. All work shall conform to the latest version of the Oregon Standard Specifications (OSS) Part 00400, except as specified herein and shown on the Plans.

1.02 RELATED REQUIREMENTS

- A. Section 31-2316 - Excavation: Excavating of trenches.
- B. Section 31-2316.13 - Trenching: Excavating, bedding, and backfilling.
- C. Section 31-2323 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS

- A. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds; 2011.
- B. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2012.
- C. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2011.
- D. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
- E. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2008.
- F. ASTM D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- G. ASTM F1417 - Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air; 2011a
- H. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- I. Oregon Standard Specifications (OSS) – The Oregon Department of Transportation, ODOT/APWA Oregon Chapter Standard Specifications for Construction; 2008.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

- A. All pipe, fittings and appurtenances shall be new and unused.
- B. PVC Storm Drain Pipe (4" through 15")
 - 1. Storm drain pipe shall be PVC meeting ASTM D3034, SDR 35
 - 2. Pipe compound shall meet ASTM D1784 Cell Class 12454 or 12364.
 - 3. Pipe shall be formed with integral bell joints meeting ASTM D3212 with rubber gaskets meeting ASTM F477.
 - 4. PVC fittings shall be provided as required including tee-wyes, wyes, elbows, caps, plugs, couplings, etc. Fittings shall be as manufactured by the pipe manufacturer or as approved by the pipe manufacturer. Fittings shall have same gasketed bell and spigot design as the pipe.
 - 5. Pipe and fittings shall be Ring-Tite PVC Gravity Sewer Pipe and Fittings as manufactured by JM Eagle; or approved equal.
- C. PVC Roof Drain Piping
 - 1. Roof drain pipe and fittings shall be Schedule 40 PVC, ASTM D2665 and ASTM D1785, Drain, Waste, and Vent (DWV) pipe.
 - 2. Solvent weld Schedule 40 fittings as required. Utilize primer and glue as recommended by manufacturer.

2.02 MISCELLANEOUS MATERIALS

- A. Concrete shall conform to Oregon Standard Specifications Section 00440, Commercial Grade Concrete. Compressive field strength shall not be less than 3,000 psi at 28 days. Maximum aggregate size shall be 1½-inches. Slump shall be between 2 and 4 inches.
- B. Non-Shrink Grout. Grout shall be Sika 212, Euco N-S, Five Star, or approved equal nonmetallic cementitious commercial grout exhibiting zero shrinkage per ASTM C827. Grout shall not be amended with cement or sand and shall not be reconditioned with water after initial mixing. Nonshrink grout shall be placed and packed only with the use of an approved commercial bonding agent. Unused grout shall be discarded after 20 minutes.
- C. Tracer Wire. Provide detectable tracer wire along all non-metallic water pipes.
 - 1.
 - 2. Insulation for tracer wire shall be 0.030-inch thick HDPE designed for direct bury.
 - 3. Insulation shall be green in color.
 - 4. Wire shall be placed along pipe and taped every 5 feet with a small amount of slack to keep the wire straight along the pipe.
- D. Warning Tape. Provide warning tape in trench over all installed pipelines.
 - 1.
 - 2. Warning tape shall be placed over the pipe zone material, approximately 15 to 18 inches below finish grade. Lay tape flat and untwisted, centered over pipe with wording facing upwards.
- E. Stone Embankment and Slope Stabilization Material shall consists of a 6"-0 or greater material meeting the requirements of ODOT SS 00330.15, Selected Stone Backfill and Embankment. Engineer must approve material prior to use.

PART 3 EXECUTION

3.01 PIPE INSTALLATION

- A. All pipe and fittings shall be installed in accordance with the manufacturer's recommendations and APWA standards.
- B. Comply with Sections on Trenching, Shoring and Dewatering.
- C. Provide stone embankment and slope stabilization material where shown and as indicated on the plans at the discharge end of storm drain pipes.
 - 1. Preparation for placement of material shall include the removal of any brush, trees, stumps and other organic material from slope to be protected by embankment material. Construct key at bottom of slope to provide base for placement of embankment material.
 - 2. Embankment material shall be placed to its full course in one operation. Do not use methods of placement that shall cause displacement or segregation of underlying materials.
 - 3. The face of the embankment placement shall be uniform and free from humps or depressions and with no excessively large cavities below.
 - 4. Maintain the embankment placement until accepted. Replace any material displaced by any cause at no additional cost to the Owner.

3.02 LOW-PRESSURE AIR TESTING OF STORM DRAIN PIPE SYSTEMS

- A. Test in accordance with ASTM F1417 as specified in Section 33-3113 - Sanitary Utility Sewerage Piping.

3.03 HYDROSTATIC TESTING OF DWV PIPE

- A. The entire DWV piping system shall be filled with water to the highest point. At least ten (10) feet of head shall be placed on every section except the uppermost 10 feet of the piping system. Water shall be held for at least 15 minutes. All leakage shall be corrected. Comply with the Oregon Plumbing Specialty Code, 2011.

3.04 DEFLECTION TESTING FOR PVC STORM DRAIN PIPE

- A. In addition to hydrostatic testing, the contractor shall conduct deflection tests of storm sewers constructed of flexible pipe. Testing will consist of pulling an approved mandrel through the completed pipeline after backfill and compaction to finish grade is complete. Testing shall be conducted in the presence of the Engineer.
- B. Diameter of the mandrel shall be at least 95% of the pipe internal diameter. Mandrel shall have at least 6 vanes.
- C. Testing shall be done from manhole to manhole. Pipe shall be thoroughly cleaned and flushed prior to pulling the mandrel. Mandrel shall pass smoothly through the pipe without excessive effort.
- D. Testing shall be conducted only after at least 30 days have elapsed after backfill and compaction was completed.

END OF SECTION